MAPPING REPORT ON PROPOSED WATER CLUSTER IN CINCINNATI REGION

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Executive Summary

Important Highlights

- The Cincinnati region has a significant contribution towards patenting and publishing activities in the drinking water, waste water, and storm water areas.
- Procter and Gamble holds key positions in both drinking water and waste water patenting activities for the Cincinnati region.
- Procter and Gamble holds one of the most highly cited patents in drinking water. This patent is for a "Microorganism filter and method for removing microorganism from water (May 20, 2003)." The filter, both filter-mounted and pour-through varieties, includes a reactive surface with a polymer coating to attract microorganisms.
- Shell Oil in Houston, TX, holds several highly cited patents in waste water. Each of the eight patents involve in situ thermal processing of hydrocarbon formations.
- EPA is involved in many highly cited papers for the Cincinnati region in both drinking water and waste water.
    - Seven of the 10 most cited drinking water papers from the Cincinnati region were co-authored by EPA and include the following topics: pervaporation for product recovery, sources of pathogenic microorganisms, indicators of recreational water quality, extraction of arsenic from rice, formation of lead oxides, lead exposure in children, and persistence of nontuberculous mycobacteria.
    - Five of the 10 most cited waste water papers from the Cincinnati region were co-authored by EPA and include the following topics: urban stream syndrome, fish exposure to synthetic estrogen, indicators of human fecal material, sources of pathogenic microorganisms, and urban contributions of glyphosate.
- EPA is a co-author on the most highly cited paper in storm water. Dr. Allison Roy is a co-author on the paper "The Urban Stream Syndrome: Current Knowledge and the Search for a Cure" in Journal of the North American Benthological Society (September 2005). The paper reviews literature to describe "urban stream syndrome" (the consistently observed ecological degradation of streams draining urban land), explores mechanisms driving the syndrome, and identifies appropriate goals and methods for ecological restoration of urban streams.

October 20 Stakeholder Meeting

Search Methodology

The number of drinking water, waste water, and storm water patents were calculated for a region representing an approximately 100-mile (160-km) radius of the following target cities: Cincinnati, Atlanta, Milwaukee, Seattle, Philadelphia, Washington, D.C., Denver, and Los Angeles. A list of the cities that were included within the 100-mile radius of each target city is included on pp. 6-8.

The United States Patent and Trademark database was searched for the period of 1976 to 2010 using the following terms:

> "Drinking Water"
> "Wastewater" or "Waste Water"
> "Stormwater" or "Storm Water" or "Wet-Weather Flow"

The term "Watershed Management" did not yield enough patents to plot them.

Maps showing the number of patents within a 100-mile radius of each of the target cities and a breakout of the patents in the major cities around the Cincinnati regional area are shown on pp. 9-14.

After determining the number of patents in a 100-mile radius of the target cites, the ISI Web of Science was searched to obtain estimates of the number of scientific publications in the areas of drinking water, waste water, and storm water for the period of 2005-2010. When searching the ISI Web of Science, only the target cities, not the cities within a 100-mile radius, were searched.

For drinking water, the following terms were searched: ***drinking water***, followed by ***treatment***, and then ***distribution.*** A total of 761 articles were located.

For waste water, the following terms were searched: *"**waste water" OR wastewater***, followed by ***collection system.*** A total of 231 articles were located.

For storm water, the following terms were searched: *"**storm water" OR stormwater***, followed by ***treatment.*** A total of 332 articles were located.

Again, watershed management did not yield enough results to plot.

Maps showing the number of articles in the areas of drinking water, waste water, and storm water for each of the target cities are shown on pp. 15-17.

Cities within 100 miles of Cincinnati

U.S.A. - Ohio - Cincinnati *	Thu 11:42 AM	-	-	-	
U.S.A. - Ohio - Dayton *	Thu 11:42 AM	72 km	45 miles	39 nm	↗ NNE
U.S.A. - Kentucky - Frankfort *	Thu 11:42 AM	112 km	70 miles	60 nm	↙ SSW
U.S.A. - Kentucky - Lexington-Fayette *	Thu 11:42 AM	126 km	78 miles	68 nm	↓ S
U.S.A. - Kentucky - Louisville *	Thu 11:42 AM	155 km	96 miles	83 nm	↙ SW
U.S.A. - Indiana - Indianapolis *	Thu 11:42 AM	156 km	97 miles	84 nm	↖ WNW
U.S.A. - Ohio - Columbus *	Thu 11:42 AM	159 km	99 miles	86 nm	↗ NE

Cities within 100 miles of Atlanta

U.S.A. - Georgia - Atlanta *	Thu 11:45 AM	-	-	-	
U.S.A. - Georgia - Macon *	Thu 11:45 AM	126 km	78 miles	68 nm	↘ SE

Cities within 100 miles of Milwaukee

U.S.A. - Wisconsin - Milwaukee *	Thu 10:46 AM	-	-	-	
U.S.A. - Wisconsin - Madison *	Thu 10:46 AM	117 km	73 miles	63 nm	← W
U.S.A. - Illinois - Rockford *	Thu 10:46 AM	125 km	78 miles	68 nm	↙ SW
U.S.A. - Illinois - Chicago *	Thu 10:46 AM	135 km	84 miles	73 nm	↓ S
U.S.A. - Illinois - Aurora *	Thu 10:46 AM	145 km	90 miles	78 nm	↓ S

Cities within 100 miles of Seattle

U.S.A. - Washington - Seattle *	Thu 8:49 AM	-	-	-	
U.S.A. - Washington - Redmond *	Thu 8:49 AM	17 km	10 miles	9 nm	↗ ENE
U.S.A. - Washington - Tacoma *	Thu 8:49 AM	44 km	27 miles	23 nm	↙ SSW
U.S.A. - Washington - Olympia *	Thu 8:49 AM	79 km	49 miles	42 nm	↙ SSW
Canada - British Columbia - Victoria *	Thu 8:49 AM	115 km	72 miles	62 nm	↖ NW
Canada - British Columbia - Saanich *	Thu 8:49 AM	115 km	72 miles	62 nm	↖ NW
Canada - British Columbia - Abbotsford *	Thu 8:49 AM	157 km	97 miles	85 nm	↑ N

Cities within 100 miles of Philadelphia

U.S.A. - Pennsylvania - Philadelphia *	Thu 11:53 AM	-	-	-	
U.S.A. - New Jersey - Trenton *	Thu 11:53 AM	41 km	25 miles	22 nm	↗ NE
U.S.A. - Pennsylvania - Allentown *	Thu 11:53 AM	70 km	44 miles	38 nm	↖ NNW
U.S.A. - Delaware - Dover *	Thu 11:53 AM	98 km	61 miles	53 nm	↙ SSW
U.S.A. - New Jersey - Elizabeth *	Thu 11:53 AM	109 km	68 miles	59 nm	↗ NE
U.S.A. - New Jersey - Newark *	Thu 11:53 AM	115 km	72 miles	62 nm	↗ NE
U.S.A. - New Jersey - Jersey City *	Thu 11:53 AM	122 km	76 miles	66 nm	↗ NE
U.S.A. - New Jersey - Paterson *	Thu 11:53 AM	131 km	81 miles	71 nm	↗ NE
U.S.A. - New York - New York *	Thu 11:53 AM	133 km	82 miles	72 nm	↗ NE
U.S.A. - Maryland - Baltimore *	Thu 11:53 AM	149 km	93 miles	80 nm	↙ WSW
U.S.A. - New York - Yonkers *	Thu 11:53 AM	150 km	93 miles	81 nm	↗ NE

Cities within 100 miles of Washington, DC

U.S.A. - District of Columbia - Washington DC *	Thu 11:57 AM	-	-	-	
U.S.A. - Virginia - Alexandria *	Thu 11:57 AM	9 km	5 miles	5 nm	↙ SSW
U.S.A. - Maryland - Annapolis *	Thu 11:57 AM	47 km	29 miles	25 nm	↗ ENE
U.S.A. - Maryland - Baltimore *	Thu 11:57 AM	57 km	36 miles	31 nm	↗ NE
U.S.A. - Delaware - Dover *	Thu 11:57 AM	134 km	83 miles	72 nm	↗ ENE
U.S.A. - Pennsylvania - Harrisburg *	Thu 11:57 AM	154 km	96 miles	83 nm	↑ N
U.S.A. - Virginia - Richmond *	Thu 11:57 AM	155 km	96 miles	83 nm	↙ SSW

Cities within 100 miles of Denver

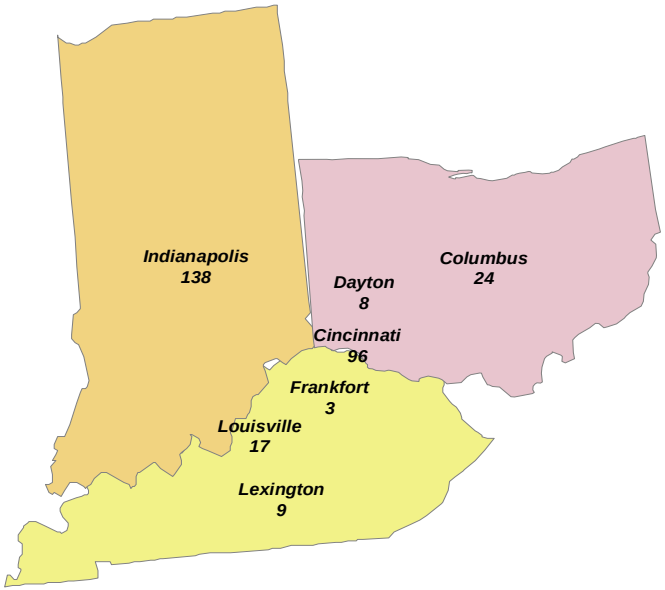
U.S.A. - Colorado - Denver *	Thu 9:59 AM	-	-	-	
U.S.A. - Colorado - Lakewood *	Thu 9:59 AM	11 km	7 miles	6 nm	↙ WSW
U.S.A. - Colorado - Aurora *	Thu 9:59 AM	23 km	14 miles	12 nm	→ E
U.S.A. - Colorado - Boulder *	Thu 9:59 AM	42 km	26 miles	23 nm	↖ NW
U.S.A. - Colorado - Fort Collins *	Thu 9:59 AM	96 km	60 miles	52 nm	↑ N
U.S.A. - Colorado - Colorado Springs *	Thu 9:59 AM	99 km	62 miles	54 nm	↓ S
U.S.A. - Wyoming - Cheyenne *	Thu 9:59 AM	158 km	98 miles	85 nm	↑ N

Cities within 100 miles of Los Angeles

U.S.A. - California - Los Angeles *	Thu 9:03 AM	-	-	-	
U.S.A. - California - Burbank *	Thu 9:03 AM	12 km	7 miles	6 nm	↗ NNE
U.S.A. - California - Glendale *	Thu 9:03 AM	14 km	9 miles	8 nm	↗ NE
U.S.A. - California - Inglewood *	Thu 9:03 AM	15 km	9 miles	8 nm	↘ SSE
U.S.A. - California - Pasadena *	Thu 9:03 AM	23 km	14 miles	12 nm	↗ ENE
U.S.A. - California - Hollywood *	Thu 9:03 AM	24 km	15 miles	13 nm	↖ WNW
U.S.A. - California - Compton *	Thu 9:03 AM	26 km	16 miles	14 nm	↘ SSE
U.S.A. - California - Torrance *	Thu 9:03 AM	28 km	17 miles	15 nm	↓ S
U.S.A. - California - Downey *	Thu 9:03 AM	28 km	18 miles	15 nm	↘ SE
U.S.A. - California - El Monte *	Thu 9:03 AM	32 km	20 miles	17 nm	→ E
U.S.A. - California - Norwalk *	Thu 9:03 AM	34 km	21 miles	19 nm	↘ SE
U.S.A. - California - Santa Clarita *	Thu 9:03 AM	37 km	23 miles	20 nm	↖ NNW
U.S.A. - California - Long Beach *	Thu 9:03 AM	39 km	24 miles	21 nm	↘ SSE
U.S.A. - California - Simi Valley *	Thu 9:03 AM	40 km	25 miles	22 nm	↖ WNW
U.S.A. - California - West Covina *	Thu 9:03 AM	43 km	27 miles	23 nm	→ E
U.S.A. - California - Fullerton *	Thu 9:03 AM	47 km	29 miles	25 nm	↘ ESE
U.S.A. - California - Thousand Oaks *	Thu 9:03 AM	47 km	29 miles	26 nm	↖ WNW
U.S.A. - California - Garden Grove *	Thu 9:03 AM	52 km	32 miles	28 nm	↘ SE
U.S.A. - California - Anaheim *	Thu 9:03 AM	54 km	33 miles	29 nm	↘ ESE
U.S.A. - California - Huntington Beach *	Thu 9:03 AM	56 km	35 miles	30 nm	↘ SE
U.S.A. - California - Pomona *	Thu 9:03 AM	57 km	35 miles	31 nm	→ E
U.S.A. - California - Orange *	Thu 9:03 AM	60 km	37 miles	32 nm	↘ ESE
U.S.A. - California - Costa Mesa *	Thu 9:03 AM	63 km	39 miles	34 nm	↘ SE
U.S.A. - California - Lancaster *	Thu 9:03 AM	69 km	43 miles	37 nm	↗ NNE
U.S.A. - California - Ontario *	Thu 9:03 AM	71 km	44 miles	38 nm	→ E
U.S.A. - California - Irvine *	Thu 9:03 AM	72 km	45 miles	39 nm	↘ SE
U.S.A. - California - San Buenaventura *	Thu 9:03 AM	84 km	52 miles	45 nm	↖ WNW
U.S.A. - California - Riverside *	Thu 9:03 AM	92 km	57 miles	50 nm	→ E
U.S.A. - California - San Bernardino *	Thu 9:03 AM	100 km	62 miles	54 nm	→ E
U.S.A. - California - Moreno Valley *	Thu 9:03 AM	109 km	68 miles	59 nm	→ E
U.S.A. - California - Santa Barbara *	Thu 9:03 AM	128 km	80 miles	69 nm	↖ WNW
U.S.A. - California - Oceanside *	Thu 9:03 AM	138 km	86 miles	74 nm	↘ SE
U.S.A. - California - Bakersfield *	Thu 9:03 AM	152 km	94 miles	82 nm	↖ NNW
U.S.A. - California - Escondido *	Thu 9:03 AM	160 km	100 miles	86 nm	↘ SE

Drinking Water Patents within 100 miles

Drinking Water Patents within 100 Miles of Cincinnati



Waste Water Patents within 100 miles

Waste Water Patents within 100 Miles of Cincinnati

Storm Water Patents within 100 miles

Storm Water Patents within 100 Miles of Cincinnati

Scientific Articles Regarding Drinking Water

Scientific Articles Regarding Waste Water

Scientific Articles Regarding Storm Water

Subsequent Patent and Paper Analysis

Search Methodology

Following the October 20 Stakeholder Meeting, subsequent patent and paper analyses were performed. Companies with the most patents in drinking water, waste water, and storm water were located within a 100-mile radius of Cincinnati. The same cities that are shown on p. 6 were searched.

The United States Patent and Trademark database was searched from 2000 to the current date for the following terms:

"Drinking Water"
Wastewater or "Waste Water"
Stormwater or "Storm Water" or "Wet-Weather Flow"

The companies with the most patents in each area are shown on pp. 19-21. The patents are shown in Appendices 1 – 3, respectively. The patents are listed with the most recently-granted patents first.

The most highly cited patents worldwide were also identified. To identify these patents, the Derwent Patent Innovation Database was searched from 2000 to 2010-Worldwide. The following terms were searched:

"Drinking Water"
Wastewater or "Waste Water"
Stormwater or "Storm Water"

The most highly cited patents in each area are shown on pp. 22-24. The patents are shown in Appendices 4 – 6, respectively.

Lastly, the most highly cited papers in each of the following areas were determined:
"Drinking Water"
Wastewater or "Waste Water"
Stormwater or "Storm Water"

ISI's Web of Science was used to search the cities Cincinnati, Indianapolis, Columbus, and also worldwide from 2005 to 2010. The title and authors for each of the papers are shown on pp. 25-40, and the abstracts are shown in Appendices 7 – 18.

Companies with Drinking Water Patents For Cincinnati and Cities within 100 miles of Cincinnati

NAME OF COMPANY	Total
The Procter & Gamble Company (Cincinnati, OH)	12
PUR Water Purification Products, Inc. (Cincinnati, OH)	7
The United States of America as represented by the U.S. Environmental Protection Agency (Washington, DC)	7
Tekmar Company (Cincinnati, OH)	4
Oasis Corporation (Columbus, OH	4
Advanced Research & Technology Institute (Indianapolis, IN)	3
Battelle Memorial Institute (Columbus, OH)	3
Ethicon Endo-Surgery, Inc. (Cincinnati, OH)	2

SEE APPENDIX 1 FOR DETAIL ON PATENTS

Companies with Waste Water Patents For Cincinnati and Cities within 100 miles of Cincinnati

NAME OF COMPANY	Total
The Procter & Gamble Company (Cincinnati, OH)	40
University of Kentucky Research Foundation (Lexington, KY)	11
The United States of America as represented by the U.S. Environmental Protection Agency (Washington, DC)	8
Zoeller Company (Louisville, KY)	7
PUR Water Purification Products, Inc. (Cincinnati, OH)	5
Tekmar Company (Cincinnati, OH)	4
Delphi Technologies, Inc. (Troy, MI)	3
Opencel LLC. (Highland Park, IL)	3
T. M. Gates, Inc. (Milford, OH)	2

SEE APPENDIX 2 FOR DETAIL ON PATENTS

Companies with Storm Water Patents For Cincinnati and Cities within 100 miles of Cincinnati

NAME OF COMPANY	Total
The Procter & Gamble Company (Cincinnati, OH)	3
Dandy Products, Inc. (Dublin, OH)	3

SEE APPENDIX 3 FOR DETAIL ON PATENTS

Most Highly Cited Patents for Drinking Water - Worldwide

Title	Patent Grant Date	Patent Number	Citations
Portable, potable water recovery and dispensing apparatus	2/6/2001	US6182453	43
Surface regeneration of biosensors and characterization of biomolecules associated therewith	9/11/2001	US6289286	37
Electrochemiluminescent rhenium moieties	10/22/2002	US6468741	35
Microorganism filter and method for removing microorganism from water	5/20/2003	US6565749	29
Silver self-regulating water purification compositions and methods	7/3/2001	US6254894	28
Methods and systems for point of care bodily fluid analysis	12/19/2006	US7150995	26
Water filtration media, apparatus and processes	6/5/2001	US6241893	22
Device for mechanically gripping and loading cylindrical objects	4/16/2002	US6371717	22
Drinking water filter	3/6/2001	US6197193	20
Carbon block water filter	4/9/2002	US6368504	20

SEE APPENDIX 4 FOR DETAIL ON PATENTS

Most Highly Cited Patents for Waste Water - Worldwide

Title	Patent Grant Date	Patent Number	Citations
In situ thermal processing of a hydrocarbon containing formation with a selected ratio of heat sources to production wells	5/4/2004	US6729395	128
In situ thermal processing of a coal formation with a selected oxygen content and/or selected O/C ratio	4/20/2004	US6722430	124
Monitoring, diagnostic, and reporting system and process	3/12/2002	US6356205	89
Heat sources with conductive material for in situ thermal processing of an oil shale formation	8/16/2005	US6929067	76
Conductor-in-conduit heat sources for in situ thermal processing of an oil shale formation	2/28/2006	US7004247	71
Analyzer for modeling and optimizing maintenance operations	6/12/2001	US6246972	70
In situ thermal processing of a hydrocarbon containing formation using a natural distributed combustor	10/3/2006	US7114566	69
Installation and use of removable heaters in a hydrocarbon containing formation	1/2/2007	US7156176	68
In situ thermal processing of an oil shale formation with a selected property	2/7/2006	US6994169	67
In situ recovery from a hydrocarbon containing formation using conductor-in-conduit heat sources with an electrically conductive material in the overburden	1/23/2007	US7165615	67

SEE APPENDIX 5 FOR DETAIL ON PATENTS

Most Highly Cited Patents for Storm Water - Worldwide

Title	Patent Grant Date	Patent Number	Citations
Method and apparatus for treating stormwater runoff	8/21/2001	US6277274	43
Suspended runoff water filter	3/11/2003	US6531059	38
Drain filter support	4/10/2001	US6214216	37
Curb-inlet storm drain systems for filtering trash and hydrocarbons	5/15/2001	US6231758	36
Selective suspension drain closure apparatus	5/6/2003	US6558077	29
Stormwater treatment apparatus	2/26/2002	US6350374	26
Stormwater dispensing chamber	3/26/2002	US6361248	25
In-line storm water drain filter system	8/6/2002	US6428692	25
Stormwater pollutant separation system and method of stormwater management	8/31/2004	US6783683	23
Silt filtration system	9/25/2001	US6294095	20

SEE APPENDIX 6 FOR DETAIL ON PATENTS

Most Highly Cited Papers for Drinking Water for Cincinnati, Indianapolis, Columbus, and Worldwide

CINCINNATI (SEE APPENDIX 7 FOR DETAIL)

1. A review of pervaporation for product recovery from biomass fermentation processes US EPA, Off Res & Dev, Natl Risk Management Res Lab, Cincinnati, OH 45268 USA

2. Sources of pathogenic microorganisms and their fate during land application of wastes 1. Univ Arizona, Dept Soil Water & Environm Sci, Tucson, AZ 85721 USA
2. US EPA, Off Res & Dev, Cincinnati, OH 45268 USA

3. Rapidly measured indicators of recreational water quality are predictive of swimming-associated gastrointestional illness 1. US EPA, Natl Hlth & Environm Effects Res Lab, Human Studies Div, Res Triangle Pk, NC 27711 USA 2. Ctr Dis Control & Prevent, Atlanta, GA USA 3. US EPA, Natl Exposure Res Lab, Cincinnati, OH 45268 USA

4. Comparison of a chemical and enzymatic extraction of arsenic from rice and an assessment of the arsenic absorption from contaminated water by cooked rice 1. US EPA, ORD, NERL, Microbiol & Chem Exposure Assessment Res Div, Cincinnati, OH 45268 USA 2. US FDA, Forens Chem Ctr, Cincinnati, OH 45249 USA

5. Formation of Pb(IV) oxides a in chlorinated water 1. US EPA, Cincinnati, OH 45268 USA

6. Combining drinking water treatment and hand washing for diarrhoea prevention, a cluster randomised controlled trial 1. Ctr Dis Control & Prevent, Natl Ctr Infect Dis, Div Bacterial & Mycot Dis, Atlanta, GA USA 2. Hlth Oriented Prevent Educ, Karachi, Pakistan 3. Aga Khan Univ, Karachi, Pakistan 4. Procter & Gamble Co, Cincinnati, OH USA

7. Amperometric determination of live Escherichia coli using antibody-coated paramagnetic beads Heineman, WR (reprint author), Univ Cincinnati, Dept Chem, 210172, Cincinnati, OH 45221 USA

8. Lead exposures in US children, 2008: Implications for prevention 1. US EPA SEP, Boston, MA 02114 USA 2. Ctr Dis Control & Prevent, Atlanta, GA USA 3. US FDA, Washington, DC 20204 USA 4. Dept Housing & Urban Dev, Washington, DC USA 5. NIOSH, Cincinnati, OH 45226 USA 6. US EPA, Washington, DC 20460 USA 7. US EPA, Cincinnati, OH 45268 USA

9. Inorganic arsenic in cooked rice and vegetables from Bangladeshi households . Agcy Tox Substances & Dis Registry, Div Hlth Studies, Atlanta, GA 30333 USA 2. Ctr Dis Control & Prevent, Natl Ctr Environm Hlth, Atlanta, GA 30333 USA 3. US FDA, Forens Chem Ctr, Cincinnati, OH 45237 USA 4. Oak Ridge Associated Univ, Oak Ridge, TN 37831 USA 5. Natl Inst Prevent & Social Med, Dhaka 1212, Bangladesh

10. Persistence of nontuberculous mycobacteria in a drinking water system after addition of filtration treatment 1. US EPA, Off Res & Dev, Natl Hlth & Environm Effects Res Lab, Res Triangle Pk, NC 27711 USA 2. US EPA, Off Res & Dev, Natl Exposure Res Lab, Cincinnati, OH 45268 USA 3. Ctr Dis Control & Prevent, Natl Ctr HIV STD & TB Prevent, Div TB Eliminat, Atlanta, GA 30333 USA
4. US EPA, Port Orchard, WA 98366 USA 5. US EPA, Off Res & Dev, Natl Homeland Secur Res Ctr, Cincinnati, OH 45268 USA 6. Clark Cty Water Reclamat Dist, Las Vegas, NV USA

INDIANAPOLIS (SEE APPENDIX 8 FOR DETAIL)

1. Human pharmaceuticals in US surface waters: A human health risk assessment 1. Quantum Management Grp, Clifton, NJ 07011 USA 2. AMEC Earth & Environm, Westford, MA 01886 USA 3. Bristol Myers Squibb Co, New Brunswick, NJ 08903 USA 4. Eli Lilly & Co, Lilly Corp Ctr, Indianapolis, IN 46285 USA 5. Pfizer, New York, NY 10017 USA 6. Schering Plough Corp, Union, NJ 07083 USA 7. Merck & Co Inc, Whitehouse Stn, NJ 08889 USA

2. Fluoride induces endoplasmic reticulum stress in ameloblasts responsible for dental enamel formation 1. Forsyth Inst, Dept Cytokine Biol, Boston, MA 02115 USA 2. Harvard Univ, Sch Dent Med, Dept Oral & Dev Biol, Boston, MA 02115 USA 3. Tohoku Univ, Grad Sch Dent, Div Aging & Geriatr Dent, Sendai, Miyagi 9808578 Japan 4. Univ N Carolina, Dept Pediat Dent, Chapel Hill, NC 27599 USA 5. Univ N Carolina, Carolina Ctr Genome Sci, Chapel Hill, NC 27599 USA 6. Indiana Univ, Sch Med & Dent, Oral Hlth Res Inst, Dept Prevent & Community Dent, Indianapolis, IN 46202 USA 7. Univ So Calif, Ctr Craniofacial Mol Biol, Sch Dent, Los Angeles, CA 90033 USA 8. Univ Massachusetts, Sch Med, Program Mol Med, Program Gene Funct & Express, Worcester, MA 01655 USA

3. Aluminum and copper in drinking water enhance inflammatory or oxidative events specifically in the brain 1. Univ Calif Irvine, Dept Community & Environm Med, Ctr Occupat & Environm Hlth Sci, Irvine, CA 92697 USA 2. Indiana Univ, Sch Med, Dept Psychiat, Inst Psychiat Res, Indianapolis, IN 46202 USA

4. Otosclerosis: Incidence of positive findings on high-resolution computed tomography and their correlation to audiological test data 1. Klin Hirslanden, ORL Zentrum, CH-8029 Zurich, Switzerland 2. Klin Hirslanden, Dept Radiol, CH-8029 Zurich, Switzerland 3. Indiana Univ, Dept Otolaryngol Head & Neck Surg, Indianapolis, IN 46204 USA

5. Acrylamide carcinogenicity 1. Indiana Univ, Sch Med, Dept Pharmacol & Toxicol, Ctr Environm Health, Indianapolis, IN 46202 USA

6. The acetochlor registration partnership surface water monitoring program for four corn herbicides 1. Monsanto Co, St Louis, MO 63167 USA 2. Syngenta Crop Protect, Greensboro, NC 27419 USA 3. Dow AgroSci LLC, Indianapolis, IN 46268 USA 4. Klein & Associates, Town Country, MO 63131 USA 5. Stone Environm, Montpelier, VT 05602 USA

7. Calcimimetic Inhibits Late-Stage Cyst Growth in ADPKD 1. Indiana Univ, Sch Med, Dept Anat & Cell Biol, Indianapolis, IN 46202 USA 2. Indiana Univ, Sch Med, Dept Med, Indianapolis, IN 46202 USA 3. Amgen Inc, Dept Metab Disorders, Thousand Oaks, CA 91320 USA 4. Roudebush VA Med Ctr, Indianapolis, IN USA

8. Agrichemicals in surface water and birth defects in the United States 1. Indiana Univ, Sch Med, Sect Neonatal Perinatal Med, Indianapolis, IN USA 2. Univ Cincinnati, Inst Study Hlth, Cincinnati, OH USA

9. Biomarker discovery for arsenic exposure using functional data. Analysis and feature learning of mass spectrometry proteomic data 1. Indiana Univ, Sch Med, Dept Med, Indianapolis, IN 46202 USA 2. Harvard Univ, Sch Publ Hlth, Dept Biostat, Boston, MA 02115 USA 3. Harvard Univ, Sch Publ Hlth, Dept Environm Hlth, Boston, MA 02115 USA 4. Dana Farber Canc Inst, Dept Biostat & Computat Biol, Boston, MA 02115 USA

10. Cancer dose-response assessment for acrylonitrile based upon rodent brain tumor incidence: Use of epidemiologic, mechanistic, and pharmacokinetic support for nonlinearity 1. Sapphire Grp Inc, Beachwood, OH USA 2. Sapphire Grp Inc, Dayton, OH USA 3. Univ Pittsburgh, Pittsburgh, PA 15260 USA 4. BP Chem, Arlington, VA USA

5. Indiana Univ, Sch Med, Indianapolis, IN USA 6. Dow Chem Co USA, Midland, MI 48674 USA 7. Cytec Ind, W Paterson, NJ USA

COLUMBUS (SEE APPENDIX 9 FOR DETAIL)

1. Analysis of perchlorate in human urine using ion chromatography and electrospray tandem mass spectrometry 1. Ctr Dis Control & Prevent, Natl Ctr Environm Hlth, Div Sci Lab, Atlanta, GA 30341 USA 2. Battelle Mem Inst, Columbus, OH 43201 USA

2. Endothelium-derived nitric oxide regulates postischemic myocardial oxygenation and oxygen consumption by modulation of mitochondrial electron transport 1. Ohio State Univ, Coll Med, Ctr Biomed EPR Spect & Imaging, Columbus, OH USA
2. Ohio State Univ, Coll Med, Davis Heart & Lung Res Inst, Columbus, OH USA 3. Ohio State Univ, Coll Med, Div Cardiovasc Med, Dept Internal Med, Columbus, OH USA

3. Influence of tap water quality and household water use activities on indoor air and internal dose levels of trihalomethanes 1. Colorado State Univ, Environm Hlth Adv Syst Lab, Dept Environm & Radiol Hlth Sci, Ft Collins, CO 80523 USA 2. Ctr Dis Control & Prevent, Emergency Response & Air Toxicants Branch, Atlanta, GA USA 3. Battelle Mem Inst, Ctr Publ Hlth Res & Evaluat, Durham, NC USA 4. Battelle Mem Inst, Columbus, OH USA 5. Univ N Carolina, Dept Environm Sci & Engn, Chapel Hill, NC USA

4. A method for determining the phosphorus sorption capacity and amorphous aluminum of aluminum-based drinking water treatment residuals 1. Ohio State Univ, Sch Nat Resources, Columbus, OH 43210 USA

5. Effect of process variables and natural organic matter on removal of microcystin-LR by PAC-UF 1. Ohio State Univ, Dept Civil & Environm Engn & Geodet Sci, Columbus, OH 43210 USA

6. Metformin therapy in a transgenic mouse model of Huntington's disease 1. Ohio State Univ, Div Pharmacol, Columbus, OH 43210 USA

7. Changes in breath trihalomethane levels resulting from household water-use activities 1. Battelle Mem Inst, Columbus, OH 43201 USA 2. Ctr Dis Control & Prevent, Natl Ctr Environm Hlth, Emergency Response & Air Toxicants Branch, Atlanta, GA USA 3. Battelle Mem Inst, Ctr Publ Hlth Res & Evaluat, Durham, NC USA 4. Univ N Carolina, Dept Environm Sci & Engn, Chapel Hill, NC USA

8. Selection of a battery of rapid toxicity sensors for drinking water evaluation 1. USA, Ctr Environm Hlth Res, Ft Detrick, MD 21702 USA 2. Battelle Mem Inst, Columbus, OH 43201 USA

9. Neovascularization and angiogenic gene expression following chronic arsenic exposure in mice 1. Univ Pittsburgh, Dept Environm & Occupat Hlth, Grad Sch Publ Hlth, Pittsburgh, PA 15260 USA 2. Dartmouth Coll, Hitchcock Med Ctr, Dartmouth Med Sch, Dept Pharmacol & Toxicol, Hanover, NH 03756 USA 3. Columbus Childrens Res Inst, Columbus, OH USA

10. Use of drinking water treatment residuals as a potential best management practice to reduce phosphorus risk index scores 1. Ohio State Univ, Sch Nat Resources, Columbus, OH 43210 USA

WORLDWIDE (SEE APPENDIX 10 FOR DETAIL)

1. Arsenic removal from water/wastewater using adsorbents - A critical review 1. Mississippi State Univ, Dept Chem, Mississippi State, MS 39762 USA 2. Ind Toxicol Res Ctr, Environm Chem Div, Lucknow 226001, Uttar Pradesh India

2. Hyperuricemia induces endothelial dysfunction 1. Baylor Univ, Dept Internal Med, Nephrol Sect, Houston, TX 77030 USA 2. Texas Tech Univ, Hlth Sci Ctr, Dept Med Nephrol, Lubbock, TX 79430 USA 3. Univ Florida, Dept Med, Gainesville, FL USA

3. Cryptosporidium: a water-borne zoonotic parasite 1. USDA, ARS, Beltsville, MD 20705 USA

4. Science and technology for water purification in the coming decades
1. Univ Illinois, NSF STC WaterCAMPWS, Urbana, IL 61801 USA 2. Univ Notre Dame, Dept Chem & Biomol Engn, Notre Dame, IN 46556 USA 3. Univ Notre Dame, Dept Chem, Notre Dame, IN 46556 USA
4. Yale Univ, Dept Environm & Chem Engn, New Haven, CT 06520 USA 5. Univ Illinois, Dept Mech Sci & Engn, Urbana, IL 61801 USA
6. Univ Illinois, Dept Civil & Environm Engn, Urbana, IL 61801 USA 7. MIT, Dept Mat Sci & Engn, Cambridge, MA 02139

5. Fate of endocrine-disruptor, pharmaceutical, and personal care product chemicals during simulated drinking water treatment processes 1. Arizona State Univ, Dept Civil & Environm Engn, Tempe, AZ 85287 USA 2. Northwestern Univ, Dept Mech Engn, Evanston, IL 60208 USA 3. So Nevada Water Author, Dept Res & Dev, Henderson, NV 89015 USA

6. Oxidation of pharmaceuticals during ozonation of municipal wastewater effluents: A pilot study 1. Fed Inst Hydrol, D-56068 Koblenz, Germany 2. Swiss Fed Inst Environm Sci & Technol, CH-8600 Dubendorf, Switzerland 3. WEDECO, Umwelttechnol GmbH, D-32051 Herford, Germany

7. Liquid chromatography-tandem mass spectrometry for the analysis of pharmaceutical residues in environmental samples: a review 1. CSIC, IIQAB, Dept Environm Chem, Barcelona 08034, Spain

8. Cyanobacterial toxins: risk management for health protection 1. Univ Dundee, Sch Life Sci, Div Environm & Appl Biol, Dundee DD1 4HN, Scotland

9. Variation in arsenic speciation and concentration in paddy rice related to dietary exposure 1. Univ Aberdeen, Sch Biol Sci, Aberdeen AB24 3UU, Scotland 2. Univ Aberdeen, Dept Chem, Aberdeen AB24 3UE, Scotland

10. Electrohydraulic discharge and nonthermal plasma for water treatment 1. Florida State Univ, FAMU FSU Coll Engn, Dept Chem & Biomed Engn, Tallahassee, FL 32310 USA 2. Gunma Univ, Dept Biol & Chem Engn, Kiryu, Gumma 3768515 Japan 3. Acad Sci Czech Republic, Inst Plasma Phys, CR-18200 Prague, Czech Republic 4. CALTECH, WM Keck Labs 138 78, Pasadena, CA 91125 USA
5. McMaster Univ, Dept Engn Phys, Hamilton, ON L8S 4L7 Canada

Most Highly Cited Papers for Waste Water for Cincinnati, Indianapolis, Columbus, and Worldwide

CINCINNATI (SEE APPENDIX 11 FOR DETAIL)

1. The urban stream syndrome: current knowledge and the search for a cure 1. Monash Univ, Cooperat Res Ctr Freshwater Ecol, Water Studies Ctr, Clayton, Vic 3800 Australia 2. Monash Univ, Sch Biol Sci, Clayton, Vic 3800 Australia 3. US EPA, Off Res & Dev, Natl Risk Management Res Lab, Cincinnati, OH 45268 USA 4. Auburn Univ, Dept Biol Sci, Auburn, AL 36849 USA 5. Univ Canberra, Cooperat Res Ctr Freshwater Ecol, Canberra, ACT 2601 Australia 6. Inst Ecosyst Studies, Millbrook, NY 12545 USA 7. Univ Maryland, Ctr Environm Sci, Appalachian Lab, Frostburg, MD 21532 USA

2. Collapse of a fish population after exposure to a synthetic estrogen 1. Fisheries & Oceans Canada, Inst Freshwater, Winnipeg, MB R3T 2N6 Canada 2. US EPA, Mol Indicators Res Branch, Cincinnati, OH 45268 USA

3. Transport of chemical and microbial compounds from known wastewater discharges: Potential for use as indicators of human fecal contamination 1. US EPA, Off Res & Dev, Natl Exposure Res Lab, Cincinnati, OH 45268 USA 2. US Geol Survey, Natl Water Qual Lab, Denver Fed Ctr, Lakewood, CO 80225 USA 3. US Geol Survey, Iowa City, IA 52244 USA 4. US Geol Survey, Natl Water Qual Lab, Denver Fed Ctr, Lakewood, CO 80225 USA 5. US Geol Survey, Organ Geochem Res Lab, Lawrence, KS 66049 USA 6. US EPA, Off Res & Dev, Nat Exposure Res Lab, Res Triangle Pk, NC 27711 USA

4. Sources of pathogenic microorganisms and their fate during land application of wastes 1. Univ Arizona, Dept Soil Water & Environm Sci, Tucson, AZ 85721 USA
2. US EPA, Off Res & Dev, Cincinnati, OH 45268 USA

5. Nanocrystalline TiO2 photocatalytic membranes with a hierarchical mesoporous multilayer structure: Synthesis, characterization, and multifunction 1. Univ Cincinnati, Dept Civil & Environm Engn, Cincinnati, OH 45221 USA 2. Univ Virginia, Dept Chem Engn, Charlottesville, VA 22904 USA

6. Excretion and ecotoxicity of pharmaceutical and personal care products in the environment 1. Univ Cincinnati, Dept Biol Sci, Cincinnati, OH 45221 USA

7. Equilibrium and kinetic adsorption study of a cationic dye by a natural adsorbent - Silkworm pupa 1. Univ Cincinnati, Dept Civil & Environm Engn, Cincinnati, OH 45221 USA 2. Amir Kabir Univ Technol, Tehran Polytech, Dept Text Engn, Tehran, Iran

8. Urban contributions of glyphosate and its degradate AMPA to streams in the United States 1. US Geol Survey, Iowa City, IA 52244 USA 2. US Geol Survey, Lawrence, KS 66049 USA 3. US EPA, Off Res & Dev, Natl Exposure Res Lab, Cincinnati, OH 45268 USA

9. Use of 16S rRNA gene terminal restriction fragment analysis to assess the impact of solids retention time on the bacterial diversity of activated sludge 1. Univ Cincinnati, Dept Civil & Environm Engn, Cincinnati, OH 45221 USA 2. Univ S Florida, Dept Civil & Environm Engn, Tampa, FL 33620 USA 3. Univ Cincinnati, Dept Biol Sci, Cincinnati, OH 45221 USA

10. Effect of permeate flux and tangential flow on membrane fouling for wastewater treatment 1. Univ Cincinnati, Dept Civil & Environm Engn, Cincinnati, OH 45221 USA

INDIANPOLIS (SEE APPENDIX 12 FOR DETAIL)

1. Waste-Indicator and Pharmaceutical Compounds in Landfill-Leachate-Affected Ground Water near Elkhart, Indiana, 2000-2002 1. US Geol Survey, Indianapolis, IN 46278 USA 2. US Geol Survey, Urbana, IL 61801 USA 3. US Geol Survey, Iowa City, IA USA 4. US Geol Survey, Lakewood, CO 80225 USA 5. US Geol Survey, Lawrence, KS 66049 USA

2. Effects of human pharmaceuticals on aquatic life: Next steps 1. Merck & Co Inc, Rahway, NJ 07065 USA 2. Eli Lilly & Co, Indianapolis, IN 46285 USA

3. Human pharmaceuticals in US surface waters: A human health risk assessment 1. Quantum Management Grp, Clifton, NJ 07011 USA 2. AMEC Earth & Environm, Westford, MA 01886 USA 3. Bristol Myers Squibb Co, New Brunswick, NJ 08903 USA 4. Eli Lilly & Co, Lilly Corp Ctr, Indianapolis, IN 46285 USA 5. Pfizer, New York, NY 10017 USA 6. Schering Plough Corp, Union, NJ 07083 USA 7. Merck & Co Inc, Whitehouse Stn, NJ 08889 USA

COLUMBUS (SEE APPENDIX 13 FOR DETAIL)

1. Cathodic limitations in microbial fuel cells: An overview 1. Ohio State Univ, Dept Food Agr & Biol Engn, Columbus, OH 43210 USA 2. Ohio State Univ, Dept Microbiol, Columbus, OH 43210 USA 3. Tampere Univ Technol, Dept Chem & Bioengn, FI-33101 Tampere, Finland

2. Willows beyond wetlands: Uses of Salix L. species for environmental projects 1. Ohio State Univ, Dept Hort & Crop Sci, Columbus, OH 43210 USA

3. Tropical treatment wetlands dominated by free-floating macrophytes for water quality improvement in Costa Rica 1. Ohio State Univ, Environm Sci Grad Program, Wilma H Schiermeier Olentangy River Wetland Res P, Columbus, OH 43202 USA 2. Ohio State Univ, Sch Environm & Nat Resources, Wilma H Schiermeier Olentangy River Wetland Res P, Columbus, OH 43202 USA

4. Sustainable land application: An overview 1. Univ Florida, Dept Soil & Water Sci, Gainesville, FL 32611 USA 2. Penn State Univ, Dept Agr & Biol Engn, University Pk, PA 16802 USA
3. Ohio State Univ, Sch Nat Resources, Columbus, OH 43210 USA 4. US EPA, Washington, DC 20460 USA
5. Utah State Univ, Logan, UT 84322 USA 6. US EPA, Cincinnati, OH 45268 USA 7. Kansas State Univ, Dept Agron, Manhattan, KS 66506 USA

5. Fabrication of microelectrode arrays for in situ sensing of oxidation reduction potentials 1. Univ Cincinnati, Dept Elect & Comp Engn & Comp Sci, Cincinnati, OH 45221 USA 2. Univ Cincinnati, Dept Civil & Environm Engn, Cincinnati, OH 45221 USA 3. EnteraTech Inc, Columbus, OH USA

6. Evaluations of different hypervariable regions of archaeal 16S rRNA genes in profiling of methanogens denaturing by Archaea-specific PCR and gradient gel electrophoresis 1. Ohio State Univ, Dept Anim Sci, MAPLE Res Initiat, Columbus, OH 43210 USA 2. Univ Leon, Dept Anim Prod, E-24071 Leon, Spain 3. CSIRO Liverstock Industries, St Lucia, Qld Australia

7. Influence of hydrologic pulses, flooding frequency, and vegetation on nitrous oxide emissions from created riparian marshes 1. Ohio State Univ, Environm Sci Grad Program, Columbus, OH 43202 USA 2. Ohio State Univ, Sch Environm & Nat Resources, Columbus, OH 43202 USA 3. Inst Ecol, Congregac Haya Xalapa, Veracruz 91070, Mexico

8. Ultrasonic destruction of surfactants: Application to industrial wastewaters 1. Ohio State Univ, Chair Civil Engn, Columbus, OH 43210 USA 2. Wellington Sch, Arlington, OH USA

9. Soil science and the carbon civilization 1. Ohio State Univ, Soil Sci Soc Amer, Columbus, OH 43210 USA

10. Use of an ecological treatment system (ETS) for removal of nutrients from dairy wastewater1. Ohio State Univ, Dept Food Agr & Biol Engn, Columbus, OH 43210 USA

WORLDWIDE (SEE APPENDIX 14 FOR DETAIL)

1. Photoinduced reactivity of titanium dioxide 1. Inst Phys Chem IG Murgulescu, Bucharest, Romania 2. Univ Augsburg, D-86159 Augsburg, Germany

2. Microbial fuel cells: Methodology and technology1. Penn State Univ, Hydrogen Energy Ctr, University Pk, PA 16802 USA 2. Wageningen Univ, Sub Dept Environm Technol, NL-6700 EV Wageningen, Netherlands 3. Wetsus, Ctr Sustainable Water Technol, NL-8900 CC Leeuwarden, Netherlands
4. Ernst Moritz Arndt Univ Greifswald, Inst Chem & Biochem, D-17489 Greifswald, Germany 5. Univ Queensland, AWMC, St Lucia, Qld 4072 Australia 6. Univ Ghent, Lab Microbial Ecol & Technol, B-9000 Ghent, Belgium

3. Non-conventional low-cost adsorbents for dye removal: A review1. Univ Franche Comte, SERAC, Ctr Spect, F-25000 Besancon, France

4. Ecotoxicology of human pharmaceuticals 1. Univ Basel, Inst Environm Technol, CH-1432 Muttenz, Switzerland 2. ETH, Swiss Fed Inst Technol, Dept Environm Sci, CH-8092 Zurich, Switzerland 3. Springborn Smithers Labs Europe AG, CH-9326 Horn, Switzerland 4. Univ Zurich, Inst Plant Biol, CH-8802 Kilchberg, Switzerland

5. Application of biosorption for the removal of organic pollutants: A review 1. Hacettepe Univ, Dept Chem Engn, TR-06532 Ankara, Turkey

6. Microbial fuel cells: novel biotechnology for energy generation 1. State Univ Ghent, Lab Microbial Ecol & Technol, B-9000 Ghent, Belgium

7. Recent developments in polysaccharide-based materials used as adsorbents in wastewater treatment 1. Univ Franche Comte, Serv Ressources Analyt & Caracterisat, Ctr Spectrometrie, F-25030 Besancon, France

8. Advanced oxidation processes for organic contaminant destruction based on the Fenton reaction and related chemistry 1. Connecticut Agr Expt Stn, Dept Soil & Water, New Haven, CT 06504 USA 2. Univ Karlsruhe, Engler Bunte Inst, Lehrstuhl Umweltmesstech, D-7500 Karlsruhe, Germany 3. Univ Connecticut, Dept Civil & Environm Engn, Storrs, CT USA

9. Fouling in membrane bioreactors used in wastewater treatment 1. Univ New S Wales, Sch Chem Engn, UNESCO Ctr Membrane Sci & Technol, Sydney, NSW 2052 Australia

10. Levels and trends of brominated flame retardants in the European environment 1. Ctr Environm Fisheries & Aquaculture Sci, CEFAS Burnham Lab, Burnham On Crouch CM0 8HA, Essex England 2. Netherlands Inst Fishery Res, NL-1970 AB Ijmuiden, Netherlands 3. Univ Antwerp, Toxicol Ctr, B-2610 Antwerp, Belgium 4. Polar Environm Ctr, Norwegian Inst Air Res, N-9296 Tromso, Norway
5. Umweltbundesant, D-14191 Berlin, Germany 6. IFREMER, F-44311 Nantes 03, France 7. Stockholm Univ, Dept Appl Environm Sci, SE-10691 Stockholm, Sweden

Most Highly Cited Papers for Storm Water for Cincinnati, Indianapolis, Columbus, and Worldwide

CINCINNATI (SEE APPENDIX 15 FOR DETAIL)

1. The urban stream syndrome: current knowledge and the search for a cure 1. Monash Univ, Cooperat Res Ctr Freshwater Ecol, Water Studies Ctr, Clayton, Vic 3800 Australia 2. Monash Univ, Sch Biol Sci, Clayton, Vic 3800 Australia 3. US EPA, Off Res & Dev, Natl Risk Management Res Lab, Cincinnati, OH 45268 USA 4. Auburn Univ, Dept Biol Sci, Auburn, AL 36849 USA 5. Univ Canberra, Cooperat Res Ctr Freshwater Ecol, Canberra, ACT 2601 Australia 6. Inst Ecosyst Studies, Millbrook, NY 12545 USA
7. Univ Maryland, Ctr Environm Sci, Appalachian Lab, Frostburg, MD 21532 USA

2. Investigating hydrologic alteration as a mechanism of fish assemblage shifts in urbanizing streams Roy, AH (reprint author), US EPA, Natl Risk Management Res Lab, Off Res & Dev, 26 W Martin Luther King Dr, Cincinnati, OH 45268 USA

3. Importance of riparian forests in urban catchments contingent on sediment and hydrologic regimes Roy, AH (reprint author), US EPA, 26 W Martin Luther King Dr, Cincinnati, OH 45268 USA

4. Application of market mechanisms and incentives to reduce stormwater runoff - An integrated hydrologic, economic and legal approach
1. US EPA, Off Res & Dev, Natl Risk Management Res Lab, Sustainable Technol Div,Sustainable Environm Bran, Cincinnati, OH 45268 USA

5. Impediments and solutions to sustainable, watershed-scale urban stormwater management: Lessons from Australia and the United States
1. US EPA, Off Res & Dev, Cincinnati, OH 45268 USA 2. Univ Georgia, Odum Sch Ecol, River Basin Ctr, Athens, GA 30602 USA 3. Monash Univ, Inst Sustainable Water Resources, Dept Civil Engn, Clayton, Vic 3800 Australia
4. Monash Univ, Water Studies Ctr, Clayton, VIC 3800 Australia 5. Monash Univ, Sch Biol Sci, Clayton, VIC 3800 Australia 6. Monash Univ, Inst Sustainable Water Resources, Sch Geog & Environm Sci, Clayton, VIC 3800 Australia

6. Opportunity costs of residential best management practices for stormwater runoff control 1. US EPA, Off Res & Dev, Natl Risk Management Res Lab, Sustainable Technol Div,Sustainable Environm Bran, Cincinnati, OH 45268 USA

7. Risk management of sediment stress: A framework for sediment risk management research 1. US EPA, Off Res & Dev, Natl Risk Management Res Lab, Water Supply Water Resources Div,Water Qual Manag, Cincinnati, OH 45268 USA 2. US EPA, Off Res & Dev, Natl Risk Management Res Lab, Water Supply Water Resources Div,Urban Watershed, Edison, NJ 08837 USA 3. US EPA, Off Res & Dev, Natl Risk Management Res Lab, Land Remediat & Pollut Control Div,Aquat Stressor, Cincinnati, OH 45268 USA

8. Prospects for enhanced groundwater recharge via infiltration of urban storm water runoff: A case study 1. US EPA, Sustainable Environm Branch, Natl Risk Management Res Lab, Cincinnati, OH 45268 USA 2. USDA, Nat Resources Conservat, Columbus, OH USA

9. ASSESSING IMPERVIOUS SURFACE CONNECTIVITY AND APPLICATIONS FOR WATERSHED MANAGEMENT 1. US EPA, Natl Risk Management Res Lab, Off Res & Dev, Cincinnati, OH 45268 USA

10. Urban wet-weather flows 1. Sch Sci Engn & Technol Penn State, Middletown, PA 17057 USA 2. Univ Utah, Dept Civil & Environm Engn, Salt Lake City, UT 84112 USA 3. Univ Alabama, Dept Civil Construct & Environm Engn, Tuscaloosa, AL 35487 USA 4. Water Supply & Water Resources Div, Urban Watershed Management Branch, Natl Risk Management Res Lab, Cincinnati, OH USA

INDIANAPOLIS (SEE APPENDIX 16 FOR DETAIL)

1. Comparative study of transport processes of nitrogen, phosphorus, and herbicides to streams in five agricultural basins, USA 1. US Geol Survey, Sacramento, CA 95819 USA 2. US Geol Survey, Baltimore, MD 21237 USA 3. US Geol Survey, Jackson, MS 39208 USA 4. US Geol Survey, Portland, OR 97216 USA 5. US Geol Survey, Indianapolis, IN 46278 USA
6. US Geol Survey, Natl Water Qual Lab, Denver Fed Ctr, Lakewood, CO 80225 USA

2. Beyond the urban gradient: barriers and opportunities for timely studies of urbanization effects on aquatic ecosystems 1. Butler Univ, Ctr Urban Ecol, Indianapolis, IN 46208 USA 2. Univ Georgia, Warnell Sch Forestry & Nat Resources, Athens, GA 30602 USA
3. Univ Georgia, Odum Sch Ecol, Athens, GA 30602 USA 4. Univ Georgia, Dept Crop & Soil Sci, Athens, GA 30602 USA 5. Univ Georgia, Dept Biol & Agr Engn, Athens, GA 30602 USA 6. Univ Georgia, Dept Geog, Athens, GA 30602 USA

COLUMBUS (SEE APPENDIX 17 FOR DETAIL)

1. Uncertainty in measured sediment and nutrient flux in runoff from small agricultural watersheds 1. USDA ARS, Temple, TX 76502 USA 2. USDA ARS, Columbus, OH USA

2. Modelling hydrological processes in created freshwater wetlands: an integrated system approach . Ohio State Univ, Olentangy River Wetland Res Pk, Columbus, OH 43210 USA

3. Effects of wetland depth and flow rate on residence time distribution characteristics 1. Ohio State Univ, Dept Food Agr & Biol Engn, Columbus, OH 43210 USA 2. Ohio State Univ, Dept Civil & Environm Engn & Geodet Sci, Columbus, OH 43210 USA 3. Ohio State Univ, Sch Nat Resources, Columbus, OH 43210 USA 4. Ohio State Univ, Dept Hort & Crop Sci, Columbus, OH 43210 USA

4. Practical guidance for discharge and water quality data collection on small watersheds 1. USDA ARS, Temple, TX 76502 USA 2. USDA ARS, Columbus, OH USA
3. Univ Arkansas, Fayetteville, AR 72701 USA 4. USDA ARS, Mississippi State, MS USA

5. Nutrient load generated by storm event runoff from a golf course watershed 1. USDA ARS, Columbus, OH 43210 USA 2. Spectrum Res Inc, Duluth, MN 55804 USA
3. Ohio State Univ, Columbus, OH 43210 USA 4. USDA ARS, Temple, TX 76502 USA

6. Urban Battery Litter 1. Case Western Reserve Univ, Dept Civil Engn, Cleveland, OH 44106 USA 2. Sci Applicat Int Corp, Twinsburg, OH 44087 USA 3. Malcolm Pirnie Inc, Columbus, OH 43240 USA
4. URS Corp, Cleveland, OH 44115 USA

7. Nutrient flux in storm water runoff and baseflow from managed turf 1. USDA ARS, Soil Drainage Res Unit, Columbus, OH 43210 USA 2. Spectrum Res Inc, Duluth, MN 55804 USA
3. USDA ARS, Temple, TX 76502 USA

8. Prospects for enhanced groundwater recharge via infiltration of urban storm water runoff: A case study 1. US EPA, Sustainable Environm Branch, Natl Risk Management Res Lab, Cincinnati, OH 45268 USA 2. USDA, Nat Resources Conservat, Columbus, OH USA

9. Analysis and modeling of suspended solids from high-frequency monitoring in a stormwater treatment wetland 1. Ohio State Univ, Dept Food Agr & Biol Engn, Columbus, OH 43210 USA 2. Ohio State Univ, Dept Civil & Environm Engn & Geodet Sci, Columbus, OH 43210 USA 3. Ohio State Univ, Sch Nat Resources, Columbus, OH 43210 USA 4. Ohio State Univ, Dept Hort, Columbus, OH 43210 USA

10. A hierarchical optimization approach to watershed land use planning 1. Ohio State Univ, Dept City & Reg Planning, Columbus, OH 43210 USA 2. Ohio State Univ, Dept City & Reg Planning, Columbus, OH 43210 USA

WORLDWIDE (SEE APPENDIX 18 FOR DETAIL)

1. The urban stream syndrome: current knowledge and the search for a cure 1. Monash Univ, Cooperat Res Ctr Freshwater Ecol, Water Studies Ctr, Clayton, Vic 3800 Australia 2. Monash Univ, Sch Biol Sci, Clayton, Vic 3800 Australia 3. US EPA, Off Res & Dev, Natl Risk Management Res Lab, Cincinnati, OH 45268 USA 4. Auburn Univ, Dept Biol Sci, Auburn, AL 36849 USA 5. Univ Canberra, Cooperat Res Ctr Freshwater Ecol, Canberra, ACT 2601 Australia 6. Inst Ecosyst Studies, Millbrook, NY 12545 USA
7. Univ Maryland, Ctr Environm Sci, Appalachian Lab, Frostburg, MD 21532 USA

2. Stream restoration in urban catchments through redesigning stormwater systems: looking to the catchment to save the stream 1. Monash Univ, Water Studies Ctr, Cooperat Res Ctr Freshwater Ecol, Clayton, Vic 3800 Australia 2. Monash Univ, Sch Biol Sci, Clayton, Vic 3800 Australia 3. Monash Univ, Dept Civil Engn, Cooperat Res Ctr Catchment Hydrol, Clayton, Vic 3800 Australia 4. Monash Univ, Dept Civil Engn, Inst Sustainable Water Resources, Clayton, Vic 3800 Australia

3. Distribution of Cryptosporidium genotypes in storm event water samples from three watersheds in New York 1. Ctr Dis Control & Prevent, Div Parasit Dis, Natl Ctr Infect Dis, Atlanta, GA 30341 USA 2. New York City Dept Environm Protect, Valhalla, NY 10595 USA

4. Chemical and microbiological parameters in New Orleans floodwater following Hurricane Katrina 1. Louisiana State Univ, Dept Civil & Environm Engn, Baton Rouge, LA 70803 USA 2. Louisiana State Univ, Dept Chem Engn, Baton Rouge, LA 70803 USA 3. EHS Tech Solut, Baton Rouge, LA USA 4. Louisiana State Univ, Louisiana Water Reources Res Inst, Baton Rouge, LA 70803 USA

5. Experimental evidence for the effects of additional water, nutrients and physical disturbance on invasive plants in low fertility Hawkesbury Sandstone soils, Sydney, Australia 1. Macquarie Univ, Dept Biol Sci, N Ryde, NSW 2109 Australia

6. Evaluation and optimization of bioretention media for treatment of urban storm water runoff 1. Univ Maryland, Dept Civil & Environm Engn, College Pk, MD 20742 USA

7. Investigating hydrologic alteration as a mechanism of fish assemblage shifts in urbanizing streams Roy, AH (reprint author), US EPA, Natl Risk Management Res Lab, Off Res & Dev, 26 W Martin Luther King Dr, Cincinnati, OH 45268 USA

8. Detection of human-derived fecal pollution in environmental waters by use of a PCR-based human polyomavirus assay 1. Univ S Florida, Dept Biol, Tampa, FL 33620 USA 2. Univ Florida, Dept Microbiol & Cell Sci, Gainesville, FL 33611 USA 3. Biol Consulting Serv N Florida, Gainesville, FL 32609 USA

9. Sources of heavy metals and polycyclic aromatic hydrocarbons in urban stormwater runoff 1. Univ Otago, Dept Chem, Dunedin, New Zealand

10. Coastal water quality impact of stormwater runoff from an urban watershed in southern California 1. Univ Calif Irvine, Henry Samueli Sch Engn, Dept Chem Engn & Mat Sci, Irvine, CA 92697 USA 2. CALTECH, Jet Prop Lab, Pasadena, CA 91109 USA 3. So Calif Coastal Water Res Project, Westminster, CA 92683 USA 4. Univ Calif Irvine, Sch Social Ecol, Dept Environm Hlth Sci & Policy, Irvine, CA 92697 USA

Conclusion

Based on an examination of both the scientific literature (papers) and technological advances (patents) for drinking water, waste water, and storm water in the US and worldwide, a number of conclusions can be drawn:

1) The Cincinnati region holds prominent positions in both drinking water and waste water patents. While Procter and Gamble is the dominant firm in the area (holding a total of 52 drinking water and waste water patents with PUR holding another 12 patents in these areas), there are a number of other important corporate stakeholders including Eli Lilly and Zoeller. EPA also has a very important position in these areas, as it holds 7 patents in the area of drinking water and 8 patents in the area of wastewater.

2) For highly cited drinking water patents, the focus appears to be on different types of filtering devices. Procter and Gamble has one of these highly cited patents. This patent is for a "Microorganism filter and method for removing microorganism from water (May 20, 2003)." The filter, both filter-mounted and pour-through varieties, includes a reactive surface with a polymer coating to attract microorganisms.

3) For highly cited waste water patents, Shell Oil is, by far, the most dominant firm. Each of the eight highly-cited patents held by Shell involves in situ thermal processing of hydrocarbon formations. The two remaining highly-cited patents describe a monitoring system to determine characteristics of fluid in a well (General Electric) and a model to optimize maintenance events (Aspen Technologies).

4) For highly cited storm water patents, the focus is on filtration and treatment systems for storm water and run off. The systems use a combination of physical, chemical, and biological filters to collect and treat sediment and hydrocarbons. Some of the treatment systems are large, and some are designed to be suspended from a storm drain or located in a catch basin.

5) For scientific papers regarding drinking water, there is a fair degree of emphasis on arsenic removal. A number of the highly cited papers center on this issue.

6) For waste water papers, the primary focus appears to be on the toxicity of pollutants (runoff, nutrients, glyphosate, estrogen, pathogenic microorganisms, pharmaceutical and personal care products, etc.) on streams and fish. Several papers concentrate on the management, or treatment, of waste water, including activated sludge, membranes, adsorption, phytoremediation, ultrasonic destruction, advanced oxidation, etc. Instrumentation for monitoring water were also in several papers.

7) For storm water papers, the "urban stream syndrome" is a primary focus. Not surprisingly, the effects of Hurricane Katrina in New Orleans are also of interest.

APPENDIX 1. DRINKING WATER PATENTS – CINCINNATI REGION

[listed with the most recently-granted patents first]

United States Patent **7,762,308**
Crawford , et al. **July 27, 2010**

Cast parts with improved surface properties and methods for their production

Abstract

Techniques for forming cast parts for medical devices suitable for contact with internal regions of patients are described herein. Such parts can be small in scale (e.g., having a major axis less than 0.3 inches, and/or a minor axis less than about 0.08 inches), and can be formed from metals that have a high melting point and high reactivity with environmental components or mold surfaces, such as stainless steel and titanium alloys. Such techniques can include injecting molten metal into the sprue of a mold tree such that the side runners are backfilled after the molten metal impacts a closed end of the sprue. Side runners can be oriented in particular directions and positions to promote backfilling. As well, flask temperatures and the use of surfactants can also promote cast part formation, hindering the formation of surface defects.

Inventors: **Crawford; William A.** (***Cincinnati*, Potter; Tracy J. (Philipsburg, PA), Heaney; Donald F. (Philipsburg, PA), DeForce; Brain S. (Port Matilda, PA), Onukuri; Samardh (*Cincinnati*< OH)**>
Assignee: **Ethicon Endo-Surgery, Inc.** (Cincinnati, OH)
Appl. No.: **11/949,262**
Filed: **December 3, 2007**

United States Patent **7,749,394**
Mitchell , et al. **July 6, 2010**

Methods of treating water

Abstract

Disclosed is a method of providing potable water that includes providing a filter, passing water through the filter, and removing bacteria and viruses from the water with the filter. The filter comprises a housing having an inlet and an outlet and a filter material disposed within the housing, the filter material formed at least in part from a plurality of filter particles consisting of mesoporous activated carbon wherein at least a portion of the plurality of filter particles is at least partially coated with silver or a silver-containing material. A sum of mesopore and macropore volumes of the filter particles may be between about 0.2 mL/g and about 2 mL/g, wherein mesopore means an intra-particle pore having a diameter between 2 nm and 50 nm, and

macropore means an intra-particle pore having a diameter greater than 50 nm, a total pore volume of the filter particles is greater than about 0.4 mL/g and less than about 3 mL/g, and a ratio of the sum of the mesopore and macropore volumes to the total pore volume of the filter particles is greater than about 0.3. The filter removes bacteria and viruses from the water at a level of Filter Bacteria Log Removal of greater than about 2 logs and a Filter Viruses Log Removal of greater than about 1 log.

Inventors: **Mitchell; Michael Donovan** (***Cincinnati*, Collias; Dimitris Ioannis (Mason, OH), Bjorkquist; David William (Wyoming, OH), Zaveri; Piyush Narendra (Mason, OH), Woolley; Matthew Morgan (Chapel Hill, NC)**

Assignee: **The Procter & Gamble Company** (Cincinnati, OH)

Appl. No.: **12/465,216**

Filed: **May 13, 2009**

United States Patent **7,740,766**

Mitchell , et al. **June 22, 2010**

Methods for treating water

Abstract

Disclosed is a method of providing potable water that includes providing a filter, passing water through the filter, and removing bacteria and viruses from the water with the filter. The filter comprises a housing having an inlet and an outlet and a filter material disposed within the housing, the filter material formed at least in part from a plurality of mesoporous wood activated carbon filter particles and particles selected from the group consisting of mesoporous wood activated carbon filter particles coated entirely with a cationic polymer, mesoporous wood activated carbon filter particles partially coated with a cationic polymer, and mixtures thereof. A sum of mesopore and macropore volumes of the filter particles may be between about 0.2 mL/g and about 2 mL/g, wherein mesopore means an intra-particle pore having a diameter between 2 nm and 50 nm, and macropore means an intra-particle pore having a diameter greater than 50 nm, a total pore volume of the filter particles is greater than about 0.4 mL/g and less than about 3 mL/g, and a ratio of the sum of the mesopore and macropore volumes to the total pore volume of the filter particles is greater than about 0.3. The filter removes bacteria and viruses from the water at a level of Filter Bacteria Log Removal of greater than about 2 logs and a Filter Viruses Log Removal of greater than about 1 log.

Inventors: **Mitchell; Michael Donovan** (***Cincinnati*, Collias; Dimitris Ioannis (Mason, OH), Bjorkquist; David William (Wyoming, OH), Zaveri; Piyush Narendra (Mason, OH), Woolley; Matthew Morgan (Chapel Hill, NC)**

Assignee: **The Procter & Gamble Company** (Cincinnati, OH)

Appl. No.: **12/465,238**

Filed: **May 13, 2009**

United States Patent **7,740,765**

Mitchell , et al. **June 22, 2010**

Methods for treating water

Abstract

Disclosed is a method of providing potable water that includes providing a filter, passing water through the filter, and removing bacteria and viruses from the water with the filter. The filter comprises a housing having an inlet and an outlet and a filter material disposed within the housing, the filter material formed at least in part from a plurality of filter particles consisting of mesoporous activated carbon. A sum of mesopore and macropore volumes of the filter particles may be between about 0.2 mL/g and about 2 mL/g, wherein mesopore means an intra-particle pore having a diameter between 2 nm and 50 nm, and macropore means an intra-particle pore having a diameter greater than 50 nm, a total pore volume of the filter particles is greater than about 0.4 mL/g and less than about 3 mL/g, and a ratio of the sum of the mesopore and macropore volumes to the total pore volume of the filter particles is greater than about 0.3. The filter removes bacteria and viruses from the water at a level of Filter Bacteria Log Removal of greater than about 2 logs and a Filter Viruses Log Removal of greater than about 1 log.

Inventors: **Mitchell; Michael Donovan** (***Cincinnati*, Collias; Dimitris Ioannis (Mason, OH), Bjorkquist; David William (Wyoming, OH), Zaveri; Piyush Narendra (Mason, OH), Woolley; Matthew Morgan (Chapel Hill, NC)**

Assignee: **The Procter & Gamble Company** (Cincinnati, OH)

Appl. No.: **12/465,193**

Filed: **May 13, 2009**

United States Patent **7,712,613**

Bahm , et al. **May 11, 2010**

Water filter materials and water filters containing a mixture of microporous and mesoporous carbon particles

Abstract

A filter and filter material for providing or treating potable water is provided. The filter includes a housing having an inlet and an outlet, a filter material disposed within the housing, the filter material formed at least in part from a mixture of a plurality of mesoporous and microporous activated carbon particles. Preferably, at least some of the mesoporous activated carbon filter particles are coated with a cationic polymer, and even more preferably, at least some of the particles are coated with a cationic polymer and silver or a silver containing material. Kits comprising filters and information relating to the reduction, killing or removal of bacteria, viruses, microbials, and TTHM are also provided.

Inventors: **Bahm; Jeannine Rebecca** (Milford, OH)**, Pearks; Andrew Thomas** (***Cincinnati*****, Vidal; Guillermo Matias (*Cincinnati*, Collias; Dimitris Ioannis (Mason, OH), Mitchell; Michael Donovan (*Cincinnati*, Astle; Robert E. (Middlefield, CT), Faye; Katharine L. K. (Moodus, CT), Governal; Robert Andrew (Middletown, CT), Hamlin; Thomas J. (Vernon, CT), Lucht; Rebecca A. (Rocky Hill, CT), Patel; Hemang (Wallingford, CT)**

Assignee: **PUR Water Purification Products, Inc.** (Cincinnati, OH)

Appl. No.: **12/211,200**

Filed: **September 16, 2008**

United States Patent **7,691,342**

Sahle-Demessie , et al. **April 6, 2010**

Process using compact embedded electron induced ozonation and activation of nanostructured titanium dioxide photocatalyst for photocatalytic oxidation

Abstract

A reactor produces a surface corona for emitting UV light and for the production of ozone by passing air or oxygen through the surface corona. The emitted UV light activates a photocatalyst coated on a surface facing a surface with embedded electrodes which generate the surface corona. The photocatalyst is a thin film of nanoparticle TiO.sub.2 with primary particle size of 0.02 to 0.2 .mu.m was deposited on a substrate by a flame aerosol method. The method combines ozonation and photocatalysis to provide effective and efficient oxidation of alcohols and hydrocarbons to value added products. The method can also be used for air and water cleaning.

Inventors: **Sahle-Demessie; Endalkachew** (***Cincinnati*****, Biswas; Pratim (*Cincinnati*, Pillai; Unnikrishnan R. (*Cincinnati*, Kim; Chulhan (Seoul, KR)**

Assignee: **The United States of America as represented by the U.S. Environmental Protection Agency** (Washington, DC)
N/A (

Appl. No.: **11/412,940**

Filed: **April 28, 2006**

United States Patent **7,645,615**

Fritsch , et al. **January 12, 2010**

Self-contained microelectrochemical bioassay platforms and methods

Abstract

Methods and devices for improved chemical and biological detection assays combined well defined microstructures having independently addressable electrodes with various surface immobilization electrochemical assays. Combining known chemical detection immobilization assays, electrochemically active moieties with microstructures having independently addressable electrodes provides for vastly improved methods of detecting microorganisms, chemical compounds, and measuring membrane transport.

Inventors: **Fritsch; Ingrid** (Fayetteville, AR)**, Beitle, Jr.; Robert** (Fayetteville, AR)**, Aguilar; Zoraida** (***Cincinnati*< OH)>**

Assignee: **Board of Trustees of The University of Arkansas, N.A.** (Little Rock, AR)

Appl. No.: **12/054,229**

Filed: **March 24, 2008**

United States Patent **7,614,508**

Mitchell , et al. **November 10, 2009**

Water filter materials, water filters and kits containing silver coated particles and processes for using the same

Abstract

A filter for providing potable water is provided. The filter includes a housing having an inlet and an outlet, a filter material disposed within the housing, the filter material formed at least in part from a plurality of mesoporous, basic, and reduced-oxygen activated carbon filter particles. Preferably, at least some of the mesoporous activated carbon filter particles are coated with silver or a silver containing material. Kits comprising filters and information relating to the killing or removal of bacteria, viruses, and microbials are also provided.

Inventors: **Mitchell; Michael Donovan** (***Cincinnati*, Collias; Dimitris Ioannis (Mason, OH), Bjorkquist; David William (Wyoming, OH), Zaveri; Piyush Narendra (Mason, OH), Woolley; Matthew Morgan (Chapel Hill, NC)**

Assignee: **PUR Water Purification Products Inc.** (Cincinnati, OH)

Appl. No.: **10/705,572**

Filed: **November 11, 2003**

United States Patent **7,614,507**

Mitchell , et al. **November 10, 2009**

Water filter materials, water filters and kits containing particles coated with cationic polymer and processes for using the same

Abstract

A filter for providing potable water is provided. The filter includes a housing having an inlet and an outlet, a filter material disposed within the housing, the filter material formed at least in part from a plurality of mesoporous, basic, and reduced-oxygen activated carbon filter particles. Preferably, at least some of the mesoporous activated carbon filter particles are coated with a cationic polymer, and even more preferably, at least some of the particles are coated with a cationic polymer and silver or a silver containing material. Kits comprising filters and information relating to the killing or removal of bacteria, viruses, and microbials are also provided.

Inventors: **Mitchell; Michael Donovan** (***Cincinnati*, Collias; Dimitris Ioannis (Mason, OH), Bjorkquist; David William (Wyoming, OH), Zaveri; Piyush Narendra (Mason, OH), Woolley; Matthew Morgan (Chapel Hill, NC)**

Assignee: **PUR Water Purification Products Inc.** (Cincinnati, OH)

Appl. No.: **10/705,174**

Filed: **November 11, 2003**

United States Patent **7,614,506**

Mitchell , et al. **November 10, 2009**

Water filter materials and water filters and processes for using the same

Abstract

A filter for providing potable water is provided. The filter includes a housing having an inlet and an outlet, a filter material disposed within the housing, the filter material formed at least in part from a plurality of mesoporous, basic, and reduced-oxygen activated carbon filter particles.

Inventors: **Mitchell; Michael Donovan** (***Cincinnati*, Collias; Dimitris Ioannis (Mason, OH), Bjorkquist; David William (Wyoming, OH), Zaveri; Piyush Narendra (Mason, OH), Woolley; Matthew Morgan (Chapel Hill, NC)**

Assignee: **PUR Water Purification Products Inc.** (Cincinnati, OH)

Appl. No.: **10/464,210**

Filed: **June 18, 2003**

United States Patent **7,604,997**

Esswein , et al. **October 20, 2009**

Wipes and methods for removal of metal contamination from surfaces

Abstract

Wipes, methods and kits useful for testing and/or removal of metal from surfaces (such as, dermal surfaces) are disclosed. Exemplar wipes, including the combination of a three-dimensionally textured absorbent support, a cationic surfactant, and a weak acid, are disclosed. In some examples, the cationic surfactant is isostearamidopropyl morpholine lactate (ISML), and the weak acid is citric acid.

Inventors: **Esswein; Eric J.** (Conifer, CO)**, Boeniger; Mark F.** (***Cincinnati*, Ashley; Kevin E. (*Cincinnati*< OH)>**

Assignee: **The United States of America as represented by the Department of Health and Human Services** (Washington, DC)
N/A (

Appl. No.: **11/039,178**

Filed: **January 18, 2005**

United States Patent **7,572,584**

Shanks , et al. **August 11, 2009**

Species-specific primer sets and identification of species-specific DNA sequences using genome fragment enrichment

Abstract

Targeted sequencing of genetic regions that differ between two DNA preparations uses genomic fragment enrichment. This method can be used to study genetic variation among closely related species and microbial communities.

Inventors: **Shanks; Orin C.** (***Cincinnati*, Domingo; Jorge Santo (*Cincinnati*, Graham; James E. (Louisville, KY), Lu; Jingrang (Mason, OH)**

Assignee: **The United States of America as represented by the U.S. Environmental Protection Agency** (Washington, DC)
N/A (

Appl. No.: **11/316,888**

Filed: **December 27, 2005**

United States Patent **7,551,279**

Adams , et al. **June 23, 2009**

Systems and methods for detecting normal levels of bacteria in water using a multiple angle light scattering (MALS) instrument

Abstract

A particle detection system to identify and classify particles is programmed to capture digitized images of the particle generated by directing a light source through a fluid that includes the particle. The particle scatters the light and the scattered light is detected using a detector. The detector creates a digital signal corresponding to the particle, which is used by the system to generate Bio-Optical Signature. This Bio-Optical Signature can then be used to classify the event, or particle. Count rate and trends of the classified particles are monitored to detect a change that is representative of the overall health safety of the water or by knowing the levels of bacteria in process water, such as Reverse Osmosis (RO) feed water, reject brine, and product water, the operator may better monitor the life and condition of the RO membrane.

Inventors: **Adams; John A.** (Escondido, CA)**, Crousore; Kristina M.** (Oceanside, CA)**, Teters; Cherish K.** (San Diego, CA)**, Ricardi; John** (Camarillo, CA)**, McCarty; David** (***Cincinnati*****, Tutrow; Michael P. (Solana Beach, CA)**

Assignee: **JMAR Technologies, Inc.** (San Diego, CA)

Appl. No.: **11/564,773**

Filed: **November 29, 2006**

United States Patent **7,537,695**

Mitchell , et al. **May 26, 2009**

Water filter incorporating activated carbon particles with surface-grown carbon nanofilaments

Abstract

A filter for producing potable water filter comprises a housing including a water inlet and a water outlet, and a filter material arranged within the housing. The filter material comprises activated carbon particles, and a plurality of carbon nanofilaments disposed on the surface of the activated carbon particles. The filter is operable to provide potable water by removing contaminants from a liquid water stream flowing from the water inlet to the water outlet of the housing.

Inventors: **Mitchell; Michael Donovan** (***Cincinnati*****, Collias; Dimitris Ioannis (Mason, OH)**

Assignee: **PUR Water Purification Products, Inc.** (Cincinnati, OH)

Appl. No.: **11/246,372**

Filed: **October 7, 2005**

United States Patent **7,518,723**

Adams , et al. **April 14, 2009**

Systems and methods for detecting radiation, biotoxin, chemical, and biological warfare agents using a multiple angle light scattering (MALS) instrument

Abstract

A particle detection system to identify and classify particles is programmed to capture digitized images of the particle generated by directing a light source through a fluid that includes the particle. The particle scatters the light and the scattered light is detected using a detector. The detector creates a digital signal corresponding to the particle, which is used by the system to generate a Bio-Optical Signature. This Bio-Optical Signature can then be used to classify the event, or particle. A count rate of the classified particles is monitored to detect a change that is representative of a toxin attack.

Inventors: **Adams; John A.** (Escondido, CA)**, Crousore; Kristina M.** (Oceanside, CA)**, Teters; Cherish K.** (San Diego, CA)**, Ricardi; John** (Camarillo, CA)**, McCarty; David L.** (***Cincinnati*****, Tutrow; Michael (Solana Beach, CA)**

Assignee: **JMAR Technologies, Inc.** (San Diego, CA)

Appl. No.: **11/564,777**

Filed: **November 29, 2006**

United States Patent **7,456,028**

Fritsch , et al. **November 25, 2008**

Electrochemical method for detecting water born pathogens

Abstract

A novel, surface immobilization electrochemical assay allows for rapid, accurate and highly sensitive detection of microorganisms and biological molecules. Known surface immobilization methods are utilized to bind an analyte to a surface. A binding material with a covalently attached electroactive complex generates electrical current in the presence of analyte. An electrode is used to detect the current, that is directly related to the concentration of analyte. The invention is especially suitable for detection of Cryptospiridium parvum.

Inventors: **Fritsch; Ingrid** (Fayetteville, AR)**, Beitle, Jr.; Robert** (Fayetteville, AR)**, Aguilar; Zoraida** (***Cincinnati*****< OH)>**

Assignee: **Board of Trustees of the University of Arkansas, N.A.** (Little Rock, AR)

Appl. No.: **10/252,342**

Filed: **September 23, 2002**

United States Patent **7,449,292**

Liggett , et al. **November 11, 2008**

Methods for predicting relative efficacy of a beta blocker therapy based on a B1-adrenergic receptor polymorphism

Abstract

Methods and compositions for the detection, diagnosis, and prevention of cardiac conditions are provided. Polymorphisms of .beta..sub.1-adrenergic receptor are provided. The Gly389 .beta..sub.1-adrenergic receptor variants are not as responsive to treatment .beta. blockers such as carvedilol, metoprolol or bisoprol. Thus, genotyping .beta..sub.1-adrenergic receptor polymorphisms is useful for predicting relative responsiveness to treatment with beta blockers. The Gly389 polymorphism also may be used, alone or in conjunction with other adrenergic receptor polymorphisms, to predict relative risk of developing cardiovascular diseases such as heart failure or to predict relative survival rate in patients with heart failure or other cardiovascular diseases. Also provided are transgenic mice and transgenic cells expressing the .beta..sub.1-adrenergic receptor polymorphisms, and their use in identifying therapeutic agents.

Inventors: **Liggett; Stephen Bryant** (***Cincinnati*, Wagoner; Lynne Elizabeth (*Cincinnati*< OH)>**

Assignee: **University of Cincinnati** (Cincinnati, OH)

Appl. No.: **10/941,063**

Filed: **September 13, 2004**

United States Patent **7,371,328**

Hokanson , et al. **May 13, 2008**

Method for treating hog and animal waste

Abstract

An animal treatment method comprises flushing the animal waste from a barn to a holding tank where the waste is mixed with an alkaline solution to kill pathogens. After neutralization, the solution is separated into solids and liquids. The liquid is treated and recycled as flushing water to clean the barns and/or ***drinking water*** for the animals. The solids are separated into digested and undigested feed. The digested feed is further processed for use as a fertilizer and the undigested feed is processed for use as animal feed.

Inventors: **Hokanson; Allan E.** (***Cincinnati*, Williams; Christopher S. (Wilmington, NC), Williams; Derek (Wilmington, NC)**

Assignee: **Recovery Systems, Inc.** (Wilmington, NC)

Appl. No.: **10/852,493**

Filed: **May 24, 2004**

United States Patent **7,348,183**
Fritsch , et al. **March 25, 2008**

Self-contained microelectrochemical bioassay platforms and methods

Abstract

Methods and devices for improved chemical and biomass detection assays combined well defined microstructures having independently addressable electrodes with various surface immobilization electrochemical assays. Combining known chemical detection immobilization assays, electrochemically active moieties with microstructures having independently addressable electrodes provides for vastly improved methods of detecting microorganisms, chemical compounds, and measuring membrane transport.

Inventors: **Fritsch; Ingrid** (Fayetteville, AR)**, Beitle, Jr.; Robert** (Fayetteville, AR)**, Aguilar; Zoraida** (***Cincinnati*< OH)>**
Assignee: **Board of Trustees of the University of Arkansas** (Little Rock, AR)
Appl. No.: **10/253,187**
Filed: **September 24, 2002**

United States Patent **7,335,307**
Scheckel , et al. **February 26, 2008**

Method for removing contaminants from water using ruthenium based contaminant sorbents and oxidizers

Abstract

Ruthenium compounds, either alone or in combination with other remediating compounds, can be used to oxidize, remove and sequester contaminants in water and soil or sediments.

Inventors: **Scheckel; Kirk G.** (***Cincinnati*, Impellitteri; Christopher A. (*Cincinnati*, Ryan; James A. (*Cincinnati*< OH)>**
Assignee: **U.S. EPA** (Washington, DC)
Appl. No.: **10/698,358**
Filed: **November 3, 2003**

United States Patent **7,316,323**

Collias , et al. **January 8, 2008**

Filters having improved permeability and virus removal capabilities

Abstract

A filter block having a permeability of greater than about 3.0*10.sup.-9 cm.sup.2, and a F-VLR of greater than about 99% is provided. The filter block may be made of filter particles having a median particle size of less than about 50 microns and having a particle span of about 1.4 or less. The filter blocks of the present invention can be used to make a filter for filtering liquids and more specifically, for providing potable water. The filter particles may be mesoporous. Kits comprising filters and information relating to the killing or removal of bacteria, viruses, and microbials are also provided.

Inventors: **Collias; Dimitris Ioannis** (Mason, OH)**, Goldman; Stephen Allen** (***Cincinnati*****, Mitchell; Michael Donovan (*Cincinnati*< OH)>**

Assignee: **The Procter & Gamble Company** (Cincinnati, OH)

Appl. No.: **10/840,578**

Filed: **May 6, 2004**

United States Patent **7,302,993**

Crawford , et al. **December 4, 2007**

Cast parts with improved surface properties and methods for their production

Abstract

Techniques for forming cast parts for medical devices suitable for contact with internal regions of patients are described herein. Such parts can be small in scale (e.g., having a major axis less than 0.3 inches, and/or a minor axis less than about 0.08 inches), and can be formed from metals that have a high melting point and high reactivity with environmental components or mold surfaces, such as stainless steel and titanium alloys. Such techniques can include injecting molten metal into the sprue of a mold tree such that the side runners are backfilled after the molten metal impacts a closed end of the sprue. Side runners can be oriented in particular directions and positions to promote backfilling. As well, flask temperatures and the use of surfactants can also promote cast part formation, hindering the formation of surface defects.

Inventors: **Crawford; William A.** (***Cincinnati*****, Potter; Tracy J. (Philipsburg, PA), Heaney; Donald F. (Philipsburg, PA), DeForce; Brain S. (Port Matilda, PA), Onukuri; Samardh (*Cincinnati*< OH)>**

Assignee: **Ethicon Endo-Surgery, Inc.** (Cincinnati, OH)

Appl. No.: **11/536,149**

Filed: **September 28, 2006**

United States Patent **7,297,099**
Boschert , et al. **November 20, 2007**

Use of osteopontin for the treatment and/or prevention of neurologic diseases

Abstract

The invention relates to the use of osteopontin, or of an agonist of osteopontin activity, for treatment or prevention of a neurologic diseases.

Inventors: **Boschert; Ursula** (Troinex, **CH**)**, Feger; Georg** (Thoiry, **FR**)**, Selvaraju; Raghuram** (Vandoeuvres, **CH**)**, Bernasconi; Lilia** (Perly, **CH**)**, Papoian; Ruben** (***Cincinnati*< OH)>**

Assignee: **Laboratoires Serono SA** (Coinsins, Vaud, **CH**)

Appl. No.: **10/981,737**

Filed: **November 5, 2004**

United States Patent **7,250,074**
Tonkovich , et al. **July 31, 2007**

Process for separating nitrogen from methane using microchannel process technology

Abstract

The disclosed invention relates to a process for separating methane or nitrogen from a fluid mixture comprising methane and nitrogen, the process comprising: (A) flowing the fluid mixture into a microchannel separator, the microchannel separator comprising a plurality of process microchannels containing a sorption medium, the fluid mixture being maintained in the microchannel separator until at least part of the methane or nitrogen is sorbed by the sorption medium, and removing non-sorbed parts of the fluid mixture from the microchannel separator; and (B) desorbing the methane or nitrogen from the sorption medium and removing the desorbed methane or nitrogen from the microchannel separator. The process is suitable for upgrading methane from coal mines, landfills, and other sub-quality sources.

Inventors: **Tonkovich; Anna Lee** (Marysville, OH)**, Qiu; Dongming** (Dublin, OH)**, Dritz; Terence Andrew** (Worthington, OH)**, Neagle; Paul** (Westerville, OH)**, Litt; Robert Dwayne** (Westerville, OH)**, Arora; Ravi** (Dublin, OH)**, Lamont; Michael Jay** (Hilliard, OH)**, Pagnotto; Kristina M.** (***Cincinnati*< OH)>**

Assignee: **Velocys, Inc.** (Plain City, OH)

Appl. No.: **10/927,370**
Filed: **August 26, 2004**

United States Patent **7,217,687**
Boschert , et al. **May 15, 2007**

Use of osteopontin for the treatment and/or prevention of neurologic diseases

Abstract

The invention relates to the use of osteopontin, or of an agonist of osteopontin activity, for treatment or prevention of a neurologic diseases.

Inventors:	**Boschert; Ursula** (Troinex, **CH**)**, Feger; Georg** (Thoiry, **FR**)**, Selvaraju; Raghuram** (Vandoeuvres, **CH**)**, Bernasconi; Lilia** (Perly, **CH**)**, Papoian; Ruben** (***Cincinnati*****< OH)>**
Assignee:	**Applied Research Systems ARS Holding N.V.** (Curacao, **AN**)
Appl. No.:	**10/477,876**
Filed:	**May 8, 2002**
PCT Filed:	**May 08, 2002**
PCT No.:	**PCT/EP02/05081**
371(c)(1),(2),(4) Date:	**April 09, 2004**
PCT Pub. No.:	**WO02/092122**
PCT Pub. Date:	**November 21, 2002**

United States Patent **7,186,441**
Mitchell , et al. **March 6, 2007**

Processes for manufacturing particles coated with activated lignosulfonate

Abstract

Processes for forming a filter material that includes coating a filter particle with a coating comprising a lignosulfonate, carbonizing the coating, and activating the coating. The filter particles may include a variety of filter particles, including but not limited to fibers, granules, and screens, and be formed from a variety of materials, such as metals, metal alloys, carbon, ceramic, or glass. Also, the lignosulfonate-coated filter particles may include a large amount of mesopore and/or macropore volume when carbonized and activated. One exemplary process for forming a filter material includes diluting ammonium lignosulfonate with water, mixing the solution with milled glass fibers, removing the excess lignosulfonate solution from the fibers, drying the lignosulfonate coated glass fibers at 65.degree. C. for 12 h, carbonizing the coated glass fibers in

a furnace ramped to 70.degree. C. with a rate of 7.degree. C./min for 30 min in a flowing nitrogen atmosphere, and activating the carbonized coated glass fibers in a furnace at 750.degree. C. for 6 h in a flowing nitrogen/steam atmosphere.

Inventors: **Mitchell; Michael Donovan** (***Cincinnati*, Owens; Blair Alex (*Cincinnati*, Collias; Dimitris Ioannis (Mason, OH), Wnuk; Andrew Julian (Wyoming, OH)**

Assignee: **Pur Water Purification Products, Inc.** (Cincinnati, OH)

Appl. No.: **10/771,778**

Filed: **February 4, 2004**

United States Patent **7,150,829**

Na , et al. **December 19, 2006**

Water treatment cartridges and processes related thereto

Abstract

An embodiment is directed to a water treatment cartridge for treating ***drinking water***. The water treatment cartridge may comprise a housing, an inlet for introducing water into the water treatment cartridge, an outlet port for egress of water from the water treatment cartridge, and a first treatment material. The first treatment material may have a core region. The water treatment cartridge also may have a second treatment material. The second treatment material may be contained within the core region of the first treatment material, such that the first treatment material and the second treatment material are in direct contact and direct communication. The second treatment material may be a calcium source. The water treatment cartridge also may have a liquid-pervious retainer. The retainer may cap the outlet port and may extend into the second treatment material. Water may enter the water treatment cartridge via the inlet, the water may then radially enter the first treatment material, then radially flow through the first treatment material, then, at least a portion of the water may radially enter the second treatment material, then axially flow through the second treatment material, then egress the water treatment cartridge via the outlet port.

Inventors: **Na; Henry Cheng** (***Cincinnati*, Funk; Joseph T. (St. Paul, OH)**

Assignee: **Pur Water Purification Products, Inc.** (Cincinnati, OH)

Appl. No.: **10/889,874**

Filed: **July 13, 2004**

United States Patent **7,148,033**

Brenner , et al. **December 12, 2006**

Method for detection for total coliforms and E. coli

Abstract

An improved method for detection of total coliforms and E. coli comprising a broth containing an ingredient that will suppress growth of non-coliform gram negative bacteria, and at least one chromogen or fluorogen has been used effectively and is cost effective. Preferred methods include use of filter and/or plates containing the growth-promoting ingredients and the indicators.

Inventors: **Brenner; Kristen P.** (***Cincinnati*, Rankin; Clifford C. (Dayton, OH), Roybal-McKenna; Yvette R. (Gilbert, AZ), Dufour; Alfred P. (*Cincinnati*< OH)>**

Assignee: **The United States of America as represented by the Administrator of the U. S. Environmental Protection Agency** (Washington, DC)
N/A (

Appl. No.: **10/713,113**

Filed: **November 17, 2003**

United States Patent **7,090,878**

Mehansho , et al. **August 15, 2006**

Mineral fortified water

Abstract

A water composition that is fortified with at least one mineral and has a pH between about 2.5 and 9.5. The water composition has a redox potential that satisfies the following equation: 0.gtoreq.RP-(A-B*pH) wherein RP is the redox potential in millivolts of the mineral-containing water composition, pH is the pH of the mineral-containing water composition, A is 400 and B is 20. The mineral is preferably selected from calcium, iron, zinc, copper, manganese, iodine, magnesium, and mixtures of these. Moreover, the mineral-fortified water composition is preferably substantially free of flavor or sweetener compounds. Even more preferably, the water composition has no metallic taste or after-taste, a Hunter colorimetric "b" reading of less than 5.0, and an NTU turbidity value of less than 5.0. The mineral-fortified water composition may optionally contain other nutrients and vitamins, for example, vitamin A, vitamin C, vitamin E, niacin, thiamin, vitamin B6, vitamin B2, vitamin B 12, folic acid, selenium, and pantathonic acid.

Inventors: **Mehansho; Haile** (Fairfield, OH)**, Mellican; Renee Irvine** (Bradenton, FL)**, Nunes; Raul Victorino** (Loveland, OH)**, Marcano; Adrian Monsalve** (***Cincinnati*< OH)>**

Assignee: **The Procter & Gamble Company** (Cincinnati, OH)

Appl. No.: **10/247,190**

Filed: **September 19, 2002**

United States Patent **7,048,842**
Tremblay , et al. **May 23, 2006**

Electrolysis cell for generating chlorine dioxide

Abstract

A method for making chlorine dioxide, by passing an aqueous feed solution comprising sodium chlorite into a non-membrane electrolysis cell comprising an anode and a cathode, adjacent to the anode, while flowing electrical current between the anode and the cathode to electrolyze the aqueous feed solution and convert the halogen dioxide salt to halogen dioxide. The anode is preferably a porous anode through which the aqueous feed solution passes to maximize the conversion of chlorite to chlorine dioxide.

Inventors: **Tremblay; Mario E.** (West Chester, OH)**, Rasmussen; Craig M.** (Loveland, OH)**, Collias; Dimitris I.** (Mason, OH)**, Mitchell; Michael D.** (***Cincinnati*****, Nesbitt; Daniel F. (*Cincinnati*< OH)>**

Assignee: **The Procter & Gamble Company** (Cincinnati, OH)

Appl. No.: **09/947,846**

Filed: **September 6, 2001**

United States Patent **6,855,498**
Hester , et al. **February 15, 2005**

In-situ hybridization probes for the detection of microsporidial species

Abstract

The present invention provides in situ hybridization probes which include a marker and a nucleic acid molecule able to hybridize exclusively with only one species of Encephalitozoon. The nucleic acid molecule may be, for example, complimentary to segment 878-896 of 16S rRNA of Encephalitozoon hellem spores. Specifically disclosed probes are those including the following nucleotides: (1) 5'-ACT CTC ACA CTC ACT TCA G-3' (Seq. I.D. No. 1) which is species specific for Encephalitozoon hellem, (2) 5'-CAG ACC ACT ATC TGC A-3' (Seq. I.D. No. 2) which is species specific for Encephalitozoon cuniculi and (3) 5'-GTT CTC CTG CCC GCT TCA G-3' (Seq. I.D. No. 3) which is species specific for Encephalitozoon intestinalis. The assay of the present invention utilizes a sample such as surface, ground or ***drinking water,*** suspected of containing one of the aforementioned species as a target organism. The microorganisms contained in the sample are fixed in a conventional manner and the probe is then introduced wherein it specifically binds with the target microorganism, if present. The sample is then washed to remove the unbound probe and the bound probe is detected in a conventional manner appropriate for the marker molecule of the probe.

Inventors: **Hester; Jeffery Dean** (***Cincinnati*, Lindquist; H. D. Alan (*Cincinnati*, Schaefer, III; Frank W. (Sharonville, OH)**

Assignee: **U.S. Environmental Protection Agency** (Washington, DC)

Appl. No.: **09/954,225**

Filed: **September 18, 2001**

United States Patent **6,846,478**

Doyle , et al. **January 25, 2005**

Promoting whole body health

Abstract

The present invention relates to promoting whole body health in humans and animals by using topical oral compositions comprising a safe and effective amount of chlorite ion in admixture with a pharmaceutically acceptable carrier, said compositions being effective in controlling bacterial-mediated diseases and conditions present in the oral cavity and inhibiting the spread into the bloodstream of oral pathogenic bacteria and associated bacterial toxins and resultant inflammatory cytokines and mediators. The present invention also encompasses methods of use of these compositions by topically applying to the oral cavity, a safe and effective amount of chlorite ion to promote and/or enhance whole body health in humans and other animals.

Inventors: **Doyle; Matthew Joseph** (***Cincinnati*, Hunter-Rinderle; Stephen Joseph (Mason, OH), Singer, Jr.; Robert Ernest (Fairfield, OH), Wimalasena; Rohan Lalith (Liberty Township, OH)**

Assignee: **The Procter & Gamble Company** (Cincinnati, OH)

Appl. No.: **09/607,729**

Filed: **June 30, 2000**

United States Patent **6,827,854**

Mitchell , et al. **December 7, 2004**

Filters and filter materials for the removal of microorganisms and processes for using the same

Abstract

Filters and filter materials for removing microorganisms from a fluid are provided along with processes for using the same. The filters include a housing having an inlet and an outlet and a filter material disposed within the housing, wherein the filter material is formed at least in part from a plurality of filter particles having an activated coating with a lignosulfonate.

Inventors: **Mitchell; Michael Donovan** (***Cincinnati*, Owens; Blair Alex (*Cincinnati*, Collias; Dimitris Ioannis (Mason, OH), Wnuk; Andrew Julian (Wyoming, OH)**
Assignee: **The Procter + Gamble Co.** (Cincinnati, OH)
Appl. No.: **09/832,581**
Filed: **April 11, 2001**

United States Patent **6,821,425**
Venosa , et al. **November 23, 2004**

Biomass concentrator reactor

Abstract

A gravity-flow Biomass Concentrator Reactor (BCR) is provided which uses a porous barrier having pore sizes averaging from about 1 to about 50 microns through which treated water permeates under the pressure of gravity. Solids suspended in water treated with the BCR are effectively retained and concentrated.

Inventors: **Venosa; Albert D.** (***Cincinnati*, Suidan; Makram T. (*Cincinnati*< OH)>**
Assignee: **U.S. Environmental Protection Agency** (Washington, DC)
Appl. No.: **10/358,260**
Filed: **February 5, 2003**

United States Patent **6,808,931**
Wang , et al. **October 26, 2004**

Method for the determination of hexavalent chromium using ultrasonication and strong anion exchange solid phase extraction

Abstract

A method for the determination of hexavalent chromium (Cr.sup.VI) in environmental and industrial hygiene samples is provided. Based on the chemical properties of chromium species in aqueous solutions, a simple, fast, sensitive, and economical field method has been developed and evaluated for the determination of hexavalent chromium (Cr.sup.VI). Using ultrasonic extraction in combination with a strong anion exchange solid phase extraction (SAE-SPE) technique, the filtration, preconcentration, and isolation of Cr.sup.VI in the presence of other chromium species and interferents was achieved. The method generally involves: (1) ultrasonication in basic buffer solution to extract Cr.sup.VI from environmental matrices; (2) strong anionic exchange solid phase extraction to separate Cr.sup.VI from other chromium species and potential interferents; (3) acidification of the eluate containing the Cr.sup.VI ions; (4) complexation of Cr.sup.VI with

a complexing agent to form a soluble, colored Cr.sup.VI -complex; and (5) spectrophotometric determination of the colored Cr.sup.VI -complex. Preferably, the ultrasonication step is carried out in the presence of a slightly basic ammonium buffer and the complexing agent is 1,5-diphenylcarbazide.

Inventors:	**Wang; Jin** (***Cincinnati*, Ashley; Kevin (*Cincinnati*< OH)>**
Assignee:	**The United States of America as represented by the Secretary of Health and Human Services** (Washington, DC)
Appl. No.:	**09/622,547**
Filed:	**October 10, 2000**
PCT Filed:	**February 25, 1999**
PCT No.:	**PCT/US99/04200**
371(c)(1),(2),(4) Date:	**October 10, 2000**
PCT Pub. No.:	**WO99/44056**
PCT Pub. Date:	**September 02, 1999**

United States Patent **6,777,374**
Sahle-Demessie , et al. **August 17, 2004**

Process for photo-induced selective oxidation of organic chemicals to alcohols, ketones and aldehydes using flame deposited nano-structured photocatalyst

Abstract

Organic molecules are partially oxidized in that the gas phase on supported and immobilized photocatalysts deposited having a nanostructure. the photocatalysts are semiconductors such as titanium dioxide and are preferentially coated onto a substrate by flame aerosol coating.

Inventors:	**Sahle-Demessie; Endalkachew** (Mason, OH)**, Biswas; Pratim** (Chesterfield, MO)**, Gonzalez; Michale A.** (Wyoming, OH)**, Wang; Zhong-Min** (***Cincinnati*, Sikdar; Subhas K. (Blue Ash, OH)**
Assignee:	**The United States of America as represented by the Environmental Protection Agency** (Washington, DC)
Appl. No.:	**09/906,810**
Filed:	**July 18, 2001**

United States Patent **6,733,827**
Mitchell , et al. **May 11, 2004**

Processes for manufacturing particles coated with activated lignosulfonate

Abstract

Processes for forming a filter material are provided. The processes include the steps of coating a filter particle with a lignosulfonate, carbonizing the coating, and activating the coating.

Inventors: **Mitchell; Michael Donovan** (***Cincinnati*, Owens; Blair Alex (*Cincinnati*, Collias; Dimitris Ioannis (Mason, OH), Wnuk; Andrew Julian (Wyoming, OH)**

Assignee: **The Procter & Gamble Co.** (Cincinnati, OH)

Appl. No.: **09/832,580**

Filed: **April 11, 2001**

United States Patent **6,670,145**

Brenner , et al. **December 30, 2003**

Method for detection of total coliforms and E. coli

Abstract

An improved method for detection of total coliforms and E. coli comprising a broth containing an ingredient that will encourage growth and repair of injured coliforms, buffers to maintain a pH in the range of 6.5-8, at least one agent that suppresses growth of gram positive cocci and spore-forming organisms, at least one active agent that will suppress growth of non-coliform gram negative bacteria, and at least one chromogen or fluorogen has been used effectively and is cost effective. In the preferred embodiment, both a fluorogen and chromogen were used. Preferred methods include use of filter and/or plates containing the growth-promoting ingredients and the indicators.

Inventors: **Brenner; Kristen P.** (***Cincinnati*, Rankin; Clifford C. (Dayton, OH), Roybal-McKenna; Yvette R. (Gilbert, AZ), Dufour; Alfred P. (*Cincinnati*< OH)>**

Assignee: **The United States of America as represented by the Administrator of the Environmental Protection Agency** (Washington, DC)

Appl. No.: **09/924,950**

Filed: **August 9, 2001**

United States Patent **6,602,410**

Tanner , et al. **August 5, 2003**

Water purifying kits

Abstract

A kit for purifying water comprises a first container for receiving untreated water, and a second container for receiving purified water and having a dispensing spigot. A water purification composition, when mixed with water in the first container, produces partially purified water having solid matter. A first filter held in a filter holder at an upper end of the second container removes the solid matter when the partially purified water is poured from the first container. A second filter in the second container comprises carbon.

Inventors: **Tanner; John D.** (Plymouth, MN)**, Emmons; David J.** (Plymouth, MN)**, Ostendorf; Ward William** (West Chester, OH)**, Baier; Kathleen Grieshop** (***Cincinnati*****, Velazquez; Jesus (West Chester, OH), Olson; Christy Ann (Little Rock, AR), Souter; Philip Frank (Northumberland, GB), Ure; Colin (Tyne & Wear, GB)**

Assignee: **The Procter & Gamble Comapny** (Cincinnati, OH)

Appl. No.: **09/712,464**

Filed: **November 14, 2000**

United States Patent **6,585,863**

Davydov , et al. **July 1, 2003**

Photocatalytic degradation of organic compounds

Abstract

The present invention relates to the photocatalytic degradation of organic compounds by zeolite and/or mesoporous material hosted photocatalysts. The present invention further relates to a method of treating a contaminated aqueous liquid or gaseous fluid containing organics using a combination of visible or solar light energy in the presence of a photocatalyst to decompose the organic impurities in the liquid or gaseous fluid.

Inventors: **Davydov; Lev** (N. Plainfield, NJ)**, France; Paul Amaat** (West Chester, OH)**, Smirniotis; Panagiotis George** (***Cincinnati*****< OH)>**

Assignee: **Procter & Gamble Company** (Cincinnati, OH)

Appl. No.: **09/920,414**

Filed: **August 1, 2001**

Food preparation compositions

Abstract

Disclosed are improved food preparation compositions. The compositions can include an anti-stick agent, a flavor enhancing agent, and an anti-foam agent. The compositions can be used in relatively low levels when preparing food, yet provide improved flavor, texture and aroma compared to results achieved using greater amounts of conventional food preparation compositions.

Inventors: **El-Khoury; Nizar, N/A (*Cincinnati*, Swaine, Jr.; Robert Leslie, N/A (*Cincinnati*, Sandy; Jessie Linda, N/A (*Cincinnati*, Lin; Peter Yau-Tak, N/A (*Cincinnati*, Volker; David Alan, Howie; John Keeney, Zyzak; David Vincent, Lair; Angela Louise**

Appl. No.: **09/960,067**

Filed: **September 21, 2001**

United States Patent **6,403,144**

El-Khoury , et al. **June 11, 2002**

Food preparation compositions

Abstract

Disclosed are improved food preparation compositions. The compositions can include an anti-stick agent, a flavor enhancing agent, and an anti-foam agent. The compositions can be used in relatively low levels when preparing food, yet provide improved flavor, texture and aroma compared to results achieved using greater amounts of conventional food preparation compositions.

Inventors: **El-Khoury; Nizar (*Cincinnati*, Swaine, Jr.; Robert Leslie (Glendale, OH), Sandy; Jessie Linda (Covington, KY), Lin; Peter Yau-Tak (Middletown, OH), Volker; David Alan (North Bend, OH), Howie; John Keeney (Oregonia, OH), Zyzak; David Vincent (*Cincinnati*, Lair; Angela Louise (*Cincinnati*< OH)>**

Assignee: **The Procter & Gamble Co.** (Cincinnati, OH)

Appl. No.: **09/557,123**

Filed: **April 25, 2000**

United States Patent **6,375,900**

Lee-Alvarez , et al. **April 23, 2002**

Carbon analyzer with improved catalyst

Abstract

A carbon analyzer, is provided which includes a combustion chamber having a platinum on titania catalyst. The combustion chamber and catalyst are also provided. A method for analyzing carbon-containing specimens with such an analyzer is also provided as well as a method for oxidizing such specimens with a platinum on titania catalyst. A method of conditioning the catalyst is also provided.

Inventors: **Lee-Alvarez; Maria Theresa** (West Chester, OH)**, Booth; Robert A.** (***Cincinnati*< OH)>**

Assignee: **Tekmar Company** (Mason, OH)

Appl. No.: **09/300,234**

Filed: **April 27, 1999**

United States Patent **6,350,438**

Witt , et al. **February 26, 2002**

Oral care compositions comprising chlorite and methods

Abstract

The present invention relates to topical oral compositions, including therapeutic rinses, especially mouth rinses, as well as toothpastes, gels, tooth powders, chewing gums, mouth sprays, lozenges (including breath mints), dental implements (such as dental floss and tape), and pet care products comprising at least a minimally effective amount of chlorite ion, wherein the pH of the final composition is greater than 7 and the composition is essentially free of chlorine dioxide or chlorous acid. This invention further relates to a method for treating or preventing diseases and conditions of the oral cavity such as gingivitis, plaque, periodontal disease, herpetic lesions, and infections that may develop following dental procedures such as osseous surgery, tooth extraction, periodontal flap surgery, dental implantation, and scaling and root planing, in humans and other animals, by applying a safe and effective amount of the chlorite ion composition to the oral cavity.

Inventors: **Witt; Jonathan James** (***Cincinnati*, Wimalasena; Rohan Lalith (Liberty Twp., OH), Wong; Andrew Lee (West Chester, OH), Goulbourne, Jr.; Eric Altman (Hamilton, OH), Doyle; Matthew Joseph (*Cincinnati*< OH)>**

Assignee: **The Procter & Gamble Company** (Cincinnati, OH)

Appl. No.: **09/607,242**

Filed: **June 30, 2000**

United States Patent **6,306,621**

Brenner , et al. **October 23, 2001**

Membrane filter agar medium for simultaneous detection of total coliforms and E. coli

Abstract

An improved method for detection of total coliforms and E. coli comprising a broth containing an ingredient that will encourage growth and repair of injured coliforms, buffers to maintain a pH in the range of 6.5-8, at least one agent that suppresses growth of gram positive cocci and spore-forming organisms, at least one active agent that will suppress growth of non-coliform gram negative bacteria, and at least one chromogen or fluorogen has been used effectively and is cost effective. In the preferred embodiment, both a fluorogen and chromogen were used. Preferred methods include use of filter and/or plates containing the growth-promoting ingredients and the indicators.

Inventors: **Brenner; Kristen P.** (***Cincinnati*, Rankin; Clifford C. (Dayton, OH), Roybal-McKenna; Yvette R. (La Mesa, NM), Dufour; Alfred P. (*Cincinnati*< OH)>**

Assignee: **The United States of America as represented by the Administrator of the U.S. Environmental Protection Agency** (Washington, DC)

Appl. No.: **09/369,173**

Filed: **August 5, 1999**

United States Patent **6,280,688**

Motz **August 28, 2001**

Rinsing device for sample processing components of an analytical instrument

Abstract

A device for rinsing sample processing components of an analytical instruments including an inlet coupleable to a fluid source, an outlet coupleable to sample processing components of an analytical instrument, and a fluid reservoir between the inlet and outlet. The device includes a heater coupled to the fluid reservoir and the fluid reservoir includes at least two reservoir chambers connected in series and separated by a restricted passageway.

Inventors: **Motz; Martin B.** (***Cincinnati*< OH)>**

Assignee: **Tekmar Company** (Cincinnati, OH)

Appl. No.: **09/195,330**

Filed: **November 18, 1998**

United States Patent **6,248,593**

Esswein , et al. **June 19, 2001**

Handwipe disclosing method for the presence of lead

Abstract

A method of detecting lead contamination of a surface is disclosed. A handwipe issued to collect any lead contamination on the surface. The lead is solubilized with an aqueous acid solution and treated with rhodizonate or sulfide anions. A change in color from pink to red, where rhodizonate anions are used, or brown to black, where sulfide anions are used, is indicative of the presence of lead. The method is suitable for testing surfaces such as floors, walls, windowsills, and human skin.

Inventors: **Esswein; Eric J.** (Conifer, CO)**, Boeniger; Mark** (***Cincinnati*****, Ashley; Kevin (*Cincinnati*< OH)>**

Assignee: **The United States of America as represented by the Department of Health and Human Services** (Washington, DC)

Appl. No.: **09/458,152**

Filed: **December 9, 1999**

United States Patent **6,143,573**

Rao , et al. **November 7, 2000**

Modular vial autosampler

Abstract

A modular vial autosampler has a storage area for vials containing samples to be analyzed and at least one modular sampling station. A vial transfer mechanism lifts a sample vial from the storage section, moves it to a station for identification and then to a sampling station, and under central control activates the sampling station for obtaining a sample for analysis. The vial transfer mechanism is movable in x, y, and z directions to capture and move a selected vial. The autosampler has a series of valves operable under central control to selectively introduce two different standards into the sample, and after obtaining the sample, for rinsing and purging the conduits or lines and needles to reduce sample carryover. The modular vial autosampler includes controls to selectively sample either a gas or a liquid using many of the same components.

Inventors: **Rao; Prabhakar P.** (***Cincinnati*****, Lewis; Edmund T. (West Chester, OH), Green; Thomas B. (Batavia, OH)**

Assignee: **Tekmar Company** (Cincinnati, OH)

Appl. No.: **08/735,485**

Filed: **October 23, 1996**

United States Patent **6,063,590**

Brenner , et al. **May 16, 2000**

Membrane filter agar medium containing two enzyme substrates used for the simultaneous detection of total coliforms and E. coli.

Abstract

An improved method for detection of total coliforms and E. coli comprising placing the target sample in a broth containing an ingredient that will encourage growth and repair of injured coliforms, at least one agent that suppresses growth of gram positive cocci and spore-forming organisms, at least one active agent that will suppress growth of non-coliform gram negative bacteria, and at least one chromogen or fluorogen has been used effectively and is cost effective. In the preferred embodiment, both a fluorogen and chromogen were used. Preferred methods include use of filter and/or plates containing the growth-promoting ingredients and the indicators.

Inventors: **Brenner; Kristen P.** (***Cincinnati*, Rankin; Clifford C. (Dayton, OH), Roybal; Yvette R. (Lakewood, CO), Dufour; Alfred P. (Cincinnatti, OH)**

Assignee: **The United States of America as represented by the Administrator of the** (Washington, DC)

Appl. No.: **08/117,342**

Filed: **September 7, 1993**

United States Patent **6,056,921**

Rao , et al. **May 2, 2000**

Vial transporter having an elevator

Abstract

A modular vial autosampler has a storage area for vials containing samples to be analyzed and at least one modular sampling station. A vial transfer mechanism lifts a sample vial from the storage section, moves it to a station for identification and then to a sampling station, and under central control activates the sampling station for obtaining a sample for analysis. The vial transfer mechanism is movable in x, y, and z directions to capture and move a selected vial. The autosampler has a series of valves operable under central control to selectively introduce two different standards into the sample, and after obtaining the sample, for rinsing and purging the conduits or lines and needles to reduce sample carryover. The modular vial autosampler includes controls to selectively sample either a gas or a liquid using many of the same components.

Inventors: **Rao; Prabhakar P.** (***Cincinnati*, Lewis; Edmund T. (West Chester, OH), Green; Thomas B. (Batavia, OH)**

Assignee: **Tekmar Company** (Cincinnati, OH)
Appl. No.: **08/842,316**
Filed: **April 24, 1997**

Indianapolis, IN

United States Patent **7,772,209**
Niyikiza **August 10, 2010**

Antifolate combination therapies

Abstract

A method of administering an antifolate to a mammal in need thereof, comprising administering an effective amount of said antifolate in combination with a methylmalonic acid lowering agent.

Inventors: **Niyikiza; Clet** (***Indianapolis*< IN)>**
Assignee: **Eli Lilly and Company** (Indianapolis, IN)
Appl. No.: **11/776,329**
Filed: **July 11, 2007**

United States Patent **7,754,737**
Baldwin , et al. **July 13, 2010**

Diaminoalkane aspartic protease inhibitors

Abstract

Diaminoalkanes of Formula I have now been found which are orally active and bind to aspartic proteases to inhibit their activity. They are useful in the treatment or amelioration of diseases associated with elevated levels of aspartic protease activity. The invention also relates to a method for the use of the compounds of Formula I in ameliorating or treating aspartic protease related disorders in a subject in need thereof comprising administering to said subject an effective amount of a compound of Formula I. ##STR00001##

Inventors: **Baldwin; John J.** (Gwynedd, PA)**, Claremon; David A.** (Maple Glen, PA)**, Tice; Colin M.** (Maple Glen, PA)**, Cacatian; Salvacion** (Philadelphia, PA)**, Dillard; Lawrence W.** (Yardley, PA)**, Ishchenko; Alexey V.** (Elkins Park, PA)**, Yuan; Jing** (Lansdale, PA)**, Xu; Zhenrong** (Horsham, PA)**, McGeehan; Gerard** (Garnet Valley, PA)**, Zhao; Wei** (Eagleville, PA)**, Simpson; Robert D.** (Wilmington, DE)**, Singh; Suresh B.** (Kendall Park, NJ)**, Flaherty; Patrick**

	T. (Pittsburgh, PA)**, Wery; Jean-Pierre** (***Indianapolis*< IN)>**
Assignee:	**Vitae Pharmaceuticals, Inc.** (Fort Washington, PA)
Appl. No.:	**11/664,558**
Filed:	**October 7, 2005**
PCT Filed:	**October 07, 2005**
PCT No.:	**PCT/US2005/036230**
371(c)(1),(2),(4) Date:	**January 23, 2008**
PCT Pub. No.:	**WO2006/042150**
PCT Pub. Date:	**April 20, 2006**

United States Patent **7,557,132**
Benko , et al. **July 7, 2009**

Compounds useful as pesticides

Abstract

Compounds useful to control pests are provided.

Inventors:	**Benko; Zoltan Laszlo** (***Indianapolis*, DeAmicis; Carl Vincent (*Indianapolis*, Demeter; David Anthony (Fishers, IN), Markley; Lowell Dean (Zionsville, IN), Samaritoni; Jack Geno (Avon, IN), Schmidt; Carrie Lynn Rau (*Indianapolis*, Zhu; Yuanming (Carmel, IN), Erickson; W. Randal (Carmel, IN), Anzeveno; Peter Biagio (Zionsville, IN), Pechacek; James Todd (*Indianapolis*, Watson; Gerald Bryan (Zionsville, IN), Deboer; Gerrit Jan (*Indianapolis*, Sheets; Joel Jay (Zionsville, IN), Zabik; Susan Erhardt (Cicero, IN), Yerkes; Carla Nanette (Crawfordsville, IN), Schobert; Christian Thomas (Zionsville, IN), Dripps; James Edwin (Carmel, IN), Dintenfass; Leonard Paul (*Indianapolis*, Karr; Laura Lee (Lebanon, IN), Neese; Paul Allen (Tucson, AZ), Huang; Jim Xinpei (Carmel, IN), Gifford; James Michael (Lebanon, IN)**
Assignee:	**Dow AgroSciences LLC** (Indianapolis, IN)
Appl. No.:	**10/535,653**
Filed:	**December 19, 2003**
PCT Filed:	**December 19, 2003**
PCT No.:	**PCT/US03/41067**
371(c)(1),(2),(4) Date:	**May 19, 2005**
PCT Pub. No.:	**WO2004/057960**
PCT Pub. Date:	**July 15, 2004**

United States Patent **7,375,122**
Samaritoni , et al. **May 20, 2008**

Compounds useful as pesticides

Abstract

Compounds useful to control pests are provided.

Inventors:	**Samaritoni; Jack Geno** (Avon, IN)**, Demeter; David Anthony** (Fishers, IN)**, Benko; Zoltan Laszlo** (***Indianapolis*****, Gifford; James Michael (Lebanon, IN), Neese; Paul Allen (Tucson, AZ), Dintenfass; Leonard Paul (*Indianapolis*, Schmidt; Carrie Lynn Rau (*Indianapolis*< IN)>**
Assignee:	**Dow AgroSciences LLC** (Indianapolis, IN)
Appl. No.:	**10/535,513**
Filed:	**December 19, 2003**
PCT Filed:	**December 19, 2003**
PCT No.:	**PCT/US03/40703**
371(c)(1),(2),(4) Date:	**May 18, 2005**
PCT Pub. No.:	**WO2004/058714**
PCT Pub. Date:	**July 15, 2004**

United States Patent **7,291,328**
Garner , et al. **November 6, 2007**

Method to enhance fat content in the milk of a diary cow

Abstract

The disclosure describes a method of administering an amount of a lactic acid producing bacterium such as Lactobacillus acidophilus alone or in combination with a lactate utilizing bacterium such as Propionibacterium freudenreichii effective to enhance the milk fat content of a dairy cow.

Inventors: **Garner; Bryan E.** (Amarillo, TX)**, Ware; Douglas R.** (***Indianapolis*****< IN)>**
Assignee: **Nutrition Physiology Corporation** (Amarillo, TX)
Appl. No.: **10/905,217**

Filed: **December 21, 2004**

United States Patent **7,291,327**
Garner , et al. **November 6, 2007**

Compositions and methods for inhibiting pathogenic growth

Abstract

The invention includes methods and compositions for treating an animal to inhibit the incidence and growth of E. coli O157:H7 and other pathogenic bacteria. The treatment method comprises administering a therapeutically effective amount of Lactobacillus acidophilus or one or a combination of a number of other probiotic bacteria to an animal. An alternative treatment method comprises administering a therapeutically effective amount of a lactic acid producing bacterium such as Lactobacillus acidophilus in combination with a lactate utilizing bacterium such as Propionibacterium freudenreichii.

Inventors: **Garner; Bryan E.** (Amarillo, TX)**, Ware; Douglas R.** (***Indianapolis*< IN)>**
Assignee: **Nutrition Physiology Corporation** (Amarillo, TX)
Appl. No.: **10/905,216**
Filed: **December 21, 2004**

United States Patent **7,063,836**
Garner , et al. **June 20, 2006**

Compositions and methods for inhibiting pathogenic growth

Abstract

The invention includes methods and compositions for treating an animal to inhibit the incidence and growth of E. coli O157:H7 and other pathogenic bacteria. The treatment method comprises administering a therapeutically effective amount of Lactobacillus acidophilus or one or a combination of a number of other probiotic bacteria to an animal. An alternative treatment method comprises administering a therapeutically effective amount of a lactic acid producing bacterium such as Lactobacillus acidophilus in combination with a lactate utilizing bacterium such as Propionibacterium freudenreichii.

Inventors: **Garner; Bryan E.** (Amarillo, TX)**, Ware; Douglas R.** (***Indianapolis*< IN)>**
Appl. No.: **10/288,487**
Filed: **November 6, 2002**

United States Patent **7,053,065**
Niyikiza , et al. **May 30, 2006**

Vitamin B12 and pemetrexed disodium combination therapies

Abstract

A method of administering an antifolate to a mammal in need thereof, comprising administering an effective amount of said antifolate in combination with a methylmalonic acid lowering agent.

Inventors:	**Niyikiza; Clet (*Indianapolis*, Paoletti; Paolo (*Indianapolis*, Rusthoven; James Jacob (Ancaster, CA)**
Assignee:	**Eli Lilly and Company** (Indianapolis, IN)
Appl. No.:	**10/297,821**
Filed:	**June 15, 2001**
PCT Filed:	**June 15, 2001**
PCT No.:	**PCT/US01/14860**
371(c)(1),(2),(4) Date:	**December 05, 2002**
PCT Pub. No.:	**WO02/02093**
PCT Pub. Date:	**January 10, 2002**

United States Patent **6,992,177**
Hui , et al. **January 31, 2006**

Saquinavir derivatives useful in immunoassay

Abstract

Analogs of saquinavir functionalized at the quinoline portion of the molecule are described. These include pyridyl analogs (replacing the quinoline ring) with a functional handle out of the ring allowing for elaboration with linkers terminated by a functional group such as an activated ester which are useful for attaching the molecule to other entities such as proteins, polysaccharides, and the like. Analogs of saquinavir derivatized out of the quinoline ring are also described.

Inventors: **Hui; Raymond A. (*Indianapolis*, Sigler; Gerald F. (Carmel, IN), Root; Richard T. (Fishers, IN), Yuan; Wei (Fishers, IN)**
Assignee: **Roche Diagnostics Operations, Inc.** (Indianapolis, IN)
Appl. No.: **11/009,823**

Filed: **December 10, 2004**

United States Patent **6,841,563**
Hopkins , et al. **January 11, 2005**

Aryloxy propanolamines for improving livestock production

Abstract

Disclosed is a compound represented by structural formula (I): R1 is a substituted or unsubstituted aryl group. R2 and R3 are independently --H, a C1-C4 straight chained or branched alkyl group. R4 and R5 are independently --H, a C1-C4 straight chained or branched alkyl group or, taken together with the nitrogen atom to which each is bonded, a non-aromatic heterocyclic ring. Ring A and Ring B are independently further substituted with zero, one or two substituents. Physiologically acceptable salts of structural formula shown above are also included. Also disclosed is a method promoting growth, efficiency of feed utilization and/or production of lean body mass in a livestock animal. The method comprises administering to the animal an effective amount of one or more compounds represented by the structural formula as shown or a physiologically acceptable salt thereof.

Inventors:	**Hopkins; Randall Bruce (*Indianapolis*, Hancock; Deana Lori (Carthage, IN), Quimby; Michael Eugene (*Indianapolis*< IN)>**
Assignee:	**Eli Lilly and Company** (Indianapolis, IN)
Appl. No.:	**10/111,267**
Filed:	**April 17, 2002**
PCT Filed:	**November 13, 2000**
PCT No.:	**PCT/US00/31060**
371(c)(1),(2),(4) Date:	**April 17, 2002**
PCT Pub. No.:	**WO01/36413**
PCT Pub. Date:	**May 25, 2001**

United States Patent **6,820,375**
Meeker **November 23, 2004**

Precut utility core for small building structures

Abstract

A precut utility core for centrally locating all utility lines to be connected to appliances located in areas surrounding the core. The core consists of an inner cage housing with utility lines, a plurality of structural walls extending outwardly therefrom forming areas that house bath and

kitchen appliances. An outer cage surrounds and partially encloses the inner cage. The structural walls are connected together to the outer cage. The precut utility core additionally is designed to support an optional upward extending rain-gathering funnel shaped tank capable of furnishing rainwater by gravity to the core.

Inventors: **Meeker; Martha C.** (***Indianapolis*< IN)>**
Appl. No.: **10/414,687**
Filed: **April 16, 2003**

United States Patent **6,818,210**
Field **November 16, 2004**

Myocardial grafts and cellular compositions useful for same

Abstract

Described are preferred myocardial grafts of skeletal myoblasts or cardiomyocytes, and cellular compositions and methods useful in obtaining the grafts. The myocardial grafts are stable and can be used, for example, to deliver recombinant proteins directly to the heart.

Inventors: **Field; Loren J.** (***Indianapolis*< IN)>**
Assignee: **Advanced Research & Technology Institute** (Indianapolis, IN)
Appl. No.: **09/878,011**
Filed: **June 8, 2001**

United States Patent **6,737,054**
Field **May 18, 2004**

Myocardial grafts and cellular compositions useful for same

Abstract

Described are preferred myocardial grafts of skeletal myoblasts or cardiomyocytes, and cellular compositions and methods useful in obtaining the grafts. The myocardial grafts are stable and can be used, for example, to deliver recombinant proteins directly to the heart.

Inventors: **Field; Loren J.** (***Indianapolis*< IN)>**
Assignee: **Advanced Research and Technology Institute** (Indianapolis, IN)
Appl. No.: **09/878,020**
Filed: **June 8, 2001**

United States Patent **6,664,271**
Creemer , et al. **December 16, 2003**

Immunopotentiator agents

Abstract

Novel compounds and methods for preparing same, immunopotentiating compositions, and a method for potentiating the immune system of a host animal. The method comprises administering to the animal an effective amount of an immunopotentiating compound of Formula I or Formula II, or a physiologically acceptable salt.

Inventors: **Creemer; Lawrence Camillo** (Greenfield, IN)**, Herring; Janice Rhea** (***Indianapolis*****, McGruder; Edward Deorsey (Fishers, IN)**
Assignee: **Eli Lilly and Company** (Indianapolis, IN)
Appl. No.: **09/980,961**
Filed: **November 15, 2001**
PCT Filed: **May 11, 2000**
PCT No.: **PCT/US00/06710**
PCT Pub. No.: **WO00/71519**
PCT Pub. Date: **November 30, 2000**

United States Patent **6,649,213**
Debikey , et al. **November 18, 2003**

Methods and compositions for preventing adverse effects of water upon a printed substrate

Abstract

In accordance with the invention, there are provided methods for affixing a transparent coating upon a substrate, such as canvas, paper, cardboard or the like, that optionally has an image printed or otherwise recorded thereon, the coating effective to repel water and to prevent smearing or running of inks that are not water-fast, such as, for example, water-based inks used in ink-jet printers. In accordance with the invention, a coating composition including a particulate thermoplastic resin a plasticizer and, optionally, one or more of a wetting agent, a light stabilizer, an ultraviolet light absorber and a flatting agent is applied on the substrate and heated to cure the composition to a transparent, flexible, water-impervious coating.

Inventors: **Debikey; George** (***Indianapolis*****, Pohlad; Michael (Asa, MI)**

Appl. No.: **09/990,675**
Filed: **November 16, 2001**

United States Patent **6,605,275**
Boyse , et al. **August 12, 2003**

Isolation and preservation of fetal and neonatal hematopoietic stem and progenitor cells of the blood

Abstract

The present invention relates to hematopoietic stem and progenitor cells of neonatal or fetal blood that are cryopreserved, and the therapeutic uses of such stem and progenitor cells upon thawing. In particular, the present invention relates to the therapeutic use of fetal or neonatal stem cells for hematopoietic (or immune) reconstitution. Hematopoietic reconstitution with the cells of the invention can be valuable in the treatment or prevention of various diseases and disorders such as anemias, malignancies, autoimmune disorders, and various immune dysfunctions and deficiencies. In another embodiment, fetal or neonatal hematopoietic stem and progenitor cells which contain a heterologous gene sequence can be used for hematopoietic reconstitution in gene therapy. In a preferred embodiment of the invention, neonatal or fetal blood cells that have been cryopreserved and thawed can be used for autologous (self) reconstitution.

Inventors: **Boyse; Edward A.** (Tucson, AZ)**, Broxmeyer; Hal E.** (***Indianapolis*****, Douglas; Gordon W. (New York, NY)**
Assignee: **PharmaStem Therapeutics, Inc.** (Wayne, PA)
Appl. No.: **08/443,221**
Filed: **May 17, 1995**

United States Patent **6,569,427**
Boyse , et al. **May 27, 2003**

Isolation and preservation of fetal and neonatal hematopoietic stem and progenitor cells of the blood

Abstract

The present invention relates to hematopoietic stem and progenitor cells of neonatal or fetal blood that are cryopreserved, and the therapeutic uses of such stem and progenitor cells upon thawing. In particular, the present invention relates to the therapeutic use of fetal or neonatal stem cells for hematopoietic (or immune) reconstitution. Hematopoietic reconstitution with the cells of the invention can be valuable in the treatment or prevention of various diseases and disorders such as anemias, malignancies, autoimmune disorders, and various immune

dysfunctions and deficiencies. In another embodiment, fetal or neonatal hematopoietic stem and progenitor cells which contain a heterologous gene sequence can be used for hematopoietic reconstitution in gene therapy. In a preferred embodiment of the invention, neonatal or fetal blood cells that have been cryopreserved and thawed can be used for autologous (self) reconstitution.

Inventors: **Boyse; Edward A.** (Tucson, AZ)**, Broxmeyer; Hal E.** (***Indianapolis*****, Douglas; Gordon W. (New York, NY)**

Assignee: **PharmaStem Therapeutics, Inc.** (Del Mar, CA)

Appl. No.: **08/442,277**

Filed: **May 16, 1995**

United States Patent **6,534,504**

Hancock , et al. **March 18, 2003**

Indazolyloxy propanolamines for improving livestock production

Abstract

Disclosed is compound represented by Structural Formula (I), wherein Ring A, Ring B and Ring C are independently substituted or unsubstituted. R1 and R2 are independently a C1-C4 straight chained or branched alkyl group. Also disclosed is a method of increasing the quantity and improving quality of meat obtained from a livestock animal. The method comprises administering to the animal an effective amount of one or more compounds represented by Structural Formula (I).

Inventors: **Hancock; Deana Lori** (Carthage, IN)**, Hopkins; Randall Bruce** (***Indianapolis*****, Quimby; Michael Eugene (*Indianapolis*, Wuethrich; Andrew Jason (Peoria, IL)**

Assignee: **Eli Lilly and Company** (Indianapolis, IN)

Appl. No.: **10/110,890**

Filed: **April 16, 2002**

PCT Filed: **November 13, 2000**

PCT No.: **PCT/US00/30129**

PCT Pub. No.: **WO01/36390**

PCT Pub. Date: **May 25, 2001**

United States Patent **RE37,978**

Field **February 4, 2003**

Myocardial grafts and cellular compositions

Abstract

Described are preferred myocardial grafts of skeletal myoblasts or cardiomyocytes, and cellular compositions and methods useful in obtaining the grafts. The myocardial grafts are stable and can be used, for example, to deliver recombinant proteins directly to the heart.

Inventors: **Field; Loren J.** (***Indianapolis*< IN)>**
Assignee: **Advanced Research & Technology Institute** (Indianapolis, IN)
Appl. No.: **09/818,132**
Filed: **March 27, 2001**

United States Patent **6,461,645**
Boyse , et al. **October 8, 2002**

Isolation and preservation of fetal and neonatal hematopoietic stem and progenitor cells of the blood

Abstract

The present invention relates to hematopoietic stem and progenitor cells of neonatal or fetal blood that are cryopreserved, and the therapeutic uses of such stem and progenitor cells upon thawing. In particular, the present invention relates to the therapeutic use of fetal or neonatal stem cells for hematopoietic (or immune) reconstitution. Hematopoietic reconstitution with the cells of the invention can be valuable in the treatment or prevention of various diseases and disorders such as anemias, malignancies, autoimmune disorders, and various immune dysfunctions and deficiencies. In another embodiment, fetal or neonatal hematopoietic stem and progenitor cells which contain a heterologous gene sequence can be used for hematopoietic reconstitution in gene therapy. In a preferred embodiment of the invention, neonatal or fetal blood cells that have been cryopreserved and thawed can be used for autologous (self) reconstitution.

Inventors: **Boyse; Edward A.** (Tucson, AZ)**, Broxmeyer; Hal E.** (***Indianapolis*, Douglas; Gordon W. (Mendham, NJ)**
Assignee: **PharmaStem Therapeutics, Inc.** (Del Mar, CA)
Appl. No.: **07/525,428**
Filed: **May 16, 1990**

United States Patent **6,399,300**
Field **June 4, 2002**

Myocardial grafts and cellular compositions useful for same

Abstract

Described are preferred myocardial grafts of skeletal myoblasts or cardiomyocytes, and cellular compositions and methods useful in obtaining the grafts. The myocardial grafts are stable and can be used, for example, to deliver recombinant proteins directly to the heart.

Inventors: **Field; Loren J.** (***Indianapolis*< IN)>**
Assignee: **Indiana University Foundation** (Bloomington, IN)
Appl. No.: **09/441,315**
Filed: **November 16, 1999**

United States Patent **6,376,511**
McChesney , et al. **April 23, 2002**

8-aminoquinolines

Abstract

It has been found that one of the enantiomers of 8-aminoquinoline antiparasitic compounds is surprisingly more active than the other enantiomer against parasitic infections including opportunistic parasitic infections. These enantiomers as well as pharmaceutical compositions containing pure enantiomers are disclosed. Also disclosed is a novel class of 8-aminoquinolines which contain a tri-substituted phenoxy substitution.

Inventors: **McChesney; James** (Boulder, CO)**, Nanayakkara; Dhammika N.** (Oxford, MS)**, Bartlett; Marilyn** (***Indianapolis*, Ager; Arba L. (Miami, FL)**
Assignee: **The University of Mississippi** (University, MS)
Appl. No.: **09/155,509**
Filed: **June 15, 1999**
PCT Filed: **March 28, 1997**
PCT No.: **PCT/US97/05160**
371 Date: **June 15, 1999**
102(e) Date: **June 15, 1999**
PCT Pub. No.: **WO97/36590**
PCT Pub. Date: **October 09, 1997**

United States Patent **6,096,270**

Rapkin , et al. **August 1, 2000**

Apparatus and methods useful in determining disinfectant effective concentration of hypochlorite ions

Abstract

The invention involves apparatus, reagents, and methods for determining a disinfecting effective amount of hypochlorite in a sample. These involve using enough neutralizing agent sufficient to neutralize up to, but no more, than 0.525%, or 5250 parts per million, of hypochlorite in a sample. If more than this amount is present in the sample, then an indicator system reacts with it to provide a detectable signal, such as color. If the hypochlorite is present at less than 0.525%, no signal forms. One can determine this in two minutes or less.

Inventors: **Rapkin; Myron** (***Indianapolis*, Tabb; David (Springfield, IL)**
Assignee: **Hapak Enterprises** (Crawfordsville, IN)
Appl. No.: **09/071,908**
Filed: **May 4, 1998**

United States Patent **6,085,475**
Parks , et al. **July 11, 2000**

Portable severe weather storm shelter

Abstract

A portable storm shelter is disclosed. The shelter includes a thin plastic tank surrounded by a horizontal frame that includes anchor legs. The shell and frame are covered with a protective layer such as fiber-filled concrete. Two ventilation conduits extend through the protective layer and into the tank. A window is attached over apertures in the protective layer and the tank. A door is attached to the protective layer and situated over an aperture in the tank and in the concrete layer. A battery provides power to a fan disposed in fluid communication with one of the ventilation conduits. A solar cell is attached to the outer surface of the concrete layer and provides a charging signal to the battery. A fluid basin attached to a fluid drain conduit is also provided. The fluid drain conduit extends through the tank and concrete layer. In a second embodiment, a tank is surrounded by a horizontal rectangular frame. Attached to the frame are a plurality of vertical rods having lifting eyes. A protective layer is formed over the tank, frame and rods with the lifting eyes exposed. An inclined enclosed chute is attached to the protective layer over an aperture in the protective layer and tank. Ventilation and drainage conduits extend through the protective layer into the interior of the tank. A battery, electric lights and ventilation fans are disposed within the tank. Another embodiment includes vertical support ribs molded into the side walls of the enclosure and reinforcement rods inserted horizontally through apertures in the vertical ribs to provide enhanced structural support.

Inventors: **Parks; James B.** (***Indianapolis*, Boles; Wiley O. (Greenfield, IN)**
Appl. No.: **09/239,278**
Filed: **January 29, 1999**

United States Patent **6,015,671**
Field **January 18, 2000**

Myocardial grafts and cellular compositions

Abstract

Described are preferred myocardial grafts of skeletal myoblasts or cardiomyocytes, and cellular compositions and methods useful in obtaining the grafts. The myocardial grafts are stable and can be used, for example, to deliver recombinant proteins directly to the heart.

Inventors: **Field; Loren J.** (***Indianapolis*< IN)>**
Assignee: **Indiana University Foundation** (Bloomington, IN)
Appl. No.: **08/976,278**
Filed: **November 21, 1997**

Columbus, OH

United States Patent **7,812,005**
Cornelli , et al. **October 12, 2010**

Glycosaminoglycans for treatment of emotional dysfunctions

Abstract

The present invention relates to the use of glycosaminoglycan fractions having an average molecular weight of 2400 (.+-.200) D for the preparation of pharmaceutical compositions suitable for the treatment of emotional dysfunctions, especially depressive disorders, anxiety disorders, anxiety neurosis, agitation, confusion.

Inventors:	**Cornelli; Umberto** (20129 Milan, **IT**)**, De Ambrosi; Luigi** (Santhia', **IT**)**, Lorens; Stanley** (Forest Park, IL)**, Fareed; Jawed** (Westchester, IL)**, Lee; John** (Wilmette, IL)**, Hanin; Israel** (Chicago, IL)**, Mervis; Ronald** (***Columbus***, ***OH***)
Assignee:	**Cornelli; Umberto** (Milan, **IT**)
Appl. No.:	**10/557,860**
Filed:	**May 19, 2004**
PCT Filed:	**May 19, 2004**
PCT No.:	**PCT/EP2004/050860**
371(c)(1),(2),(4) Date:	**November 21, 2005**
PCT Pub. No.:	**WO2004/103381**
PCT Pub. Date:	**December 02, 2004**

United States Patent **7,507,274**
Tonkovich , et al. **March 24, 2009**

Separation process using microchannel technology

Abstract

The disclosed invention relates to a process and apparatus for separating a first fluid from a fluid mixture comprising the first fluid. The process comprises: (A) flowing the fluid mixture into a microchannel separator in contact with a sorption medium, the fluid mixture being maintained in the microchannel separator until at least part of the first fluid is sorbed by the sorption medium, removing non-sorbed parts of the fluid mixture from the microchannel separator; and (B) desorbing first fluid from the sorption medium and removing desorbed first fluid from the

microchannel separator. The process and apparatus are suitable for separating nitrogen or methane from a fluid mixture comprising nitrogen and methane. The process and apparatus may be used for rejecting nitrogen in the upgrading of sub-quality methane.

Inventors: **Tonkovich; Anna Lee** (Dublin, ***OH***), **Perry; Steven T.** (Galloway, ***OH***), **Arora; Ravi** (Dublin, ***OH***), **Qiu; Dongming** (Bothell, WA), **Lamont; Michael Jay** (Hilliard, ***OH***), **Burwell; Deanna** (Cleveland Heights, ***OH***), **Dritz; Terence Andrew** (Worthington, ***OH***), **McDaniel; Jeffrey S.** (***Columbus***, ***OH***), **Rogers, Jr.; William A.** (Marysville, ***OH***), **Silva; Laura J.** (Dublin, ***OH***), **Weidert; Daniel J.** (Lewis Center, ***OH***), **Simmons; Wayne W.** (Dublin, ***OH***), **Chadwell; G. Bradley** (Reynoldsburg, ***OH***)

Assignee: **Velocys, Inc.** (Plain City, OH)

Appl. No.: **11/367,044**

Filed: **March 2, 2006**

United States Patent **7,410,637**

Sayre , et al. **August 12, 2008**

Transgenic algae for delivering antigens to an animal

Abstract

Delivery systems and methods are provided for delivering a biologically active protein to a host animal. The systems and methods provided include obtaining an algal cell transformed by an expression vector, the expression vector comprising a nucleotide sequence coding for the biologically active protein, operably linked to a promoter. In one illustrated embodiment, the biologically active protein is an antigenic epitope and upon administration to the animal the algal cell induces an immune response in the host animal.

Inventors: **Sayre; Richard T.** (Worthington, ***OH***), **Wagner; Richard E.** (Bloomington, IN), **Siripornadulsil; Surasak** (***Columbus***, ***OH***), **Farias; Carlos** (Valdivia, **CL**)

Assignee: **Phycotransgenics, LLC** (Bloomington, IN)
The Ohio State University (Columbus, OH)

Appl. No.: **10/311,741**

Filed: **June 20, 2001**

PCT Filed: **June 20, 2001**

PCT No.: **PCT/US01/19643**

371(c)(1),(2),(4) Date: **December 18, 2002**

PCT Pub. No.: **WO01/98335**

PCT Pub. Date: **December 27, 2001**

United States Patent **7,396,470**
Gavaskar , et al. **July 8, 2008**

Treatment of environmental pollutants with mineral ores

Abstract

A method for removing a pollutant from emissions or the environment comprising: contacting a mineral ore or the use of a mineral ore selected from the group consisting of bauxite, modified bauxite and mixtures thereof. Typically, the pollutant is a heavy metal or a microorganism.

Inventors:	**Gavaskar; Arun R.** (***Columbus***, ***OH***)**, Chattopadhyay; Sandip** (Powell, ***OH***)
Assignee:	**Battelle Memorial Institute** (Columbus, OH)
Appl. No.:	**10/507,354**
Filed:	**March 12, 2003**
PCT Filed:	**March 12, 2003**
PCT No.:	**PCT/US03/07631**
371(c)(1),(2),(4) Date:	**May 31, 2005**
PCT Pub. No.:	**WO03/078030**
PCT Pub. Date:	**September 25, 2003**

United States Patent **7,263,465**
Turley , et al. **August 28, 2007**

Pipeline integrity management process

Abstract

A method for reducing the consequences and risks of failure in a hydrocarbon pipeline system includes identifying specific segments of pipelines the leakage of which could have an adverse impact on environment or safety, particularly in areas of high consequence, developing a baseline assessment plan for such segments by analyzing information including age, corrosion, and types of seams and joints and then establishing preventive and migitative measures including, where necessary, positioning emergency flow restricting devices in one or more pipeline segments.

Inventors: **Turley; Richard D.** (Findlay, ***OH***)**, Feigert; Debra S.** (Findlay, ***OH***)**, Stechschulte; Donald J.** (***Columbus OH***, ***OH***)**, Jones; J. Charles** (Findlay, ***OH***)**, Johnston;**

Dennis C. (Wothington, ***OH***)**, Hucke; Dennis C.** (Findlay, ***OH***)**, Guinn; George L.** (Friendswood, TX)**, Melan; Bryan P.** (Cypress, TX)**, Jones; Thomas A.** (Findlay, ***OH***)**, Schmits; Nina M.** (Findlay, ***OH***)**, Carr; Douglas T.** (Findlay, ***OH***)**, Price; Raymond W.** (Canton, MI)**, Ross; Steven T.** (Findlay, ***OH***)**, Kendrick; Andrew W.** (Pittsburgh, PA)**, Siebold; David E.** (Findlay, ***OH***)

Assignee: **Marathon Ashland Petroleum LLC** (Findlay, OH)

Appl. No.: **11/010,242**

Filed: **December 10, 2004**

United States Patent **6,835,307**

Talbert , et al. **December 28, 2004**

Thermal water treatment

Abstract

A thermal treatment system for supplying thermally conditioned or purified water for human or animal consumption, industrial processes, environmental containment, or removal of foreign species. The water purifier includes a heat exchanger for exchanging heat between outgoing thermally conditioned or purified water and incoming makeup water; a water heater is connected to the heat exchanger so as to receive pre-heated incoming makeup water, where the water heater subsequently heats the incoming preheated makeup water to a set-point temperature in the case of thermally conditioned water and for purified water also holds the water for a period of time sufficient to inactivate selected organisms to a predetermined level. The heat exchanger has one or more treated water outlets for supplying thermally conditioned or purified water at selected temperatures.

Inventors: **Talbert; Sherwood G.** (***Columbus***, ***OH***)**, Paul; Darrell D.** (Upper Arlington, ***OH***)**, Millett; Stephen M.** (***Columbus***, ***OH***)**, Evers; David P.** (Canal Winchester, ***OH***)**, Dvorsky; James E.** (Norwich Township, ***OH***)**, George, II; Paul E.** (Powell, ***OH***)**, Haubert; Thomas D.** (***ColumbusOH***, ***OH***)**, Schelhorn; Jean E.** (Granville Township, ***OH***)**, Wiesmann; Klaus H.** (Upper Arlington, ***OH***)

Assignee: **Battelle Memorial Institute** (Columbus, OH)

Appl. No.: **09/921,344**

Filed: **August 2, 2001**

United States Patent **6,736,298**

Busick , et al. **May 18, 2004**

Thermoelectric water cooler with filter monitor system

Abstract

A filter monitor system is provided in a bottled water cooler for automatically tracking a filter service interval, and for indicating that filter cleaning or replacement is required for continued efficient cooler operation. In the preferred form, the water cooler includes a thermoelectric chiller module for chilling at least a portion of water contained within a cooler reservoir. An air filter is mounted on a filter frame which is removably positioned for filtering air drawn by a fan to circulate over a heat sink associated with the thermoelectric chiller module. The filter monitor system includes a reset switch engaged by the filter frame to initiate and track a predetermined filter service time interval, such as thirty days, and to energize a signal such as an indicator light at the conclusion of this service interval to indicate that the air filter should be removed for cleaning or replacement.

Inventors: **Busick; Louis M.** (***Columbus***, ***OH***)**, Host; John W.** (Lake Mary, FL)**, Nichols; Larry L.** (Valencia, CA)**, Wharton; Stephen W.** (***Columbus***, ***OH***)

Assignee: **Oasis Corporation** (Columbus, OH)

Appl. No.: **10/114,861**

Filed: **April 2, 2002**

United States Patent **6,680,137**

Paisley **January 20, 2004**

Integrated biomass gasification and fuel cell system

Abstract

An integrated biomass gasification and fuel cell system wherein the electrochemical reaction in the fuel cell is effected by providing the reactant gases from a gasifier. Fuel gas from the gasifier is directed to the anode of the fuel cell and at least a portion of the exhaust gas from the anode is directed to the combustor. The portion of the exhaust gas from the anode is then combusted to recover residual energy to increase the overall efficiency of integrated biomass gasification and fuel cell system. Also, the oxidant gas from the combustor may be directed to the cathode of the fuel cell.

Inventors: **Paisley; Mark A.** (***Columbus***, ***OH***)

Assignee: **Future Energy Resources Corporation** (Norcross, GA)

Appl. No.: **10/122,505**

Filed: **April 15, 2002**

United States Patent **6,644,037**

Busick , et al. **November 11, 2003**

Thermoelectric beverage cooler

Abstract

A beverage cooler is provided with an improved thermoelectric chiller unit for chilling a supply of water or other selected beverage within a cooler reservoir. The improved thermoelectric chiller unit includes a thermoelectric heat transfer module captured by a spring mount with substantially uniform pressure distribution between a chiller probe for chilling the water within the cooler reservoir, and a heat exchanger for dissipating heat drawn from the chilled water. The cooler reservoir has a faucet mounted thereon for on-demand dispensing of the water, and is mounted as a removable unit within a cooler housing with a bottom wall of the reservoir defining an inverted cup-shaped receptacle for close slide-fit reception of the chiller probe.

Inventors: **Busick; Louis M.** (***Columbus***, ***OH***)**, Wharton; Stephen W.** (***Columbus***, ***OH***)**, Sabin; Stephen J.** (Ballina, **IE**)**, Coyle; Declan L.** (Ballina, **IE**)

Assignee: **Oasis Corporation** (Columbus, OH)

Appl. No.: **10/255,554**

Filed: **September 25, 2002**

United States Patent **6,636,151**

Busick **October 21, 2003**

Water dispensing station with communication system

Abstract

A water dispensing station includes a source of water a water temperature adjustment system connected to the source of water and adapted to adjust water obtained from the source of water, a temperature sensor positioned to sense water temperature of water in the temperature adjusting system, and a dispensing system connected to the water temperature adjusting system and adapted to selectively dispense water. A controller has processing and memory means and is connected to the water temperature adjusting system and the temperature sensor. The controller is adapted to receive and store water temperature information from the temperature sensor. The station preferably includes a display screen to display information from the controller and input means for the user to input information to the controller. The station can further include a modem so that the controller can communicate with a remote service center. Preferably, the modem is in communication with the controller via transceivers and the modem automatically receives calls from the remote service center. The controller can automatically alert the remote service center when there is a need for service such as filter replacement, component replacement, or bottled water delivery or can alert the remote service center that the user desires to be contacted by the remote service center. The remote service center can check status of the station and send message to the user such as replacement filters are on the way or bottled water will be delivered on a certain date.

Inventors: **Busick; Louis M.** (***Columbus***, ***OH***)

Assignee: **Oasis Corporation** (Columbus, OH)
Appl. No.: **09/895,013**
Filed: **June 27, 2001**

United States Patent **6,344,146**
Moorehead , et al. **February 5, 2002**

Portable water purification device

Abstract

A portable, self-contained, fully integrated water purification device which includes a receptacle modified to accommodate a filtration assembly for purifying water, and to store water following purification. The receptacle provides separate openings for water intake, and water outflow. The filtration assembly includes a pump and a multistage filter cartridge. Pump action draws water into the water purification device and forces the water through the multistage filter and into the receptacle. Purified water may be stored in the receptacle until consumption.

Inventors: **Moorehead; John S.** (Westerville, ***OH***)**, Pettenski; Thomas A.** (***Columbus***, ***OH***)**, Searle; John F.** (Millersport, ***OH***)**, Larson; Eric J.** (Saint George, UT)
Assignee: **Battelle Memorial Institute** (Columbus, OH)
Appl. No.: **09/456,663**
Filed: **December 9, 1999**

United States Patent **6,341,376**
Smerdon, Jr. **January 29, 2002**

Hand and wrist protector

Abstract

A palm and wrist protector for bicycling and other activities requiring hand and wrist protection. A pad of resilient material covers an area of the hand including the base of the thenar eminence, the saddle between the thumb and forefinger, the distal portion of the palm below the base of the fingers, the ulnar side of the palm, and the wrist crease. The pad includes a tubular section that encircles and protects a proximal portion of the wearer's forefinger. An elastic retaining strap holds the protective pad against the palm while allowing the lower edge of the pad to move freely across the wrist during the side to side movement of the hand. In one embodiment, the pad is a laminate construction that includes a pressure distribution plate sandwiched between two coextensive layers of resilient material that are mated together.

Inventors: **Smerdon, Jr.; E. Thomas** (***Columbus***, ***OH***)

Appl. No.: **09/798,306**
Filed: **March 2, 2001**

United States Patent **6,235,318**
Lombardy, Jr. , et al. **May 22, 2001**

Effervescent chewing gum

Abstract

Disclosed is an oral hygiene preparation which is plaque disrupting in the form of a chewing gum. The chewing gum comprises a core containing a carbonate and/or bicarbonate which is surrounded by a coating that contains an encapsulated edible acid. Upon mastication the chewing gum effervesces, thus promoting the cleansing and breath freshening properties of the preparation.

Inventors: **Lombardy, Jr.; Charles M.** (Chagrin Falls, ***OH***), **Lombardy; David R.** (Chagrin Falls, ***OH***), **Liebrecht; Jeffrey Wayne** (***Columbus***, ***OH***)
Assignee: **Lombardy, Jr.; Charles M.** (Chagrin Falls, OH)
Lombardy; David R. (Chagrin Falls, OH)
Appl. No.: **09/234,815**
Filed: **January 21, 1999**

United States Patent **6,221,243**
Flanagan **April 24, 2001**

Device for removing hydrocarbons from storm water

Abstract

A hydrocarbon capturing device includes a retainer that is inserted into the end of an outlet pipe in a storm sewer catch basin. The retainer includes a ring that expands under a bias against the inner surface of the outlet pipe and radially extending fingers mounted to the ring that prevent insertion of the ring into the pipe too far. Two hooks are mounted to the retainer near the upper side of the outlet pipe to fasten one end of a hydrophobic, hydrocarbon-absorbing fabric sheet to the retainer. The opposite end of the sheet extends into the passageway of the outlet pipe, thereby floating atop any water that flows through the pipe during and after a rainfall or snowfall.

Inventors: **Flanagan; Terry L.** (***Columbus***, ***OH***)
Appl. No.: **09/521,289**
Filed: **March 8, 2000**

United States Patent **6,119,462**
Busick , et al. **September 19, 2000**

Water cooler with improved thermoelectric chiller system

Abstract

A water cooler is provided with an improved chiller system of the type having a thermoelectric chiller module for maintaining a supply of water at a reduced and refreshing temperature level. The chiller system comprises the thermoelectric chiller module having a cold side thereof in thermal communication with a supply of water to be chilled, and a hot side thereof exposed within a manifold defining a heat transfer chamber filled with a heat exchange medium such as water. An impeller located centrally within the heat transfer chamber circulates the water directly against the hot side of the thermoelectric module, from which the water then flows radially outwardly through a plurality of hollow fin elements and is recirculated back to the impeller. In the preferred form, the impeller is coupled by a hermetically sealed magnetic coupling to an air flow fan disposed outside the manifold for providing a cooling air flow over exterior surfaces of the hollow fin elements.

Inventors: **Busick; Louis M.** (***Columbus***, ***OH***)**, Burrows; Bruce D.** (Valencia, CA)
Assignee: **Oasis Corporation** (Columbus, OH)

Appl. No.: **09/273,807**
Filed: **March 22, 1999**

United States Patent **RE36,815**
Teumac , et al. **August 8, 2000**

Flavor protectant closure liner compositions

Abstract

A liner composition for a potable fluid container closure element which includes an inorganic sulfite such as sodium sulfite and/or a tocopherol compound such as a dl-.alpha.-tocopherol (vitamin E) for preventing off-flavors due to the presence of aldehydes in the fluid. Also, a potable fluid container of a reservoir element for containing a potable fluid, the reservoir element having an opening, a closure element capable of being attached to the opening, and the liner composition associated with the closure element. Also, a method of improving the taste of a potable fluid such as bottled water by use of the container and one of the previously described liner compositions associated therewith. Also, an improved method for processing the composition into closure liners based upon the prevention of the development of off-flavor-causing substances therein.

APPENDIX 2. WASTE WATER PATENTS – CINCINNATI REGION

[listed with the most recently-granted patents first]

United States Patent **7,749,394**
Mitchell , et al. **July 6, 2010**

Methods of treating water

Abstract

Disclosed is a method of providing potable water that includes providing a filter, passing water through the filter, and removing bacteria and viruses from the water with the filter. The filter comprises a housing having an inlet and an outlet and a filter material disposed within the housing, the filter material formed at least in part from a plurality of filter particles consisting of mesoporous activated carbon wherein at least a portion of the plurality of filter particles is at least partially coated with silver or a silver-containing material. A sum of mesopore and macropore volumes of the filter particles may be between about 0.2 mL/g and about 2 mL/g, wherein mesopore means an intra-particle pore having a diameter between 2 nm and 50 nm, and macropore means an intra-particle pore having a diameter greater than 50 nm, a total pore volume of the filter particles is greater than about 0.4 mL/g and less than about 3 mL/g, and a ratio of the sum of the mesopore and macropore volumes to the total pore volume of the filter particles is greater than about 0.3. The filter removes bacteria and viruses from the water at a level of Filter Bacteria Log Removal of greater than about 2 logs and a Filter Viruses Log Removal of greater than about 1 log.

Inventors: **Mitchell; Michael Donovan** (***Cincinnati*, Collias; Dimitris Ioannis (Mason, OH), Bjorkquist; David William (Wyoming, OH), Zaveri; Piyush Narendra (Mason, OH), Woolley; Matthew Morgan (Chapel Hill, NC)**

Assignee: **The Procter & Gamble Company** (Cincinnati, OH)

Appl. No.: **12/465,216**

Filed: **May 13, 2009**

United States Patent **7,740,766**
Mitchell , et al. **June 22, 2010**

Methods for treating water

Abstract

Disclosed is a method of providing potable water that includes providing a filter, passing water through the filter, and removing bacteria and viruses from the water with the filter. The filter comprises a housing having an inlet and an outlet and a filter material disposed within the

housing, the filter material formed at least in part from a plurality of mesoporous wood activated carbon filter particles and particles selected from the group consisting of mesoporous wood activated carbon filter particles coated entirely with a cationic polymer, mesoporous wood activated carbon filter particles partially coated with a cationic polymer, and mixtures thereof. A sum of mesopore and macropore volumes of the filter particles may be between about 0.2 mL/g and about 2 mL/g, wherein mesopore means an intra-particle pore having a diameter between 2 nm and 50 nm, and macropore means an intra-particle pore having a diameter greater than 50 nm, a total pore volume of the filter particles is greater than about 0.4 mL/g and less than about 3 mL/g, and a ratio of the sum of the mesopore and macropore volumes to the total pore volume of the filter particles is greater than about 0.3. The filter removes bacteria and viruses from the water at a level of Filter Bacteria Log Removal of greater than about 2 logs and a Filter Viruses Log Removal of greater than about 1 log.

Inventors: **Mitchell; Michael Donovan** (***Cincinnati*, Collias; Dimitris Ioannis (Mason, OH), Bjorkquist; David William (Wyoming, OH), Zaveri; Piyush Narendra (Mason, OH), Woolley; Matthew Morgan (Chapel Hill, NC)**

Assignee: **The Procter & Gamble Company** (Cincinnati, OH)

Appl. No.: **12/465,238**

Filed: **May 13, 2009**

United States Patent **7,740,765**

Mitchell , et al. **June 22, 2010**

Methods for treating water

Abstract

Disclosed is a method of providing potable water that includes providing a filter, passing water through the filter, and removing bacteria and viruses from the water with the filter. The filter comprises a housing having an inlet and an outlet and a filter material disposed within the housing, the filter material formed at least in part from a plurality of filter particles consisting of mesoporous activated carbon. A sum of mesopore and macropore volumes of the filter particles may be between about 0.2 mL/g and about 2 mL/g, wherein mesopore means an intra-particle pore having a diameter between 2 nm and 50 nm, and macropore means an intra-particle pore having a diameter greater than 50 nm, a total pore volume of the filter particles is greater than about 0.4 mL/g and less than about 3 mL/g, and a ratio of the sum of the mesopore and macropore volumes to the total pore volume of the filter particles is greater than about 0.3. The filter removes bacteria and viruses from the water at a level of Filter Bacteria Log Removal of greater than about 2 logs and a Filter Viruses Log Removal of greater than about 1 log.

Inventors: **Mitchell; Michael Donovan** (***Cincinnati*, Collias; Dimitris Ioannis (Mason, OH), Bjorkquist; David William (Wyoming, OH), Zaveri; Piyush Narendra (Mason, OH), Woolley; Matthew Morgan (Chapel Hill, NC)**

Assignee: **The Procter & Gamble Company** (Cincinnati, OH)
Appl. No.: **12/465,193**
Filed: **May 13, 2009**

United States Patent **7,712,613**
Bahm , et al. **May 11, 2010**

Water filter materials and water filters containing a mixture of microporous and mesoporous carbon particles

Abstract

A filter and filter material for providing or treating potable water is provided. The filter includes a housing having an inlet and an outlet, a filter material disposed within the housing, the filter material formed at least in part from a mixture of a plurality of mesoporous and microporous activated carbon particles. Preferably, at least some of the mesoporous activated carbon filter particles are coated with a cationic polymer, and even more preferably, at least some of the particles are coated with a cationic polymer and silver or a silver containing material. Kits comprising filters and information relating to the reduction, killing or removal of bacteria, viruses, microbials, and TTHM are also provided.

Inventors: **Bahm; Jeannine Rebecca** (Milford, OH)**, Pearks; Andrew Thomas** (***Cincinnati*****, Vidal; Guillermo Matias (*Cincinnati*, Collias; Dimitris Ioannis (Mason, OH), Mitchell; Michael Donovan (*Cincinnati*, Astle; Robert E. (Middlefield, CT), Faye; Katharine L. K. (Moodus, CT), Governal; Robert Andrew (Middletown, CT), Hamlin; Thomas J. (Vernon, CT), Lucht; Rebecca A. (Rocky Hill, CT), Patel; Hemang (Wallingford, CT)**
Assignee: **PUR Water Purification Products, Inc.** (Cincinnati, OH)
Appl. No.: **12/211,200**
Filed: **September 16, 2008**

United States Patent **7,691,342**
Sahle-Demessie , et al. **April 6, 2010**

Process using compact embedded electron induced ozonation and activation of nanostructured titanium dioxide photocatalyst for photocatalytic oxidation

Abstract

A reactor produces a surface corona for emitting UV light and for the production of ozone by passing air or oxygen through the surface corona. The emitted UV light activates a photocatalyst coated on a surface facing a surface with embedded electrodes which generate the surface

corona. The photocatalyst is a thin film of nanoparticle TiO.sub.2 with primary particle size of 0.02 to 0.2 .mu.m was deposited on a substrate by a flame aerosol method. The method combines ozonation and photocatalysis to provide effective and efficient oxidation of alcohols and hydrocarbons to value added products. The method can also be used for air and water cleaning.

Inventors: **Sahle-Demessie; Endalkachew** (***Cincinnati*, Biswas; Pratim (*Cincinnati*, Pillai; Unnikrishnan R. (*Cincinnati*, Kim; Chulhan (Seoul, KR)**

Assignee: **The United States of America as represented by the U.S. Environmental Protection Agency** (Washington, DC)
N/A (

Appl. No.: **11/412,940**

Filed: **April 28, 2006**

United States Patent **7,614,508**

Mitchell , et al. **November 10, 2009**

Water filter materials, water filters and kits containing silver coated particles and processes for using the same

Abstract

A filter for providing potable water is provided. The filter includes a housing having an inlet and an outlet, a filter material disposed within the housing, the filter material formed at least in part from a plurality of mesoporous, basic, and reduced-oxygen activated carbon filter particles. Preferably, at least some of the mesoporous activated carbon filter particles are coated with silver or a silver containing material. Kits comprising filters and information relating to the killing or removal of bacteria, viruses, and microbials are also provided.

Inventors: **Mitchell; Michael Donovan** (***Cincinnati*, Collias; Dimitris Ioannis (Mason, OH), Bjorkquist; David William (Wyoming, OH), Zaveri; Piyush Narendra (Mason, OH), Woolley; Matthew Morgan (Chapel Hill, NC)**

Assignee: **PUR Water Purification Products Inc.** (Cincinnati, OH)

Appl. No.: **10/705,572**

Filed: **November 11, 2003**

United States Patent **7,614,507**

Mitchell , et al. **November 10, 2009**

Water filter materials, water filters and kits containing particles coated with cationic polymer and processes for using the same

Abstract

A filter for providing potable water is provided. The filter includes a housing having an inlet and an outlet, a filter material disposed within the housing, the filter material formed at least in part from a plurality of mesoporous, basic, and reduced-oxygen activated carbon filter particles. Preferably, at least some of the mesoporous activated carbon filter particles are coated with a cationic polymer, and even more preferably, at least some of the particles are coated with a cationic polymer and silver or a silver containing material. Kits comprising filters and information relating to the killing or removal of bacteria, viruses, and microbials are also provided.

Inventors: **Mitchell; Michael Donovan** (***Cincinnati*, Collias; Dimitris Ioannis (Mason, OH), Bjorkquist; David William (Wyoming, OH), Zaveri; Piyush Narendra (Mason, OH), Woolley; Matthew Morgan (Chapel Hill, NC)**

Assignee: **PUR Water Purification Products Inc.** (Cincinnati, OH)

Appl. No.: **10/705,174**

Filed: **November 11, 2003**

United States Patent **7,614,506**

Mitchell , et al. **November 10, 2009**

Water filter materials and water filters and processes for using the same

Abstract

A filter for providing potable water is provided. The filter includes a housing having an inlet and an outlet, a filter material disposed within the housing, the filter material formed at least in part from a plurality of mesoporous, basic, and reduced-oxygen activated carbon filter particles.

Inventors: **Mitchell; Michael Donovan** (***Cincinnati*, Collias; Dimitris Ioannis (Mason, OH), Bjorkquist; David William (Wyoming, OH), Zaveri; Piyush Narendra (Mason, OH), Woolley; Matthew Morgan (Chapel Hill, NC)**

Assignee: **PUR Water Purification Products Inc.** (Cincinnati, OH)

Appl. No.: **10/464,210**

Filed: **June 18, 2003**

United States Patent **7,493,237**

Weinberg , et al. **February 17, 2009**

Environmental monitoring and reporting system

Abstract

A system and method are provided for tracking and documenting environmental compliance in a pulp mill, related primarily to the bypassing of liquid hazardous pollutants from a capture and treatment system. The method and system provide continuous information regarding the input materials, the output products, and the operations of equipment in the pulping process. The continuous information is provided to a central processor for determination of emission levels that exceed certain predetermined levels. The method and system permit personnel to verify compliance with environmental regulations, verify the reliability of pollutant collection and treatment equipment and record the actions taken to correct an inappropriate emission or equipment failure.

Inventors: **Weinberg; Marla K** (Milford, OH)**, Whitam; Clifford S** (Mason, OH)**, Smith; Richard M** (***Cincinnati*****, Williams; Sarah Francis Watson (Loveland, OH), Hamilton; Suzanne Rice (Germantown, TN), Brillhart; David Keith (Mobile, AL), Cox; Marceia Louise (Bartlett, TN), Risse; Karen Beth (Memphis, TN), Trate; Daniel Joseph (Loveland, OH)**

Assignee: **International Paper Company** (Memphis, TN)

Appl. No.: **11/207,407**

Filed: **August 19, 2005**

United States Patent **7,371,328**

Hokanson , et al. **May 13, 2008**

Method for treating hog and animal waste

Abstract

An animal treatment method comprises flushing the animal waste from a barn to a holding tank where the waste is mixed with an alkaline solution to kill pathogens. After neutralization, the solution is separated into solids and liquids. The liquid is treated and recycled as flushing water to clean the barns and/or drinking water for the animals. The solids are separated into digested and undigested feed. The digested feed is further processed for use as a fertilizer and the undigested feed is processed for use as animal feed.

Inventors: **Hokanson; Allan E.** (***Cincinnati*****, Williams; Christopher S. (Wilmington, NC), Williams; Derek (Wilmington, NC)**

Assignee: **Recovery Systems, Inc.** (Wilmington, NC)

Appl. No.: **10/852,493**

Filed: **May 24, 2004**

United States Patent **7,353,820**

Kumamoto , et al. **April 8, 2008**

Warming device

Abstract

A warming device consisting essentially of a heat generating main body comprising a heat generating element and an air-permeable holding member having the heat generating element enclosed therein. The warming device has a receiving part for receiving a part of a body being inserted. The heat generating element comprises a sheet which contains an oxidizable metal, a moisture-retaining agent, and a fibrous material and is prepared by papermaking.

Inventors: **Kumamoto; Yoshiaki** (Haga-gun, **JP**)**, Ishikawa; Masataka** (Haga-gun, **JP**)**, Orii; Takao** (Sumida-ku, **JP**)**, Hall; Christine** (***Cincinnati*****, Lynch; Jill Kathleen (*Cincinnati*< OH)>**

Assignee: **KAO Corporation** (Tokyo, **JP**)

Appl. No.: **10/873,225**

Filed: **June 23, 2004**

United States Patent **7,335,307**

Scheckel , et al. **February 26, 2008**

Method for removing contaminants from water using ruthenium based contaminant sorbents and oxidizers

Abstract

Ruthenium compounds, either alone or in combination with other remediating compounds, can be used to oxidize, remove and sequester contaminants in water and soil or sediments.

Inventors: **Scheckel; Kirk G.** (***Cincinnati*****, Impellitteri; Christopher A. (*Cincinnati*****, Ryan; James A. (*Cincinnati*< OH)>**

Assignee: **U.S. EPA** (Washington, DC)

Appl. No.: **10/698,358**

Filed: **November 3, 2003**

United States Patent **7,329,315**

Vilner , et al. **February 12, 2008**

Copper phthalocyanine blue pigment composition and water borne dispersion thereof

Abstract

Phthalocyanine blue pigments and pigment dispersions for water-borne inks and coatings are described. The pigments are produced by dry milling phthalocyanine blue and a polymeric dispersant, optionally with inorganic fillers and other additives, to obtain a material with improved coloristic, rheological, and stability properties. The resulting activated crude is then processed directly into water-based pigment dispersion with additives and/or surfactants to facilitate conversion to pigmentary form while maintaining the desirable green and clean shade.

Inventors: **Vilner; Stanislav** (Parsippany, NJ)**, Romanova; Tatiana N.** (Loveland, OH)**, Ortalano; Mark** (***Cincinnati*****, Robertson; George H. (Loveland, OH), Schwartz; Russell J. (Montgomery, OH)**

Assignee: **Sun Chemical Corporation** (Parsippany, NJ)

Appl. No.: **11/636,621**

Filed: **December 11, 2006**

United States Patent **7,316,323**

Collias , et al. **January 8, 2008**

Filters having improved permeability and virus removal capabilities

Abstract

A filter block having a permeability of greater than about 3.0*10.sup.-9 cm.sup.2, and a F-VLR of greater than about 99% is provided. The filter block may be made of filter particles having a median particle size of less than about 50 microns and having a particle span of about 1.4 or less. The filter blocks of the present invention can be used to make a filter for filtering liquids and more specifically, for providing potable water. The filter particles may be mesoporous. Kits comprising filters and information relating to the killing or removal of bacteria, viruses, and microbials are also provided.

Inventors: **Collias; Dimitris Ioannis** (Mason, OH)**, Goldman; Stephen Allen** (***Cincinnati*****, Mitchell; Michael Donovan (*Cincinnati*< OH)>**

Assignee: **The Procter & Gamble Company** (Cincinnati, OH)

Appl. No.: **10/840,578**

Filed: **May 6, 2004**

United States Patent **7,279,103**

Burckle , et al. **October 9, 2007**

Process for the purification of acidic metal-bearing waste waters to permissible discharge levels with recovery of marketable metal products

Abstract

Acidic metal-bearing wastewaters are treated to produce a finished water of sufficient purity to meet discharge standards while recovering metals removed in forms which are commercially valuable. The metals are selectively precipitated, either in a batch or in a continuous system, for removal of individual metal products in a specific sequence of steps from the ***wastewater***. In each step, the pH is adjusted to the specific pH range and sulfide ion is introduced to precipitate the metals, excepting the removal of ferric iron and aluminum which is achieved using hydroxide precipitation. Bioconversion process using unique equipment converts sulfate in the ***wastewater*** to the hydrogen sulfide gas required for the precipitation process. This bioconversion process reduces the sulfate in the ***wastewater*** so that the water can be directly discharged or used for agricultural applications.

Inventors: **Burckle; John** (***Cincinnati*, Govind; Rakesh (*Cincinnati*, Kawahara; Fred (Ft. Wright, KY), Scharp; Richard (*Cincinnati*, Tabak; Henry (*Cincinnati*< OH)>**

Assignee: **United States of America Enviromental Protection Agency** (Washington, DC)

Appl. No.: **11/224,039**

Filed: **September 13, 2005**

United States Patent **7,231,323**

Weinberg , et al. **June 12, 2007**

Environmental monitoring and reporting system for EPA cluster rule 010094

Abstract

A system and method are provided for tracking and documenting environmental compliance in a pulp mill, related primarily to the bypassing of liquid hazardous pollutants from a capture and treatment system. The method and system provide continuous information regarding the input materials, the output products, and the operations of equipment in the pulping process. The continuous information is provided to a central processor for determindation of emission levels that exceed certain predetermined levels. The method and system permit personnel to verify compliance with environmental regulations, verify the reliability of pollutant collection and treatment equipment and record the actions taken to correct an inappropriate emission or equipment failure.

Inventors: **Weinberg; Marla K.** (Milford, OH)**, Whitam; Clifford S.** (Mason, OH)**, Smith; Richard M.** (***Cincinnati*, Williams; Sarah W. (Loveland, OH), Hamilton; Suzanne R. (Germantown, TN), Brillhart; David K. (Mobile, AL), Cox; Marceia**

L. (Bartlett, TN), Risse; Karen B. (Memphis, TN), Trate; Daniel J. (Loveland, OH)

Assignee: **International Paper Company** (Stamford, CT)

Appl. No.: **10/324,680**

Filed: **December 20, 2002**

United States Patent **7,186,441**

Mitchell , et al. **March 6, 2007**

Processes for manufacturing particles coated with activated lignosulfonate

Abstract

Processes for forming a filter material that includes coating a filter particle with a coating comprising a lignosulfonate, carbonizing the coating, and activating the coating. The filter particles may include a variety of filter particles, including but not limited to fibers, granules, and screens, and be formed from a variety of materials, such as metals, metal alloys, carbon, ceramic, or glass. Also, the lignosulfonate-coated filter particles may include a large amount of mesopore and/or macropore volume when carbonized and activated. One exemplary process for forming a filter material includes diluting ammonium lignosulfonate with water, mixing the solution with milled glass fibers, removing the excess lignosulfonate solution from the fibers, drying the lignosulfonate coated glass fibers at 65.degree. C. for 12 h, carbonizing the coated glass fibers in a furnace ramped to 70.degree. C. with a rate of 7.degree. C./min for 30 min in a flowing nitrogen atmosphere, and activating the carbonized coated glass fibers in a furnace at 750.degree. C. for 6 h in a flowing nitrogen/steam atmosphere.

Inventors: **Mitchell; Michael Donovan** (***Cincinnati*, Owens; Blair Alex (*Cincinnati*, Collias; Dimitris Ioannis (Mason, OH), Wnuk; Andrew Julian (Wyoming, OH)**

Assignee: **Pur Water Purification Products, Inc.** (Cincinnati, OH)

Appl. No.: **10/771,778**

Filed: **February 4, 2004**

United States Patent **7,148,033**

Brenner , et al. **December 12, 2006**

Method for detection for total coliforms and E. coli

Abstract

An improved method for detection of total coliforms and E. coli comprising a broth containing an ingredient that will suppress growth of non-coliform gram negative bacteria, and at least one chromogen or fluorogen has been used effectively and is cost effective. Preferred methods

include use of filter and/or plates containing the growth-promoting ingredients and the indicators.

Inventors: **Brenner; Kristen P.** (***Cincinnati*, Rankin; Clifford C. (Dayton, OH), Roybal-McKenna; Yvette R. (Gilbert, AZ), Dufour; Alfred P. (*Cincinnati*< OH)>**

Assignee: **The United States of America as represented by the Administrator of the U. S. Environmental Protection Agency** (Washington, DC)
N/A (

Appl. No.: **10/713,113**

Filed: **November 17, 2003**

United States Patent **7,101,832**

Asher , et al. **September 5, 2006**

Cleaners containing peroxide bleaching agents for cleaning paper making equipment and method

Abstract

A cleaning solution for paper making equipment includes a stabilized source of peroxide in combination with a glycol ether solvent system and an alcohol ethoxylate. The peroxide system can be hydrogen peroxide stabilized with a phosphonate such as HEDP. The glycol solvent system may be a propylene glycol ether such as dipropylene glycol methylether or tripropylene glycol methylether. This solution can be formulated with a pH from about 4 to about 12. This is used by recirculating it through a paper making equipment during a shut down procedure.

Inventors: **Asher; Vikram** (***Cincinnati*, Ebbeler; Robert E. (*Cincinnati*< OH)>**

Assignee: **JohnsonDiversey, Inc.** (Sturtevant, WI)

Appl. No.: **10/465,248**

Filed: **June 19, 2003**

United States Patent **7,098,292**

Zhao , et al. **August 29, 2006**

Molded or extruded articles comprising polyhydroxyalkanoate copolymer and an environmentally degradable thermoplastic polymer

Abstract

Environmentally degradable molded or extruded articles comprising a blend of polyhydroxyalkanoate copolymer and an environmentally degradable thermoplastic polymer or

copolymer are disclosed. Such compositions provide annealing cycle times to form molded or extruded articles that are less than annealing cycle times to form a molded or extruded article lacking the environmentally degradable thermoplastic polymer or copolymer.

Inventors: **Zhao; Jean Jianqun** (***Cincinnati*, Noda; Isao (Fairfield, OH), Gilbertson; Gary Wayne (Liberty Township, OH), McAvoy; Drew Clifton (*Cincinnati*, Gray; Brian Francis (*Cincinnati*, Melik; David Harry (*Cincinnati*< OH)>**

Assignee: **The Procter & Gamble Company** (Cincinnati, OH)

Appl. No.: **10/431,796**

Filed: **May 8, 2003**

United States Patent **7,097,031**

Holland , et al. **August 29, 2006**

Lubricious liners and methods for their use

Abstract

Conveyor systems and methods for transporting articles, such as containers, using the conveyor systems are provided. The conveyor systems include a lubricious liner adhesively attached to a surface of a conveyor or an article for transport on the conveyor, such that the liner is disposed between the article and the surface. The lubricious liners facilitate the transport of the articles by the conveyor systems.

Inventors: **Holland; Brian T.** (Chicago, IL)**, Robitaille; Gregory T.** (***Cincinnati*, Hilarides; Jim J. (Lake Geneva, WI)**

Assignee: **JohnsonDiversey, Inc.** (Sturtevant, WI)

Appl. No.: **10/711,428**

Filed: **September 17, 2004**

United States Patent **7,048,842**

Tremblay , et al. **May 23, 2006**

Electrolysis cell for generating chlorine dioxide

Abstract

A method for making chlorine dioxide, by passing an aqueous feed solution comprising sodium chlorite into a non-membrane electrolysis cell comprising an anode and a cathode, adjacent to the anode, while flowing electrical current between the anode and the cathode to electrolyze the aqueous feed solution and convert the halogen dioxide salt to halogen dioxide. The anode is

preferably a porous anode through which the aqueous feed solution passes to maximize the conversion of chlorite to chlorine dioxide.

Inventors: **Tremblay; Mario E.** (West Chester, OH)**, Rasmussen; Craig M.** (Loveland, OH)**, Collias; Dimitris I.** (Mason, OH)**, Mitchell; Michael D.** (***Cincinnati*****, Nesbitt; Daniel F. (*Cincinnati*< OH)>**

Assignee: **The Procter & Gamble Company** (Cincinnati, OH)

Appl. No.: **09/947,846**

Filed: **September 6, 2001**

United States Patent **7,018,642**

Degenhardt , et al. **March 28, 2006**

Compounds, compositions, and methods for controlling biofilms

Abstract

The present invention provides nitrogen heterocyclic compounds, compositions, and methods for controlling biofilms, i.e., disrupting biofilms, preventing biofilm formation, enhancing biofilms, or modifying biofilms. Methods for screening test compounds for control of biofilms and devices for use therein are also provided.

Inventors: **Degenhardt; Charles Raymond** (***Cincinnati*****, Grayling; Rowan Andrew (Loveland, OH), Dille; Christopher Andrew (Erlanger, KY), Tansky; Cheryl Sue (*Cincinnati*< OH)>**

Assignee: **The Procter & Gamble Company** (Cincinnati, OH)

Appl. No.: **10/132,906**

Filed: **April 25, 2002**

United States Patent **6,998,377**

Deak , et al. **February 14, 2006**

Process for treating a lipophilic fluid

Abstract

The present invention relates to a process for treating a lipophilic fluid contained in an emulsion of water and lipophilic fluid. The process includes the steps of pre-treating the emulsion, removing lipophilic fluid from the emulsion, and purifying the lipophilic fluid to remove at least a portion of the impurities collected during the use of the emulsion. Method options are provided for each of the aforementioned steps.

Inventors: **Deak; John Christopher** (West Chester, OH)**, France; Paul Amaat** (West Chester, OH)**, Gansle; Kristina Marie Rohal** (***Cincinnati*****, Noyes; Anna Vadimovna (Hamilton, OH), Radomyselski; Arseni V. (Hamilton, OH), Severns; John Cort (West Chester, OH), Kamiel Thoen; Christiaan Arthur Jacques (West Chester, OH), Wevers; Jean (Steenhuffel, BE)**

Assignee: **Procter & Gamble Company** (Cincinnati, OH)

Appl. No.: **10/757,583**

Filed: **January 14, 2004**

United States Patent **6,997,201**

Preul **February 14, 2006**

Wastewater source control system

Abstract

A ***wastewater*** control system for use with a sewer service line conducting a flow of ***wastewater*** from a building to a sewer main. A flow control device is installed in the sewer service line; and an actuator, in electrical communication with the sensor, is connected to the flow control device. The actuator in response to an output signal from a hydrologic sensor causes the flow control device to block the flow of ***wastewater*** to the sewer main and detain the ***wastewater*** in the sewer service line.

Inventors: **Preul; Herbert C.** (***Cincinnati*****< OH)>**

Appl. No.: **10/678,009**

Filed: **October 2, 2003**

United States Patent **6,946,506**

Bond , et al. **September 20, 2005**

Fibers comprising starch and biodegradable polymers

Abstract

Environmentally degradable finely attenuated fibers produced by melt spinning a composition comprising destructurized starch, a biodegradable thermoplastic polymer, and a plasticizer are disclosed. The present invention is also directed to highly attenuated fibers containing thermoplastic polymer microfibrils which are formed within the starch matrix of the finely attenuated fiber. Nonwoven webs and disposable articles comprising the highly attenuated fibers are also disclosed.

Inventors: **Bond; Eric Bryan** (Maineville, OH)**, Autran; Jean-Philippe Marie** (Wyoming, OH)**, Mackey; Larry Neil** (Fairfield, OH)**, Noda; Isao** (Fairfield, OH)**, O'Donnell; Hugh Joseph** (***Cincinnati*< OH)>**

Assignee: **The Procter & Gamble Company** (Cincinnati, OH)

Appl. No.: **09/852,889**

Filed: **May 10, 2001**

United States Patent **6,930,079**

Deak , et al. **August 16, 2005**

Process for treating a lipophilic fluid

Abstract

The present invention relates to a process for treating a lipophilic fluid contained in an emulsion of water and lipophilic fluid. The process includes the steps of pretreating the emulsion, removing lipophilic fluid from the emulsion, and purifying the lipophilic fluid to remove at least a portion of the impurities collected during the use of the emulsion. Method options are provided for each of the aforementioned steps.

Inventors: **Deak; John Christopher** (West Chester, OH)**, France; Paul Amaat** (West Chester, OH)**, Gansle; Kristina Marie Rohal** (***Cincinnati*, Noyes; Anna Vadimovna (Hamilton, OH), Radomyselski; Arseni V. (Hamilton, OH), Severns; John Cort (West Chester, OH), Thoen; Christiaan Arthur Jacques Kamiel (West Chester, OH), Wevers; Jean (Steenhuffel, BE)**

Assignee: **Procter & Gamble Company** (Cincinnati, OH)

Appl. No.: **09/849,963**

Filed: **May 4, 2001**

United States Patent **6,914,040**

Deak , et al. **July 5, 2005**

Process for treating a lipophilic fluid in the form of a siloxane emulsion

Abstract

The present invention relates to a process for treating a lipophilic fluid contained in an emulsion of water and lipophilic fluid. The process includes the steps of pretreating the emulsion, removing lipophilic fluid from the emulsion, and purifying the lipophilic fluid to remove at least a portion of the impurities collected during the use of the emulsion. Method options are provided for each of the aforementioned steps.

Inventors: **Deak; John Christopher** (Clarks Summit, PA)**, France; Paul Armaat** (West Chester, OH)**, Gansle; Kristina Marie Rohal** (***Cincinnati*****, Radomyselski; Anna Vadimovna (Hamilton, OH), Radomyselski; Arseni V. (Hamilton, OH), Severns; John Cort (West Chester, OH), Thoen; Christiaan Arthur Jacques Kamiel (West Chester, OH), Wevers; Jean (Steenhuffel, BE)**

Assignee: **Procter & Gamble Company** (Cincinnati, OH)

Appl. No.: **10/238,294**

Filed: **September 10, 2002**

United States Patent **6,908,555**

Arnett , et al. **June 21, 2005**

Biosolids flow-through thermophilic treatment process

Abstract

A method of treating ***wastewater*** sludge includes pumping, continuously, raw sludge into a first digester and treating the raw sludge at a specific temperature of between about 51.degree. C. to 60.degree. C.; transferring the treated ***wastewater*** sludge to a batch tank; treating the ***wastewater*** sludge in the batch tank, anaerobically, at a thermophilic temperature which is not more than 2.degree. C. warmer than the specific temperature in the first digester; and disposing of the treated ***wastewater*** sludge as a Class A biosolid. A ***wastewater*** sludge treatment system includes a first thermophilic digester for treating raw ***wastewater*** sludge at a specific temperature in a range of between about 51.degree. C. to 60.degree. C., and discharging a treated ***wastewater*** sludge; a batch tank for receiving the treated ***wastewater*** sludge discharged from the first digester and for thermophilically treating sludge at a temperature in a range of between about 51.degree. C. to 60.degree. C. and not more than 2.degree. C. warmer than the specific temperature in the first digester, for between about 0.5 hours and 5 hours; and a disposal mechanism for disposing of the treated ***wastewater*** sludge as a Class A biosolid.

Inventors: **Arnett; Clifford J.** (Columbus, GA)**, Farrell; Joseph B.** (***Cincinnati*****, Hull, III; Daniel T. (Atlanta, GA), Krugel; Steven J. (Seattle, WA), Schafer; Perry L. (Sacramento, CA), Turner; Billy G. (Columbus, GA), Uhte; Warren R. (Fort Jones, CA), Willis; John L. (Norcross, GA)**

Assignee: **Columbus Water Works** (Columbus, GA)

Appl. No.: **10/425,131**

Filed: **April 28, 2003**

United States Patent **6,905,987**

Noda , et al. **June 14, 2005**

Fibers comprising polyhydroxyalkanoate copolymer/polylactic acid polymer or copolymer blends

Abstract

Environmentally degradable melt spun fibers comprising a polyhydroxyalkanoate copolymer and a polylactic acid polymer or copolymer are disclosed. A preferred configuration of the present invention is directed to environmentally degradable fibers comprising a sheath/core structure where the core comprises a biodegradable polyhydroxyalkanoate copolymer and the sheath comprises a polymer or copolymer of polylactic acid. Nonwoven webs and disposable articles comprising the environmentally degradable fibers are also disclosed.

Inventors: **Noda; Isao** (Fairfield, OH)**, Bond; Eric Bryan** (Maineville, OH)**, Melik; David Harry** (***Cincinnati*< OH)>**

Assignee: **The Procter & Gamble Company** (Cincinnati, OH)

Appl. No.: **10/051,723**

Filed: **January 17, 2002**

United States Patent **6,890,872**

Bond , et al. **May 10, 2005**

Fibers comprising starch and biodegradable polymers

Abstract

Environmentally degradable finely attenuated fibers produced by melt spinning a composition comprising destructurized starch, a biodegradable thermoplastic polymer, and a plasticizer are disclosed. The present invention is also directed to highly attenuated fibers containing thermoplastic polymer microfibrils which are formed within the starch matrix of the finely attenuated fiber. Nonwoven webs and disposable articles comprising the highly attenuated fibers are also disclosed.

Inventors: **Bond; Eric Bryan** (Maineville, OH)**, Autran; Jean-Philippe Marie** (Wyoming, OH)**, Mackey; Larry Neil** (Fairfield, OH)**, Noda; Isao** (Fairfield, OH)**, O'Donnell; Hugh Joseph** (***Cincinnati*< OH)>**

Assignee: **The Procter & Gamble Company** (Cincinnati, OH)

Appl. No.: **10/294,382**

Filed: **November 14, 2002**

United States Patent **6,866,888**

Baker , et al. **March 15, 2005**

Compositions for treating shoes and methods and articles employing same

Abstract

The present invention relates to compositions for treating shoes, especially leather-containing shoes, such as athletic shoes, and methods and articles of manufacture employing same to treat the shoes prior to and/or during and/or after washing the shoes. More particularly, the present invention relates to compositions applied to one or more shoes in need of treatment prior to and/or during and/or after washing the shoes for imparting a desired benefit to the shoes such as cleaning and/or conditioning and/or disinfecting and/or deodorizing.

Inventors: **Baker; Keith Homer** (***Cincinnati*, Siklosi; Michael Peter (*Cincinnati*, Na; Henry Cheng (*Cincinnati*, Strang; Janine Morgens (*Cincinnati*, Haeggberg; Donna Jean (*Cincinnati*, Scheper; William Michael (Lawrenceburg, IN), Sheets; Connie Lynn (*Cincinnati*, Tollens; Fernando Ray (Indian Hill, OH), Murray; Michael Glen (South Lebanon, OH), Creedon; Michael Timothy (*Cincinnati*, Wahl; Errol Hoffman (*Cincinnati*, Trinh; Toan (Maineville, OH), Sadlowski; Eugene Steven (*Cincinnati*, Becks; Vincent John (Liberty Township, OH)**

Assignee: **The Procter & Gamble Company** (Cincinnati, OH)

Appl. No.: **10/007,449**

Filed: **November 5, 2001**

United States Patent **6,846,478**

Doyle , et al. **January 25, 2005**

Promoting whole body health

Abstract

The present invention relates to promoting whole body health in humans and animals by using topical oral compositions comprising a safe and effective amount of chlorite ion in admixture with a pharmaceutically acceptable carrier, said compositions being effective in controlling bacterial-mediated diseases and conditions present in the oral cavity and inhibiting the spread into the bloodstream of oral pathogenic bacteria and associated bacterial toxins and resultant inflammatory cytokines and mediators. The present invention also encompasses methods of use of these compositions by topically applying to the oral cavity, a safe and effective amount of chlorite ion to promote and/or enhance whole body health in humans and other animals.

Inventors: **Doyle; Matthew Joseph** (***Cincinnati*, Hunter-Rinderle; Stephen Joseph (Mason, OH), Singer, Jr.; Robert Ernest (Fairfield, OH), Wimalasena; Rohan Lalith (Liberty Township, OH)**

Assignee: **The Procter & Gamble Company** (Cincinnati, OH)
Appl. No.: **09/607,729**
Filed: **June 30, 2000**

United States Patent **6,827,854**
Mitchell , et al. **December 7, 2004**

Filters and filter materials for the removal of microorganisms and processes for using the same

Abstract

Filters and filter materials for removing microorganisms from a fluid are provided along with processes for using the same. The filters include a housing having an inlet and an outlet and a filter material disposed within the housing, wherein the filter material is formed at least in part from a plurality of filter particles having an activated coating with a lignosulfonate.

Inventors: **Mitchell; Michael Donovan** (***Cincinnati*, Owens; Blair Alex (*Cincinnati*, Collias; Dimitris Ioannis (Mason, OH), Wnuk; Andrew Julian (Wyoming, OH)**
Assignee: **The Procter + Gamble Co.** (Cincinnati, OH)
Appl. No.: **09/832,581**
Filed: **April 11, 2001**

United States Patent **6,821,425**
Venosa , et al. **November 23, 2004**

Biomass concentrator reactor

Abstract

A gravity-flow Biomass Concentrator Reactor (BCR) is provided which uses a porous barrier having pore sizes averaging from about 1 to about 50 microns through which treated water permeates under the pressure of gravity. Solids suspended in water treated with the BCR are effectively retained and concentrated.

Inventors: **Venosa; Albert D.** (***Cincinnati*, Suidan; Makram T. (*Cincinnati*< OH)>**
Assignee: **U.S. Environmental Protection Agency** (Washington, DC)
Appl. No.: **10/358,260**
Filed: **February 5, 2003**

United States Patent **6,821,042**
Baker , et al. **November 23, 2004**

Compositions for treating shoes and methods and articles employing same

Abstract

The present invention relates to compositions for treating shoes, especially leather-containing shoes, such as athletic shoes, and methods and articles of manufacture employing same to treat the shoes prior to and/or during and/or after washing the shoes. More particularly, the present invention relates to compositions applied to one or more shoes in need of treatment prior to and/or during and/or after washing the shoes for imparting a desired benefit to the shoes such as cleaning and/or conditioning and/or disinfecting and/or deodorizing.

Inventors: **Baker; Keith Homer** (***Cincinnati*, Siklosi; Michael Peter (*Cincinnati*, Na; Henry Cheng (*Cincinnati*, Strang; Janine Morgens (*Cincinnati*, Haeggberg; Donna Jean (*Cincinnati*, Scheper; William Michael (Lawrenceburg, IN), Sheets; Connie Lynn (*Cincinnati*, Tollens; Fernando Ray (Indian Hill, OH), Murray; Michael Glen (South Lebanon, OH), Creedon; Michael Timothy (*Cincinnati*, Wahl; Errol Hoffman (*Cincinnati*, Trinh; Toan (Maineville, OH), Sadlowski; Eugene Steven (*Cincinnati*, Becks; Vincent John (Liberty Township, OH)**

Assignee: **The Procter & Gamble Company** (Cincinnati, OH)

Appl. No.: **10/672,854**

Filed: **September 26, 2003**

United States Patent **6,818,295**
Bond , et al. **November 16, 2004**

Fibers comprising starch and polymers

Abstract

The present invention is directed to highly attenuated fibers produced by melt spinning a composition comprising destructurized starch, a thermoplastic polymer, and a plasticizer. The present invention is also directed to highly attenuated fibers containing microfibrils which are formed within the starch matrix. Nonwoven webs and disposable articles comprising the highly attenuated fibers are also disclosed.

Inventors: **Bond; Eric Bryan** (Maineville, OH)**, Autran; Jean-Philippe Marie** (Wyoming, OH)**, Mackey; Larry Neil** (Fairfield, OH)**, Noda; Isao** (Fairfield, OH)**, O'Donnell; Hugh Joseph** (***Cincinnati*, Phan; Dean Van (West Chester, OH)**

Assignee: **The Procter & Gamble Company** (Cincinnati, OH)

Appl. No.: **10/294,419**
Filed: **November 14, 2002**

United States Patent **6,808,931**
Wang , et al. **October 26, 2004**

Method for the determination of hexavalent chromium using ultrasonication and strong anion exchange solid phase extraction

Abstract

A method for the determination of hexavalent chromium (Cr.sup.VI) in environmental and industrial hygiene samples is provided. Based on the chemical properties of chromium species in aqueous solutions, a simple, fast, sensitive, and economical field method has been developed and evaluated for the determination of hexavalent chromium (Cr.sup.VI). Using ultrasonic extraction in combination with a strong anion exchange solid phase extraction (SAE-SPE) technique, the filtration, preconcentration, and isolation of Cr.sup.VI in the presence of other chromium species and interferents was achieved. The method generally involves: (1) ultrasonication in basic buffer solution to extract Cr.sup.VI from environmental matrices; (2) strong anionic exchange solid phase extraction to separate Cr.sup.VI from other chromium species and potential interferents; (3) acidification of the eluate containing the Cr.sup.VI ions; (4) complexation of Cr.sup.VI with a complexing agent to form a soluble, colored Cr.sup.VI -complex; and (5) spectrophotometric determination of the colored Cr.sup.VI -complex. Preferably, the ultrasonication step is carried out in the presence of a slightly basic ammonium buffer and the complexing agent is 1,5-diphenylcarbazide.

Inventors:	**Wang; Jin** (***Cincinnati*, Ashley; Kevin (*Cincinnati*< OH)>**
Assignee:	**The United States of America as represented by the Secretary of Health and Human Services** (Washington, DC)
Appl. No.:	**09/622,547**
Filed:	**October 10, 2000**
PCT Filed:	**February 25, 1999**
PCT No.:	**PCT/US99/04200**
371(c)(1),(2),(4) Date:	**October 10, 2000**
PCT Pub. No.:	**WO99/44056**
PCT Pub. Date:	**September 02, 1999**

United States Patent **6,808,795**
Noda , et al. **October 26, 2004**

Polyhydroxyalkanoate copolymer and polylactic acid polymer compositions for laminates and films

Abstract

Environmentally degradable films comprising a blend of polyhydroxyalkanoate copolymer and a polylactic acid polymer or copolymer are disclosed. Laminates having a first layer comprising a PHA copolymer and a second layer comprising a PLA polymer or copolymer are also disclosed. Disposable articles comprising the environmentally degradable films or laminates are also disclosed.

Inventors: **Noda; Isao** (Fairfield, OH)**, Bond; Eric Bryan** (Maineville, OH)**, Melik; David Harry** (***Cincinnati*< OH)>**

Assignee: **The Procter & Gamble Company** (Cincinnati, OH)

Appl. No.: **10/051,724**

Filed: **January 17, 2002**

United States Patent **6,755,975**

Vane , et al. **June 29, 2004**

Separation process using pervaporation and dephlegmation

Abstract

A process for treating liquids containing organic compounds and water. The process includes a pervaporation step in conjunction with a dephlegmation step to treat at least a portion of the permeate vapor from the pervaporation step. The process yields a membrane residue stream, a stream enriched in the more volatile component (usually the organic) as the overhead stream from the dephlegmator and a condensate stream enriched in the less volatile component (usually the water) as a bottoms stream from the dephlegmator. Any of these may be the principal product of the process. The membrane separation step may also be performed in the vapor phase, or by membrane distillation.

Inventors: **Vane; Leland M.** (***Cincinnati*, Mairal; Anurag P. (Fremont, CA), Ng; Alvin (Palo Alto, CA), Alvarez; Franklin R. (*Cincinnati*, Baker; Richard W. (Palo Alto, CA)**

Assignee: **Membrane Technology and Research, Inc.** (Menlo Park, CA)
The United States of America as represented by the Environmental Protection Agency (Washington, DC)

Appl. No.: **10/170,333**

Filed: **June 12, 2002**

United States Patent **6,750,188**

Baker , et al. **June 15, 2004**

Compositions for treating shoes and methods and articles employing same

Abstract

The present invention relates to compositions for treating shoes, especially leather-containing shoes, such as athletic shoes, and methods and articles of manufacture employing same to treat the shoes prior to and/or during and/or after washing the shoes. More particularly, the present invention relates to compositions applied to one or more shoes in need of treatment prior to and/or during and/or after washing the shoes for imparting a desired benefit to the shoes such as cleaning and/or conditioning and/or disinfecting and/or deodorizing.

Inventors: **Baker; Keith Homer** (***Cincinnati*****, Siklosi; Michael Peter (*Cincinnati*, Na; Henry Cheng (*Cincinnati*, Strang; Janine Morgens (*Cincinnati*, Haeggberg; Donna Jean (*Cincinnati*, Scheper; William Michael (Lawrenceburg, IN), Sheets; Connie Lynn (*Cincinnati*, Tollens; Fernando Ray (Indian Hill, OH), Murray; Michael Glen (South Lebanon, OH), Creedon; Michael Timothy (*Cincinnati*, Wahl; Errol Hoffman (*Cincinnati*, Trinh; Toan (Maineville, OH), Sadlowski; Eugene Steven (*Cincinnati*, Becks; Vincent John (Liberty Township, OH)**

Assignee: **The Procter & Gamble Company** (Cincinnati, OH)

Appl. No.: **09/992,757**

Filed: **November 6, 2001**

United States Patent **6,746,766**

Bond , et al. **June 8, 2004**

Multicomponent fibers comprising starch and polymers

Abstract

The present invention is directed to multicomponent fibers. The fibers may be in a side-by-side, sheath-core, segmented pie, islands-in-the-sea configuration, or any combination of configurations. Each component of the fiber will comprise destructurized starch and/or a thermoplastic polymer. The present invention is also directed to nonwoven webs and disposable articles comprising the multicomponent fibers. The nonwoven webs may also contain other synthetic or natural fibers blended with the multicomponent fibers of the present invention.

Inventors: **Bond; Eric Bryan** (Maineville, OH)**, Autran; Jean-Philippe Marie** (Wyoming, OH)**, Mackey; Larry Neil** (Fairfield, OH)**, Noda; Isao** (Fairfield, OH)**, O'Donnell; Hugh Joseph** (***Cincinnati*****, Van Phan; Dean (West Chester, OH)**

Assignee: **The Procter & Gamble Company** (Cincinnati, OH)

Appl. No.: **10/294,417**
Filed: **November 14, 2002**

United States Patent **6,742,962**
Hater , et al. **June 1, 2004**

Infiltration and gas recovery systems for landfill bioreactors

Abstract

A trench located in a landfill including the combination of a liquid infiltration piping system and a horizontal gas withdrawal piping system, the combination allowing for simultaneous liquid infiltration and gas withdrawal from a landfill.

Inventors: **Hater; Gary** (***Cincinnati*, Barbush; John A. (Goshen, KY), Barr; Richard N. (Sellersburg, IN)**
Assignee: **Waste Management, Inc.** (Houston, TX)
Appl. No.: **10/260,179**
Filed: **September 30, 2002**

United States Patent **6,733,827**
Mitchell , et al. **May 11, 2004**

Processes for manufacturing particles coated with activated lignosulfonate

Abstract

Processes for forming a filter material are provided. The processes include the steps of coating a filter particle with a lignosulfonate, carbonizing the coating, and activating the coating.

Inventors: **Mitchell; Michael Donovan** (***Cincinnati*, Owens; Blair Alex (*Cincinnati*, Collias; Dimitris Ioannis (Mason, OH), Wnuk; Andrew Julian (Wyoming, OH)**
Assignee: **The Procter & Gamble Co.** (Cincinnati, OH)
Appl. No.: **09/832,580**
Filed: **April 11, 2001**

United States Patent **6,730,057**
Zhao , et al. **May 4, 2004**

Flushable tampon applicators

Abstract

Disclosed are flushable tampon applicators which comprise a combination of thermoplastic materials that readily disintegrate in water such as toilet water for improved disposal and reduced environmetal concerns regarding the destruction of these applicators. The flushable tampon applicators comprise a combination of high molecular weight polyethylene oxides, low molecular weight polyethylene glycols, and biodegradable polymers, wherein this combination of water-dispersible and biodegradable thermoplastic polymers provide flushable tampon applicators that are readily disposed of and that are smooth, soft, flexible, and non-sticky or non-slimy to the touch before and during use.

Inventors: **Zhao; Jean Jianqun** (***Cincinnati*, Gilbertson; Gary Wayne (Liberty Township, OH), Wnuk; Andrew Julian (Wyoming, OH)**

Assignee: **The Procter & Gamble Company** (Cincinnati, OH)

Appl. No.: **09/810,292**

Filed: **March 16, 2001**

United States Patent **6,726,362**

Frisch , et al. **April 27, 2004**

Shoe bags for use in laundering process

Abstract

The present invention relates to shoe bags useful in laundering processes, especially for laundering of shoes, particularly leather-containing shoes, such as athletic shoes. The shoe bags of the present invention are preferably used in combination with compositions for treating one or more shoes in need of treatment, and methods and articles of manufacture employing same to treat the shoes prior to and/or during and/or after washing the shoes for imparting a desired benefit to the shoes such as cleaning and/or conditioning and/or disinfecting and/or deodorizing.

Inventors: **Frisch; Jerome Edward** (***Cincinnati*, Hortel; Thomas Charles (*Cincinnati*, Nicks; Yana Milligan (*Cincinnati*< OH)>**

Assignee: **The Procter & Gamble Company** (Cincinnati, OH)

Appl. No.: **09/693,314**

Filed: **October 20, 2000**

United States Patent **6,706,942**

Zhao , et al. **March 16, 2004**

Molded or extruded articles comprising polyhydroxyalkanoate copolymer compositions having short annealing cycle times

Abstract

Environmentally degradable molded or extruded articles comprising a polyhydroxyalkanoate C4C6 copolymer composition having short annealing cycle times are provided. Such short annealing cycle times are achieved by compositions having a percentage of C6 units of 2-8%. Desirable annealing cycle times are obtained for molded or extruded articles, particularly for tampon applicators.

Inventors: **Zhao; Jean Jiangun** (***Cincinnati*, Noda; Isao (Fairfield, OH), Gilbertson; Gary Wayne (Liberty Township, OH), McAvoy; Drew Clifton (*Cincinnati*, Gray; Brian Francis (*Cincinnati*, Melik; David Harry (*Cincinnati*< OH)>**

Assignee: **The Procter & Gamble Company** (Cincinnati, OH)

Appl. No.: **10/431,797**

Filed: **May 8, 2003**

United States Patent **6,670,145**

Brenner , et al. **December 30, 2003**

Method for detection of total coliforms and E. coli

Abstract

An improved method for detection of total coliforms and E. coli comprising a broth containing an ingredient that will encourage growth and repair of injured coliforms, buffers to maintain a pH in the range of 6.5-8, at least one agent that suppresses growth of gram positive cocci and spore-forming organisms, at least one active agent that will suppress growth of non-coliform gram negative bacteria, and at least one chromogen or fluorogen has been used effectively and is cost effective. In the preferred embodiment, both a fluorogen and chromogen were used. Preferred methods include use of filter and/or plates containing the growth-promoting ingredients and the indicators.

Inventors: **Brenner; Kristen P.** (***Cincinnati*, Rankin; Clifford C. (Dayton, OH), Roybal-McKenna; Yvette R. (Gilbert, AZ), Dufour; Alfred P. (*Cincinnati*< OH)>**

Assignee: **The United States of America as represented by the Administrator of the Environmental Protection Agency** (Washington, DC)

Appl. No.: **09/924,950**

Filed: **August 9, 2001**

United States Patent **6,635,799**

Osborn, III , et al. **October 21, 2003**

Topsheet for contacting hydrous body tissues and absorbent device with such a topsheet

Abstract

A body-contacting surface or topsheet for absorbent articles or devices that is comfortable when it is placed in contact with hydrous body tissues is disclosed. In one non-limiting embodiment, the topsheet is a non-absorbent, moderately hydrophilic to substantially hydrophobic nonwoven web. The topsheet can have a critical surface tension of less than or equal to about 45 dynes/cm. In one embodiment, the nonwoven web has been mechanically modified so that it is extensible in an amount greater than equal to about 30% under a force of 50 grams, and undergoes a caliper change of greater than or equal to about 30% under a pressure of 1,000 Pa after being subjected to a pressure of 250 Pa. The topsheet is placed on absorbent devices such as sanitary napkins, tampons, pantiliners, interlabial devices, incontinence devices, bandages, and other types of articles. A method of capturing discharges from a source of discharges on a wearer's body in which at least a portion of the source of discharges is located within hydrous membranes having irregular surfaces (e.g., a female wearer's interlabial or intervaginal space) is also disclosed.

Inventors: **Osborn, III; Thomas Ward** (***Cincinnati*, Bewick-Sonntag; Christopher (*Cincinnati*, Brown; Pamela Jean (Maineville, OH)**

Assignee: **The Procter & Gamble Company** (Cincinnati, OH)

Appl. No.: **09/637,440**

Filed: **August 11, 2000**

United States Patent **6,620,322**

Vesio , et al. **September 16, 2003**

Apparatus and methods for purifying a waste influent material

Abstract

Apparatus can comprise an anoxic zone, an aeration zone in communication with the anoxic zone, and a sedimentation zone in communication with the aeration and anoxic zones. The sedimentation zone may include a first outlet in a lower portion thereof adapted to recycle material. A device may be provided to control the flow rate of the recycle material. Another device may be positioned relative to a sedimentation zone inlet and adapted to manipulate a material flow profile as material travels into the sedimentation zone. A sedimentation zone may also define an inlet comprising an overlapped area. Methods for purifying a waste inlet material comprise the steps of providing an anoxic zone, an aeration zone and a sedimentation zone. The methods may comprise the step of recycling material from a first outlet in a lower portion of the sedimentation zone.

Inventors: **Vesio; Michael G.** (***Cincinnati*, Smith; John M. (New Richmond, OH)**
Assignee: **Smith & Vesio LLC** (Walton, KY)
Appl. No.: **10/177,679**
Filed: **June 21, 2002**

United States Patent **6,585,863**
Davydov , et al. **July 1, 2003**

Photocatalytic degradation of organic compounds

Abstract

The present invention relates to the photocatalytic degradation of organic compounds by zeolite and/or mesoporous material hosted photocatalysts. The present invention further relates to a method of treating a contaminated aqueous liquid or gaseous fluid containing organics using a combination of visible or solar light energy in the presence of a photocatalyst to decompose the organic impurities in the liquid or gaseous fluid.

Inventors: **Davydov; Lev** (N. Plainfield, NJ)**, France; Paul Amaat** (West Chester, OH)**, Smirniotis; Panagiotis George** (***Cincinnati*< OH)>**
Assignee: **Procter & Gamble Company** (Cincinnati, OH)
Appl. No.: **09/920,414**
Filed: **August 1, 2001**

United States Patent **6,514,602**
Zhao , et al. **February 4, 2003**

Water-flushable and biodegradable film useful as backsheets for disposable absorbent articles

Abstract

A film which is water-flushable and biodegradable that is particularly useful as a backsheet for disposable absorbent articles, and in particular flushable interlabial catamenial products. The film comprises: (1) a relatively thin water-impervious biodegradable layer to maintain the integrity of the film during use and to minimize or prevent aqueous liquids from penetrating through the film; (2) a relatively thick substantially water-soluble layer adjacent the water-impervious layer to cause the film to lose integrity after the film is flushed; and (3) a relatively thin substantially water-permeable layer adjacent the water-soluble layer to control the rate at which water and other aqueous liquids contact, dissolve and disintegrate the water-soluble layer.

Inventors: **Zhao; Jianqun** (***Cincinnati*, Fereshtehkhou; Saeed (*Cincinnati*, Gilbertson; Gary Wayne (Middletown, OH)**
Assignee: **The Procter & Gamble Company** (Cincinnati, OH)
Appl. No.: **09/520,676**
Filed: **March 7, 2000**

United States Patent **6,503,317**
Ortalano , et al. **January 7, 2003**

Dye based aqueous pigment dispersions

Abstract

Aqueous based pigment dispersions wherein the pigment is dispersed in a dispersant dye in the absence of any other dispersant or additive and aqueous based printing ink compositions containing these a pigment dispersions. Methods for preparing aqueous based pigment dispersions, wherein the pigment is dispersed in a dispersant dye, and method for preparing printing ink compositions incorporating these dispersions.

Inventors: **Ortalano; Darren Mark** (***Cincinnati*, Vissing; Christopher Joseph (Amelia, OH)**
Assignee: **Sun Chemical Corporation** (Fort Lee, NJ)
Appl. No.: **09/700,927**
Filed: **November 20, 2000**
PCT Filed: **May 28, 1999**
PCT No.: **PCT/US99/11935**
PCT Pub. No.: **WO99/61534**
PCT Pub. Date: **December 02, 1999**

United States Patent **6,444,126**
Gates , et al. **September 3, 2002**

System and method for treating sanitary ***wastewater*** for on-site disposal

Abstract

An exemplary embodiment of the invention includes a ***wastewater*** treatment plant having, in serial fluid flow relationship, a ***wastewater*** source, a ***wastewater*** treatment plant, and a discharge site. The ***wastewater*** treatment plant has, in serial fluid flow relationship, an aerobic bioreactor in fluid flow communication with the ***wastewater*** source and an anoxic bioreactor in fluid flow communication with the discharge site. Fixed film packing for growing microbes is disposed in

first and second tanks of the first and second bioreactors, respectively. A primary holding tank is disposed between the ***wastewater*** source and the aerobic bioreactor. A first pump is used for pumping liquid out of the primary hold tank through a first pressure line into the first tank to a pressure line outlet in a bottom of the first tank. The liquid in the first tank is flowed out through a first tank outlet near a top of the first tank, through a transfer pipe in fluid communication with the first tank outlet, and into a bottom of the second tank through a transfer pipe outlet at the bottom of the second tank. A blower is used to supply air to the bottoms of the first and second tanks. The liquid in the second tank is flowed out through a second tank outlet near a top of the second tank, through an exit pipe in fluid communication with the second tank outlet and then into a secondary holding tank which is disposed in fluid communication with the discharge site.

Inventors: **Gates; Patrick T.** (***Cincinnati*, Gates; Todd M. (Loveland, OH)**
Assignee: **T. M. Gates, Inc.** (Milford, OH)
Appl. No.: **09/665,263**
Filed: **September 19, 2000**

United States Patent **6,444,126**
Gates , et al. **September 3, 2002**

System and method for treating sanitary ***wastewater*** for on-site disposal

Abstract

An exemplary embodiment of the invention includes a ***wastewater*** treatment plant having, in serial fluid flow relationship, a ***wastewater*** source, a ***wastewater*** treatment plant, and a discharge site. The ***wastewater*** treatment plant has, in serial fluid flow relationship, an aerobic bioreactor in fluid flow communication with the ***wastewater*** source and an anoxic bioreactor in fluid flow communication with the discharge site. Fixed film packing for growing microbes is disposed in first and second tanks of the first and second bioreactors, respectively. A primary holding tank is disposed between the ***wastewater*** source and the aerobic bioreactor. A first pump is used for pumping liquid out of the primary hold tank through a first pressure line into the first tank to a pressure line outlet in a bottom of the first tank. The liquid in the first tank is flowed out through a first tank outlet near a top of the first tank, through a transfer pipe in fluid communication with the first tank outlet, and into a bottom of the second tank through a transfer pipe outlet at the bottom of the second tank. A blower is used to supply air to the bottoms of the first and second tanks. The liquid in the second tank is flowed out through a second tank outlet near a top of the second tank, through an exit pipe in fluid communication with the second tank outlet and then into a secondary holding tank which is disposed in fluid communication with the discharge site.

Inventors: **Gates; Patrick T.** (***Cincinnati*, Gates; Todd M. (Loveland, OH)**
Assignee: **T. M. Gates, Inc.** (Milford, OH)
Appl. No.: **09/665,263**

Filed: **September 19, 2000**

United States Patent **6,420,595**
Hallinan , et al. **July 16, 2002**

Process control for vinyl acetate manufacture

Abstract

A method of real time process control in a reaction system for the production of vinyl acetate from the oxidation of ethylene and acetic acid. Reaction system samples are collected from the reactor vessel feed and/or effluent and/or from columns and/or transfer lines downstream of the reactor vessel, and the concentration of one or more components in the sample is measured by an infrared analyzer. The concentration measurements are then used to make adjustments in the concentration of components in the reaction system, directly or indirectly, such as by adjusting the temperature profile in a particular column, the flow rate of solution in to or out of a column, or the addition or extraction of a component to or from the solution. For optimum process control, the measurements are transmitted to a control unit for real time analysis, and the adjustments are made almost instantly after the infrared analysis.

Inventors: **Hallinan; Noel** (***Cincinnati*, Brtko; Wayne (West Chester, OH)**
Assignee: **Millennium Petrochemicals, Inc.** (Cincinnati, OH)
Appl. No.: **09/950,903**
Filed: **September 10, 2001**

United States Patent **6,398,958**
Hater , et al. **June 4, 2002**

Facultative landfill bioreactor

Abstract

A method and apparatus for sequentially nitrifying ammonia in landfill leachate ex situ and then returning the nitrified landfill leachate to the landfill where the leachate is denitrified.

Inventors: **Hater; Gary R.** (***Cincinnati*, Green; Roger B. (*Cincinnati*, Harris; Jeffrey M. (Cypress, TX)**
Assignee: **Waste Management, Inc.** (Houston, TX)
Appl. No.: **09/520,935**
Filed: **March 8, 2000**

United States Patent **6,388,165**
Bhat **May 14, 2002**

Method and compositions for stabilization of heavy metals, acid gas removal and pH control in contaminated matrices

Abstract

A method for treating a heavy metal-contaminated solid, semi-solid, liquid or gaseous matrix, comprising contacting the matrix with an inorganic-sulfur containing material selected from the group consisting of magnesium sulfite, calcium magnesium sulfite, and mixtures thereof as well as with scrubber magnesium product.

Inventors: **Bhat; Vasanth K.** (***Cincinnati*< OH)>**
Assignee: **Bhat; Vasanth K.** (Prospect, KY)
Appl. No.: **09/492,795**
Filed: **January 28, 2000**

United States Patent **6,375,900**
Lee-Alvarez , et al. **April 23, 2002**

Carbon analyzer with improved catalyst

Abstract

A carbon analyzer, is provided which includes a combustion chamber having a platinum on titania catalyst. The combustion chamber and catalyst are also provided. A method for analyzing carbon-containing specimens with such an analyzer is also provided as well as a method for oxidizing such specimens with a platinum on titania catalyst. A method of conditioning the catalyst is also provided.

Inventors: **Lee-Alvarez; Maria Theresa** (West Chester, OH)**, Booth; Robert A.** (***Cincinnati*< OH)>**
Assignee: **Tekmar Company** (Mason, OH)
Appl. No.: **09/300,234**
Filed: **April 27, 1999**

United States Patent **6,355,022**
Osborn, III , et al. **March 12, 2002**

Absorbent interlabial device with substance thereon for maintaining the device in position

Abstract

An absorbent interlabial device worn by female wearers for catamenial purposes, incontinence protection, or both, is disclosed. The absorbent interlabial device has at least one body-contacting surface which comprises a substance that contacts the wearer's body for assisting the interlabial device in staying in place in the desired position in the interlabial space. The substance can be either adhesive or non-adhesive. In embodiments in which the substance is non-adhesive, it may have no initial tack so that it will not stick to the wrong portions of the wearer's body when the device is placed between the labia. Non-adhesive substances include moisture-activated substances which become viscous and develop a tack when contacted by relatively small amounts of moisture.

Inventors: **Osborn, III; Thomas W.** (***Cincinnati*, Klofta; Thomas J. (*Cincinnati*, Brown; Pamela J. (Maineville, OH)**

Assignee: **The Procter & Gamble Company** (Cincinnati, OH)

Appl. No.: **09/266,639**

Filed: **March 11, 1999**

United States Patent **6,350,438**

Witt , et al. **February 26, 2002**

Oral care compositions comprising chlorite and methods

Abstract

The present invention relates to topical oral compositions, including therapeutic rinses, especially mouth rinses, as well as toothpastes, gels, tooth powders, chewing gums, mouth sprays, lozenges (including breath mints), dental implements (such as dental floss and tape), and pet care products comprising at least a minimally effective amount of chlorite ion, wherein the pH of the final composition is greater than 7 and the composition is essentially free of chlorine dioxide or chlorous acid. This invention further relates to a method for treating or preventing diseases and conditions of the oral cavity such as gingivitis, plaque, periodontal disease, herpetic lesions, and infections that may develop following dental procedures such as osseous surgery, tooth extraction, periodontal flap surgery, dental implantation, and scaling and root planing, in humans and other animals, by applying a safe and effective amount of the chlorite ion composition to the oral cavity.

Inventors: **Witt; Jonathan James** (***Cincinnati*, Wimalasena; Rohan Lalith (Liberty Twp., OH), Wong; Andrew Lee (West Chester, OH), Goulbourne, Jr.; Eric Altman**

(Hamilton, OH), Doyle; Matthew Joseph (*Cincinnati*< OH)>
Assignee: **The Procter & Gamble Company** (Cincinnati, OH)
Appl. No.: **09/607,242**
Filed: **June 30, 2000**

United States Patent **6,313,368**
Bhat **November 6, 2001**

Method and compositions for stabilization of heavy metals, acid gas removal and pH control in contaminated matrices

Abstract

A one-step method and compositions for stabilization of heavy metals, acid gas removal and pH control in hazardous and toxic solid, semi-solid, liquid and/or gaseous matrices using a mixture of reactive agents in a single product, for the broader purpose of enhancing environmental pollution control, prevention and remediation are described. The product contains sulfonated calcium aluminum magnesium phosphate. This material may be used alone or in combination with magnesium sulfite and/or hydroboracite.

Inventors: **Bhat; Vasanth K.** (***Cincinnati*< OH)>**
Assignee: **Bhat; Vasanth K.** (
Appl. No.: **09/404,531**
Filed: **September 24, 1999**

United States Patent **6,306,621**
Brenner , et al. **October 23, 2001**

Membrane filter agar medium for simultaneous detection of total coliforms and E. coli

Abstract

An improved method for detection of total coliforms and E. coli comprising a broth containing an ingredient that will encourage growth and repair of injured coliforms, buffers to maintain a pH in the range of 6.5-8, at least one agent that suppresses growth of gram positive cocci and spore-forming organisms, at least one active agent that will suppress growth of non-coliform gram negative bacteria, and at least one chromogen or fluorogen has been used effectively and is cost effective. In the preferred embodiment, both a fluorogen and chromogen were used. Preferred methods include use of filter and/or plates containing the growth-promoting ingredients and the indicators.

Inventors: **Brenner; Kristen P.** (***Cincinnati*, Rankin; Clifford C. (Dayton, OH), Roybal-McKenna; Yvette R. (La Mesa, NM), Dufour; Alfred P. (*Cincinnati*< OH)>**

Assignee: **The United States of America as represented by the Administrator of the U.S. Environmental Protection Agency** (Washington, DC)

Appl. No.: **09/369,173**

Filed: **August 5, 1999**

United States Patent **6,299,607**

Osborn, III , et al. **October 9, 2001**

Individual packages for absorbent interlabial devices

Abstract

Individual packages to assist the hygienic insertion of an absorbent device into the interlabial space of a female user are disclosed. The individual package includes a wrapper for packaging the absorbent device. The wrapper provides a flexible sheet which is wrapped around the absorbent device. The wrapper being at least partially removable from around the absorbent device wherein at least a portion of the wrapper remains between a user's hands and the absorbent device when the absorbent device is inserted into the interlabial space to prevent the user's hands from contacting the absorbent device for hygienic insertion. The wrapper is folded about the absorbent device relative to the longitudinal axis of the lower portion forming a longitudinal fold, an opposing open end, and transverse side edges. The opposing open end and transverse side edges are sealed forming the individual package.

Inventors: **Osborn, III; Thomas Ward** (***Cincinnati*, Farris; Diane Dunn (West Chester, OH)**

Assignee: **The Procter & Gamble Company** (Cincinnati, OH)

Appl. No.: **08/975,795**

Filed: **November 21, 1997**

United States Patent **6,280,688**

Motz **August 28, 2001**

Rinsing device for sample processing components of an analytical instrument

Abstract

A device for rinsing sample processing components of an analytical instruments including an inlet coupleable to a fluid source, an outlet coupleable to sample processing components of an analytical instrument, and a fluid reservoir between the inlet and outlet. The device includes a heater coupled to the fluid reservoir and the fluid reservoir includes at least two reservoir chambers connected in series and separated by a restricted passageway.

Inventors: **Motz; Martin B.** (***Cincinnati*< OH)>**
Assignee: **Tekmar Company** (Cincinnati, OH)
Appl. No.: **09/195,330**
Filed: **November 18, 1998**

United States Patent **6,264,924**
Witt , et al. **July 24, 2001**

Oral care compositions comprising chlorite and methods

Abstract

The present invention relates to oral care chewing gum composition comprising at least a minimally effective amount of chlorite ion, wherein preferably the pH of the final composition in use is greater than 7 and level of chlorine dioxide or chlorous acid is less than about 50 ppm, preferably is essentially free of chlorine dioxide or chlorous acid. This invention further relates to a method for treating breath malodor in humans or other animals, by applying a safe and effective amount of the chlorite ion composition to the oral cavity.

Inventors: **Witt; Jonathan James** (***Cincinnati*, Wimalasena; Rohan Lalith (Liberty Township, OH), Wong; Andrew Lee (West Chester, OH), Goulbourne, Jr.; Eric Altman (West Chester, OH)**
Assignee: **The Procter & Gamble Company** (Cincinnati, OH)
Appl. No.: **09/481,624**
Filed: **January 12, 2000**

United States Patent **D445,046**
Kravtsov **July 17, 2001**

Bubble generator

Claims

The ornamental design for a bubble generator, as shown and described.

Inventors: **Kravtsov; Alexander E.** (***Cincinnati*< OH)>**
Appl. No.: **D/131,432**
Filed: **October 23, 2000**

United States Patent **6,251,372**

Witt , et al. **June 26, 2001**

Oral care compositions comprising chlorite and methods

Abstract

The present invention relates to oral care compositions, including therapeutic rinses, especially mouth rinses, as well as toothpastes, gels, tooth powders, chewing gums, mouth sprays, and lozenges (including breath mints), comprising at least a minimally effective amount of chlorite ion, wherein preferably the pH of the final composition is greater than 7 and level of chlorine dioxide or chlorous acid is less than about 50 ppm, preferably is essentially free of chlorine dioxide or chlorous acid. This invention further relates to a method for treating or preventing gingivitis, plaque, periodontal disease, and/or breath malodor, and/or for the whitening of teeth, in humans or other animals, by applying a safe and effective amount of the chlorite ion composition to the oral cavity.

Inventors: **Witt; Jonathan James** (***Cincinnati*, Wimalasena; Rohan Lalith (Liberty Township, OH), Wong; Andrew Lee (West Chester, OH), Goulbourne, Jr.; Eric Altman (West Chester, OH)**

Assignee: **The Procter & Gamble Company** (Cincinnati, OH)

Appl. No.: **09/032,237**

Filed: **February 27, 1998**

United States Patent **6,244,574**

Downs **June 12, 2001**

Dual diffuser assembly

Abstract

The dual diffuser assembly of the present invention includes a first and second diffuser body in fluid communication with an air distribution pipe. The diffuser assembly further includes a saddle that connects the first diffuser body and the second diffuser body to the air distribution pipe. The air received from the distribution pipe passes into the first and second diffuser bodies and exits the first diffuser body through a first diffuser and exits the second diffuser body through a second diffuser. The first and second diffusers form the air into fine bubbles that serve to facilitate aeration of the medium.

Inventors: **Downs; Ernest W.** (***Cincinnati*< OH)>**

Assignee: **United States Filter Corporation** (Palm Desert, CA)

Appl. No.: **09/622,384**

Filed: **August 16, 2000**

PCT Filed: **March 02, 1999**
PCT No.: **PCT/US99/04614**
371 Date: **August 16, 2000**
102(e) Date: **August 16, 2000**
PCT Pub. No.: **WO99/44730**
PCT Pub. Date: **September 10, 1999**

United States Patent **6,240,585**
Praechter , et al. **June 5, 2001**

Method of treating ***wastewater*** from industrial laundries

Abstract

Wastewater from a commercial laundry is treated by adding coagulant directly to the ***wastewater*** from each load of items washed. The amount of coagulant is administered using a controller. The controller in turn is programmed with an amount of coagulant which should be added based on the type of item being washed. The same controller can be used to inject the detergent into the washing apparatus. Thus the operator of the laundry simply enters the type of item being washed into the controller. This will automatically control both the amount of detergent added to the laundry as well as the amount of coagulant added to the ***wastewater*** discharged from the washing apparatus.

Inventors: **Praechter; Roy A.** (***Cincinnati*, Tibbitts; David (Mason, OH), Weber; Andrew J. (Mason, OH)**
Assignee: **Washing Systems, Inc.** (Cincinnati, OH)
Appl. No.: **09/324,313**
Filed: **June 2, 1999**

United States Patent **6,235,269**
Witt , et al. **May 22, 2001**

Oral care compositions comprising chlorite and methods

Abstract

The present invention relates to oral care compositions, including therapeutic rinses, especially mouth rinses, as well as toothpastes, gels, tooth powders, chewing gums, mouth sprays, and lozenges (including breath mints), comprising at least a minimally effective amount of chlorite ion, wherein preferably the pH of the final composition is greater than 7 and level of chlorine dioxide or chlorous acid is less than about 50 ppm, preferably is essentially free of chlorine dioxide or chlorous acid. This invention further relates to a method for treating or preventing

gingivitis, plaque, periodontal disease, and/or breath malodor, and/or for the whitening of teeth, in humans or other animals, by applying a safe and effective amount of the chlorite ion composition to the oral cavity.

Inventors: **Witt; Jonathan James** (***Cincinnati*, Wimalasena; Rohan Lalith (Liberty Township, OH), Wong; Andrew Lee (West Chester, OH), Goulbourne, Jr.; Eric Altman (West Chester, OH)**

Assignee: **The Procter & Gamble Company** (Cincinnati, OH)

Appl. No.: **09/487,692**

Filed: **January 19, 2000**

United States Patent **6,203,512**

Farris , et al. **March 20, 2001**

Method for opening a packaging device and retrieving an interlabial absorbent article placed therein

Abstract

The invention provides an individual package in combination with an absorbent interlabial device. The package has a longitudinal axis, a top portion, a bottom portion positioned oppositely to the top portion, a first surface and a second surface. The package may be folded about the longitudinal axis to form two halves or it may be formed from one more sheets fitted together to form the package. The package may be re-sealable. An absorbent interlabial device is positioned within the package. The absorbent interlabial device is readily retrievable from the package such that a user neither touches nor contaminates the absorbent portion of the absorbent interlabial device with any part of her hand prior to the use and in using the absorbent interlabial device.

United States Patent **6,191,068**

Bhat **February 20, 2001**

Method and compositions for stabilization of heavy metals, acid gas removal and pH control in contaminated matrices

Abstract

A composition comprising magnesium sulfite, triple super phosphate, and one of limestone and hydroboracite, useful for heavy metal stabilizing, controlling pH and/or removing acid gas from a solid, semi-solid, liquid or gaseous matrix.

Inventors: **Bhat; Vasanth K.** (***Cincinnati*< OH)>**

Assignee: **Bhat Industries, Inc.** (Cincinnati, OH)
Appl. No.: **09/244,996**
Filed: **February 4, 1999**

United States Patent **6,174,382**
Cord , et al. **January 16, 2001**

Low pressure-high volume water washoff apparatus and process for cleaning and reclaiming screens

Abstract

A printing screen cleaning and reclaiming apparatus comprises a cleaning device defining a cleaning and reclaiming path and a plurality of low pressure-high volume water washoff stations, in series, along the path. An ink degradent, an emulsion remover, and a degreaser are each applied successively along the path, and an ink removal station, an emulsion removal station, and a degreaser removal station are positioned successively along the path to provide the low pressure-high volume water washoff. Each station is capable of delivering washoff fluid to the screen of up to 20 feet in height and any length in the range of approximately 40-400 psi, and in the range of approximately 10-250 gallons per minute for efficient and inexpensive cleaning of the screen.

Inventors: **Cord; Albert B.** (***Cincinnati*, Cord; Cameron W. (*Cincinnati*, Parr; Ted K. (*Cincinnati*, Jensen; Gregory N. (Westchester, OH)**
Assignee: **Intercontinental Chemical Corporation** (
Appl. No.: **09/287,074**
Filed: **April 6, 1999**

United States Patent **6,143,573**
Rao , et al. **November 7, 2000**

Modular vial autosampler

Abstract

A modular vial autosampler has a storage area for vials containing samples to be analyzed and at least one modular sampling station. A vial transfer mechanism lifts a sample vial from the storage section, moves it to a station for identification and then to a sampling station, and under central control activates the sampling station for obtaining a sample for analysis. The vial transfer mechanism is movable in x, y, and z directions to capture and move a selected vial. The autosampler has a series of valves operable under central control to selectively introduce two different standards into the sample, and after obtaining the sample, for rinsing and purging the

conduits or lines and needles to reduce sample carryover. The modular vial autosampler includes controls to selectively sample either a gas or a liquid using many of the same components.

Inventors: **Rao; Prabhakar P.** (***Cincinnati*, Lewis; Edmund T. (West Chester, OH), Green; Thomas B. (Batavia, OH)**

Assignee: **Tekmar Company** (Cincinnati, OH)

Appl. No.: **08/735,485**

Filed: **October 23, 1996**

United States Patent **6,132,702**

Witt , et al. **October 17, 2000**

Oral care compositions comprising chlorite and methods

Abstract

The present invention relates to oral care compositions, including therapeutic rinses, especially mouth rinses, as well as toothpaste, gels, tooth powders, chewing gums, mouth sprays, and lozenges (including breath mints), comprising at least a minimally effective amount of chlorite wherein preferably the pH of the final composition is greater than 7 and level of chlorine dioxide or chlorous acid is less than about 50 ppm, preferably is essentially free of chlorine dioxide or chlorous acid. This invention further relates to a method for treating or preventing gingivitis, plaque, periodontal disease, and/or breath malodor, and/or for the whitening of teeth, in humans or other animals, by applying a safe and effective amount of the chlorite ion composition to the oral cavity.

Inventors: **Witt; Jonathan James** (***Cincinnati*, Wimalasena; Rohan Lalith (Liberty Township, OH), Wong; Andrew Lee (West Chester, OH)**

Assignee: **The Procter & Gamble Company** (Cincinnati, OH)

Appl. No.: **09/032,234**

Filed: **February 27, 1998**

United States Patent **6,131,736**

Farris , et al. **October 17, 2000**

Packaging device for an interlabial absorbent article

Abstract

The invention provides an individual package in combination with an absorbent interlabial device. The package has a longitudinal axis, a top portion, a bottom portion positioned

oppositely to the top portion, a first surface and a second surface. The package may be folded about the longitudinal axis to form two halves or it may be formed from one more sheets fitted together to form the package. The package may be re-sealable. An absorbent interlabial device is positioned within the package. The absorbent interlabial device is readily retrievable from the package such that a user neither touches nor contaminates the absorbent portion of the absorbent interlabial device with any part of her hand prior to the use and in using the absorbent interlabial device.

Inventors: **Farris; Diane Dunn** (West Chester, OH)**, Hall; Alicia Mary** (***Cincinnati*****, Osborn, III; Thomas Ward (*Cincinnati*< OH)>**

Assignee: **The Procter & Gamble Company** (Cincinnati, OH)

Appl. No.: **09/340,912**

Filed: **June 28, 1999**

United States Patent **6,127,593**

Bjorkquist , et al. **October 3, 2000**

Flushable fibrous structures

Abstract

The present invention relates to a flushable fibrous structure that is particularly useful as a disposable tissue product and as a component (e.g., topsheets) for absorbent articles such as catamenial pads, diapers, incontinent articles and the like. The invention specifically relates to a flushable fibrous structure that has an in-use wet tensile strength of at least about 100 g/in. and a disposal wet tensile strength of not more than about 30 g/in. The invention also relates to absorbent articles comprising the fibrous structures, and methods for making the structures.

Inventors: **Bjorkquist; David William** (Wyoming, OH)**, Mansfield; Todd Leon** (***Cincinnati*****< OH)>**

Assignee: **The Procter & Gamble Company** (Cincinnati, OH)

Appl. No.: **08/976,746**

Filed: **November 25, 1997**

United States Patent **6,117,328**

Sikdar , et al. **September 12, 2000**

Adsorbent-filled membranes for pervaporation

Abstract

Pervaporation membranes are used for removing volatile organic compounds from wastewaters. These pervaporation membranes are prepared by dispersing at least one hydrophobic adsorbent such as activated carbon uniformly into a polymer matrix.

Inventors: **Sikdar; Subhas K.** (***Cincinnati*, Ji; Wenchang (Natick, MA), Wang; Sun-tak (*Cincinnati*< OH)>**

Assignee: **U.S. Environmental Protection Agency** (Washington, DC)
University of Cincinnati (Cincinnati, OH)

Appl. No.: **08/827,310**

Filed: **March 26, 1997**

United States Patent **6,077,502**

Witt , et al. **June 20, 2000**

Oral care compositions comprising chlorite and methods

Abstract

The present invention relates to oral care compositions, including therapeutic rinses, especially mouth rinses, as well as toothpastes, gels, tooth powders, chewing gums, mouth sprays, and lozenges (including breath mints), comprising at least a minimally effective amount of chlorite ion, wherein preferably the pH of the final composition is greater than 7 and level of chlorine dioxide or chlorous acid is less than about 50 ppm, preferably is essentially free of chlorine dioxide or chlorous acid. This invention further relates to a method for treating or preventing gingivitis, plaque, periodontal disease, and/or breath malodor, and/or for the whitening of teeth, in humans or other animals, by applying a safe and effective amount of the chlorite ion composition to the oral cavity.

Inventors: **Witt; Jonathan James** (***Cincinnati*, Wimalasena; Rohan Lalith (Liberty Township, OH), Wong; Andrew Lee (West Chester, OH), Goulbourne, Jr.; Eric Altman (West Chester, OH)**

Assignee: **The Procter & Gamble Company** (Cincinnati, OH)

Appl. No.: **09/032,238**

Filed: **February 27, 1998**

United States Patent **6,056,921**

Rao , et al. **May 2, 2000**

Vial transporter having an elevator

Abstract

A modular vial autosampler has a storage area for vials containing samples to be analyzed and at least one modular sampling station. A vial transfer mechanism lifts a sample vial from the storage section, moves it to a station for identification and then to a sampling station, and under central control activates the sampling station for obtaining a sample for analysis. The vial transfer mechanism is movable in x, y, and z directions to capture and move a selected vial. The autosampler has a series of valves operable under central control to selectively introduce two different standards into the sample, and after obtaining the sample, for rinsing and purging the conduits or lines and needles to reduce sample carryover. The modular vial autosampler includes controls to selectively sample either a gas or a liquid using many of the same components.

Inventors: **Rao; Prabhakar P.** (***Cincinnati*, Lewis; Edmund T. (West Chester, OH), Green; Thomas B. (Batavia, OH)**

Assignee: **Tekmar Company** (Cincinnati, OH)

Appl. No.: **08/842,316**

Filed: **April 24, 1997**

United States Patent **6,056,128**

Glasgow **May 2, 2000**

Coalescer with removable cartridge

Abstract

A coalescer for separating a first liquid component from a multiple component liquid mixture wherein the first liquid component has a lower specific gravity than the liquid mixture. The coalescer comprises a generally rectangular housing defining an entry port and an exit port and a flow path therebetween. A grid contained within a removable cartridge is received within the housing and includes a plurality of parallel inclined plates residing along the flow path to separate the first liquid component from the liquid mixture. A second liquid port in communication with the flow path via an outlet causes the first liquid component to flow into a separate container. The liquid mixture continues to flow through the coalescer until all of the first liquid component is removed.

Inventors: **Glasgow; James A.** (***Cincinnati*< OH)>**

Appl. No.: **09/128,884**

Filed: **August 4, 1998**

United States Patent **6,039,878**

Sikdar , et al. **March 21, 2000**

Recovery of volatile organic compounds from emulsion of volatile organic compounds in water by pervaporation

Abstract

Volatile organic compounds (VOCS) can be removed from surfactant solutions using pervaporation with hydrophobic pervaporation membranes. This process can be used to remove volatile non-laqueous phase liquids from surfactant-based soil washing and soil flushing solutions for recovery of the volatile compounds and reuse of the surfactant. The process of the present invention can also be used to separate VOCs from industrial process streams containing surfactants for in-process recycling and reclamation of the VOCs and/or surfactants. In addition, the process of the present invention can be used to separate VOCs from industrial waste streams containing surfactants for waste volume reduction or for recovery/recycle of the VOCs and/or surfactant.

Inventors: **Sikdar; Subhas** (***Cincinnati*, Vane; Leland (*Cincinnati*< OH)>**

Assignee: **The United States of America as represented by the United States** (Washington, DC)

Appl. No.: **08/862,308**

Filed: **May 23, 1997**

United States Patent **6,012,480**

Helmsderfer **January 11, 2000**

Cover assembly for covering undersink piping utilizing sliding cover pieces

Abstract

A cover assembly and methods for covering undersink piping includes insulative cover pieces placed over respective pipe sections such that their ends are adjacent at pipe junctures. Collars are slidable over or inside the cover pieces to be moved to cover the junctures. An alternative cover structure may be wrapped around the pipe juncture to form a generally continuous insulative cover, or alternatively, the fastening structures are insulated such that when the pipe sections are assembled together, the cover pieces and insulating fastening structures form a continuous insulative cover. In an alternative embodiment, one of the cover pieces is dimensioned to slide upwardly and downwardly on a pipe section and a collar structure is placed over the exposed pipe section to provide a continuous cover piece. In another alternative embodiment, pipe sections such as a trap pipe or offset grid drain are insulated by a unique insulative method to produce a generally continuous insulative cover layer on the pipe section which is free of slits or openings to prevent contaminants and bacteria from accumulating on the pipe. A still further embodiment utilizes a cover piece for a trap pipe which includes a projection and closure structure for covering the drain opening of the trap pipe but allowing access to the drain opening without requiring removal of the cover piece or disassembly of the P-trap piping assembly.

Inventors: **Helmsderfer; John A.** (***Cincinnati*< OH)>**
Appl. No.: **09/109,137**
Filed: **July 2, 1998**

United States Patent **6,010,001**
Osborn, III **January 4, 2000**

Individual packaging for hygienic wiping

Abstract

Individual packages to assist the hygienic insertion of an absorbent device into the interlabial space of a female user are disclosed. The individual package comprises a wrapper for packaging the absorbent device. The wrapper comprises a flexible sheet which is wrapped around the absorbent device. The flexible sheet has an absorbent inside surface adjacent to the absorbent interlabial device, which when the wrapper is opened, provides the user with a sanitary wiping device to wipe the labia while inserting said absorbent interlabial device into the interlabial space. In one embodiment, the wrapper is folded about the absorbent device relative to the longitudinal axis of the lower portion of the absorbent interlabial device forming a longitudinal fold, an opposing open end, and transverse side edges. The opposing open end and transverse side edges are sealed to form the individual package.

Inventors: **Osborn, III; Thomas Ward** (***Cincinnati*< OH)>**
Assignee: **The Procter & Gamble Company** (Cincinnati, OH)
Appl. No.: **08/975,792**
Filed: **November 21, 1997**

United States Patent **7,357,341**
Gutwein , et al. **April 15, 2008**

Two stage sewage grinder pump

Abstract

A two-stage sewage grinder pump (10) having two impellers (30, 32) and a grinder (60) attached to the motor shaft (24). Preferably, both impellers are vortex impellers and are positioned between the grinder and the motor. The motor housing includes a discharge conduit (70) that is monolithic with the motor housing (20). An anti-siphon valve (71) is integral with the discharge conduit. An integral discharge flange (75) and check valve (78) are attached to the discharge conduit to connect the sewage grinder pump to a sewage outlet.

Inventors:	**Gutwein; Gregory J.** (***Dayton***, ***OH***)**, Holder; Donald** (Troy, ***OH***)**, Kowalak; Mark P.** (Troy, ***OH***)**, Ordway; Bruce B.** (Troy, ***OH***)
Assignee:	**Crane Pumps & Systems, Inc.** (Piqua, OH)
Appl. No.:	**10/595,301**
Filed:	**October 14, 2004**
PCT Filed:	**October 14, 2004**
PCT No.:	**PCT/IB2004/052100**
371(c)(1),(2),(4) Date:	**April 06, 2006**
PCT Pub. No.:	**WO2005/035447**
PCT Pub. Date:	**April 21, 2005**

United States Patent **7,148,033**
Brenner , et al. **December 12, 2006**

Method for detection for total coliforms and E. coli

Abstract

An improved method for detection of total coliforms and E. coli comprising a broth containing an ingredient that will suppress growth of non-coliform gram negative bacteria, and at least one chromogen or fluorogen has been used effectively and is cost effective. Preferred methods include use of filter and/or plates containing the growth-promoting ingredients and the indicators.

Inventors:	**Brenner; Kristen P.** (Cincinnati, ***OH***)**, Rankin; Clifford C.** (***Dayton***, ***OH***)**, Roybal-McKenna; Yvette R.** (Gilbert, AZ)**, Dufour; Alfred P.** (Cincinnati, ***OH***)
Assignee:	**The United States of America as represented by the Administrator of the U. S. Environmental Protection Agency** (Washington, DC) **N/A** (
Appl. No.:	**10/713,113**
Filed:	**November 17, 2003**

Related U.S. Patent Documents

Application Number	Filing Date	Patent Number	Issue Date<TD< TD>
09924950	Aug., 2001	6670145	<TD< TD>
09369173	Nov., 2001	6306621	<TD< TD>
08117342	Sep., 1993	6063590	<TD< TD>

07793881 Nov., 1991 <TD< TD>

Current U.S. Class:	**435/34** ; 435/14; 435/252.1; 435/252.2; 435/252.4; 435/30; 435/38
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References Cited [Referenced By]

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6306621	October 2001	Brenner et al.

Primary Examiner: Guzo; David
Assistant Examiner: Joike; Michele K.
Attorney, Agent or Firm: Hendricks & Associates Hendricks; Glenna

United States Patent **6,890,157**
Pfeil , et al. **May 10, 2005**

Matching or not matching flow rates in two fluidly-unconnected flow paths

Abstract

A flow rate of unconnected first and second fluid flows is matched or not matched, such as, but not limited to, matching or not matching the flow rate of the replacement water stream with the ***waste water*** stream in kidney dialysis. First and second flow paths are interconnected so substantially the same flow from a first positive displacement pump in the first path encounters a flow-rate transducer in the second path. A first set of transducer readings are taken for various values of the controllable first pump speed of the first pump. The first and second flow paths are disconnected, and a second set of transducer readings are taken for various values of the controllable second pump speed of the second pump. The flow rates are substantially matched or not matching by controlling one of the first and second pump speeds using the other of the pump speeds and the first and second sets of readings.

Inventors: **Pfeil; Michael C.** (***Dayton***, ***OH***), **Fulks; Gary C.** (Spring Valley, ***OH***)
Assignee: **Delphi Technologies, Inc.** (Troy, MI)
Appl. No.: **10/358,463**
Filed: **February 5, 2003**

United States Patent **6,752,928**
Pfeil , et al. **June 22, 2004**

Flow matching method and system using two transducers

Abstract

A property of unconnected first and second fluid flows is matched, such as, but not limited to, matching the flow rate of the replacement water stream with the ***waste water*** stream in kidney dialysis. The first and second flow paths are interconnected so substantially the same flow from the first flow source encounters a first flow transducer which is in the first flow path and a second flow transducer which is in the second flow path. Transducer readings are taken for various identical values of the property of the first fluid flow. Then the first and second flow paths are disconnected, and the property, such as but not limited to flow rate, of one of the fluid flows in one of the flow paths is controlled using transducer readings and the previous interconnected-path transducer readings to match the property in the two flows. In one example, the transducers are uncalibrated transducers.

Inventors: **Pfeil; Michael C.** (***Dayton***, ***OH***)**, Fulks; Gary C.** (Spring Valley, ***OH***)
Assignee: **Delphi Technologies, Inc.** (Troy, MI)
Appl. No.: **10/045,776**
Filed: **January 10, 2002**

United States Patent **6,746,606**
Pfeil , et al. **June 8, 2004**

Method and system for matching flow rate

Abstract

A flow rate of unconnected first and second fluid flows is matched, such as, but not limited to, matching the flow rate of the replacement water stream with the ***waste water*** stream in kidney dialysis. The first and second flow paths are interconnected so substantially the same flow from a positive displacement pump in the first path encounters a flow-rate transducer in the second path. Transducer readings are taken for various values of the controllable pump speed of the pump. Then, the first and second flow paths are disconnected, a transducer reading is taken, and the flow rate of the fluid flow in the first flow path is controlled by controlling the pump speed using the value of the pump speed from the previous interconnected paths which corresponds to the value of the transducer reading from the previous interconnected paths which matches the transducer reading for the disconnected paths.

Inventors: **Pfeil; Michael C.** (***Dayton***, ***OH***)**, Fulks; Gary C.** (Spring Valley, ***OH***)
Assignee: **Delphi Technologies, Inc.** (Troy, MI)
Appl. No.: **10/045,700**
Filed: **January 11, 2002**

United States Patent **6,670,145**
Brenner , et al. **December 30, 2003**

Method for detection of total coliforms and E. coli

Abstract

An improved method for detection of total coliforms and E. coli comprising a broth containing an ingredient that will encourage growth and repair of injured coliforms, buffers to maintain a pH in the range of 6.5-8, at least one agent that suppresses growth of gram positive cocci and spore-forming organisms, at least one active agent that will suppress growth of non-coliform gram negative bacteria, and at least one chromogen or fluorogen has been used effectively and is cost effective. In the preferred embodiment, both a fluorogen and chromogen were used. Preferred methods include use of filter and/or plates containing the growth-promoting ingredients and the indicators.

Inventors: **Brenner; Kristen P.** (Cincinnati, ***OH***)**, Rankin; Clifford C.** (***Dayton***, ***OH***)**, Roybal-McKenna; Yvette R.** (Gilbert, AZ)**, Dufour; Alfred P.** (Cincinnati, ***OH***)
Assignee: **The United States of America as represented by the Administrator of the Environmental Protection Agency** (Washington, DC)
Appl. No.: **09/924,950**
Filed: **August 9, 2001**

United States Patent **6,625,844**
Savage **September 30, 2003**

Modular vacuum system and method

Abstract

A system and method for vacuuming an area is provided. The system and method include a plurality of modular components which can be used in multiple combinations, even while the components are mounted on a vehicle or when they are selectively and individually removed from the vehicle and used near the area being cleaned. An automatic pump-out system and method are provided for automatically pumping out ***wastewater*** and a heating system and method are provided for maintaining the heat of the water being applied to the area being cleaned at a predetermined temperature, even when the operator is not applying the water to the surface.

Inventors: **Savage; Robert E.** (***Dayton***, ***OH***)
Appl. No.: **09/861,610**
Filed: **May 18, 2001**

United States Patent **6,315,493**
Malone , et al. **November 13, 2001**

Retrievable filter element for subsurface drainage

Abstract

Filter elements for draining ***wastewater*** into the soil in leach fields comprise net sacks filled with scrap rubber or plastic chips and supplied with fabric filter cloth. Leach fields are constructed by excavating trenches, placing a first row of filter elements at the bottom of the trenches, installing a drain pipe on top of the row of filter elements, placing a second row of filter elements on top of the first row and the drain pipe, overlapping the pieces of filter cloth to provide a barrier to the surrounding soil, and backfilling the trench with soil.

Inventors: **Malone; Philip G.** (Vicksburg, MS)**, Huntsman; Brad L** (***Dayton***, ***OH***)**,**
Huntsman; Brent E. (Xenia, ***OH***)
Assignee: **U.S Army Corps of Engineers as represented by the Secretary of the Army** (Washington, DC)
Appl. No.: **09/797,671**
Filed: **March 5, 2001**

United States Patent **6,306,621**
Brenner , et al. **October 23, 2001**

Membrane filter agar medium for simultaneous detection of total coliforms and E. coli

Abstract

An improved method for detection of total coliforms and E. coli comprising a broth containing an ingredient that will encourage growth and repair of injured coliforms, buffers to maintain a pH in the range of 6.5-8, at least one agent that suppresses growth of gram positive cocci and spore-forming organisms, at least one active agent that will suppress growth of non-coliform gram negative bacteria, and at least one chromogen or fluorogen has been used effectively and is cost effective. In the preferred embodiment, both a fluorogen and chromogen were used. Preferred methods include use of filter and/or plates containing the growth-promoting ingredients and the indicators.

Inventors: **Brenner; Kristen P.** (Cincinnati, ***OH***), **Rankin; Clifford C.** (***Dayton***, ***OH***), **Roybal-McKenna; Yvette R.** (La Mesa, NM), **Dufour; Alfred P.** (Cincinnati, ***OH***)

Assignee: **The United States of America as represented by the Administrator of the U.S. Environmental Protection Agency** (Washington, DC)

Appl. No.: **09/369,173**

Filed: **August 5, 1999**

United States Patent **6,303,033**

Malone , et al. **October 16, 2001**

Retrievable filter element for subsurface drainage

Abstract

Filter elements for draining ***wastewater*** into the soil in leach fields comprise net sacks filled with scrap rubber or plastic chips and supplied with fabric filter cloth. Leach fields are constructed by excavating trenches, placing a first row of filter elements at the bottom of the trenches, installing a drain pipe on top of the row of filter elements, placing a second row of filter elements on top of the first row and the drain pipe, overlapping the pieces of filter cloth to provide a barrier to the surrounding soil, and backfilling the trench with soil.

Inventors: **Malone; Philip G.** (Vicksburg, MS), **Huntsman; Brad L** (***Dayton***, ***OH***), **Huntsman; Brent E.** (Xenia, ***OH***)

Assignee: **The United States of America as represented by the Secretary of the Army** (Washington, DC)

Appl. No.: **09/408,911**

Filed: **September 30, 1999**

United States Patent **6,214,242**

Swensen **April 10, 2001**

Direct injection air stripping method and apparatus

Abstract

A method and apparatus for stripping a volatile compound from ***waste water*** comprises creating a high velocity spray of air and stream of water at a first inlet to a first expansion chamber to volatize the compound, recombining the water and air flow through a second and successive expansion chambers and recreating a spray at each such chamber, whereby additional volatile compounds are released from the water at each stage to steadily reduce the contamination of the water. The decontaminated water and volatile compound-laden air are separately collected after exiting the last expansion chamber.

Inventors: **Swensen; Frederick B.** (***Dayton***, ***OH***)
Appl. No.: **09/427,990**
Filed: **October 27, 1999**

United States Patent **6,134,045**
Jiang , et al. **October 17, 2000**

Chitosan optical materials

Abstract

Chitosan-based electro-optic elements are disclosed. An optical waveguide is made from films of chitosan-acetic acid, and from films of chitosan-acetic acid doped with various rare-earth metal ions, over a substrate. Optical limiters are made from chitosan gel host materials doped with a variety of photo-interactive or light limiting dopants. Three different suitable example chitosan gel hosts are disclosed. An electrostatically self-assembling multilayer film is made with a chitosan base layer.

Inventors: **Jiang; Hao** (***Dayton***, ***OH***)**, Su; Weijie** (***Dayton***, ***OH***)**, Cooper; Thomas M.** (Miamisburg, ***OH***)
Assignee: **The United States of America as represented by the Secretary of the Air** (Washington, DC)
Appl. No.: **09/118,301**
Filed: **July 17, 1998**

United States Patent **7,613,407**
Craig , et al. **November 3, 2009**

Method and apparatus to detect loads associated with one of a plurality of components driven by a shared motor in an image forming apparatus

Abstract

An image forming apparatus includes a waste toner system that collects waste toner in a waste toner container. An amount of waste toner collected in the container is increased by using a driven toner distributing member that distributes accumulated toner within the container. The toner distributing member may be driven by a shared speed-controlled motor that further drives an image forming process member. The waste toner system may detect the accumulation of waste toner by monitoring a drive control circuit while the toner distributing member is being driven. For example, a logic circuit may detect the accumulation of waste toner based on monitoring a predetermined frequency of interest of a frequency domain transform of a motor

control signal, the frequency of interest associated with the shared motor driving the toner distributing member.

Inventors: **Craig; Michael William** (***FrankfortKY***, ***KY***)**, Turney; Steven Michael** (Lexington, ***KY***)**, Chapman; Danny Keith** (Sadieville, ***KY***)

Assignee: **Lexmark International, Inc.** (

Appl. No.: **11/383,266**

Filed: **May 15, 2006**

United States Patent **7,770,455**

Stencel **August 10, 2010**

Instruments, related systems, and methods for monitoring or controlling foaming

Abstract

The present invention relates to methods, systems, and instruments (10) for monitoring, detecting or measuring one or more acoustic emissions of a foam. The detected emission(s) may then be used to generate a response, such as one to control an associated process.

Inventors: **Stencel; John M.** (***LexingtonKY***, ***KY***)

Assignee: **Tribo Flow Separations, LLC** (Lexington, KY)

Appl. No.: **10/588,091**

Filed: **March 16, 2005**

PCT Filed: **March 16, 2005**

PCT No.: **PCT/US2005/008817**

371(c)(1),(2),(4) Date: **July 28, 2006**

PCT Pub. No.: **WO2005/098377**

PCT Pub. Date: **October 20, 2005**

United States Patent **7,611,628**

Hinds, III **November 3, 2009**

Aligned nanotubule membranes

Abstract

A method is provided for producing a permeable membrane, comprising the steps of aligning a plurality of hollow nanotubules to form a mat, coating the mat with a continuous polymer matrix

to form a membrane. The membrane is etched (a) to open the plurality of hollow nanotubules and form pores and (b) to oxidize the carboxyl groups to carboxylate groups. At least one additional functional unit having at least one available amine group to bind the at least one additional functional unit to the nanotubule end carboxylate group may be provided. Membranes fabricated in accordance with the method of the invention are provided also.

Inventors: **Hinds, III; Bruce J.** (***LexingtonKY***, ***KY***)

Assignee: **University of Kentucky Research Foundation** (Lexington, KY)

Appl. No.: **11/128,443**

Filed: **May 13, 2005**

United States Patent **7,604,744**

Baskis , et al. **October 20, 2009**

System and method for processing organic waste material

Abstract

A method is provided for maintaining a biomass disposed on a substrate in a bioreactor tank. The bioreactor tank has an inlet and an outlet in fluid communication with a waste treatment system whereby an influent fluid may be selectively introduced through the inlet into the bioreactor tank for removal of waste material therefrom. This produces an effluent fluid which can be returned through the outlet to the waste treatment system. The method comprises processing a quantity of influent fluid through the bioreactor tank to produce a quantity of effluent fluid and removing the effluent fluid from the bioreactor tank through the outlet. The method further comprises isolating the bioreactor tank from the waste treatment system and establishing a set of dry cycle conditions in the bioreactor tank. The dry cycle conditions are selected to effect endogenous growth within at least a portion of the biomass whereby an average age of the at least a portion of the biomass may be tailored. The method also comprises restoring the bioreactor tank connection to the waste treatment system.

Inventors: **Baskis; Paul Thomas** (Rantoul, IL)**, Atkinson; Keith** (Norcross, GA)**, Camanse; Windell** (***LexingtonKY***, ***KY***)**, Neustedter; Glen** (Lake St. Louis, MO)**, Mullinix; F. David** (Rantoul, IL)

Assignee: **Baswood, Inc.** (Atlanta, GA)

Appl. No.: **12/134,778**

Filed: **June 6, 2008**

United States Patent **7,459,223**

Zeikus , et al. **December 2, 2008**

Electrochemical methods for generation of a biological proton motive force

Abstract

Disclosed are methods using neutral red to mediate the interconversion of chemical and electrical energy. Electrically reduced neutral red has been found to promote cell growth and formation of reduced products by reversibly increasing the ratio of the reduced:oxidized forms of NAD(H) or NADP(H). Electrically reduced neutral red is able to serve as the sole source of reducing power for microbial cell growth. Neutral red is also able to promote conversion of chemical energy to electrical energy by facilitating the transfer of electrons from microbial reducing power to a fuel cell cathode.

Inventors: **Zeikus; Joseph Gregory** (Okemos, MI)**, Shin; Hyoun S.** (Lansing, MI)**, Jain; Mahendra K.** (***LexingtonKY***, ***KY***)

Assignee: **Board of Trustees of Michigan State University** (East Lansing, MI)

Appl. No.: **11/088,278**

Filed: **March 23, 2005**

United States Patent **7,419,604**

Atwood **September 2, 2008**

Use of boron compounds to precipitate uranium from water

Abstract

A method is provided for removing uranium from water. The method includes the mixing of a boron reagent with water contaminated with uranyl dication ions, leading to removal of the uranium from that water.

Inventors: **Atwood; David A.** (***LexingtonKY***, ***KY***)

Assignee: **University of Kentucky Research Foundation** (Lexington, KY)

Appl. No.: **11/321,488**

Filed: **December 29, 2005**

United States Patent **7,387,733**

Baskis , et al. **June 17, 2008**

System and method for processing organic waste material

Abstract

A method is provided for maintaining a biomass disposed on a substrate in a bioreactor tank. The bioreactor tank has an inlet and an outlet in fluid communication with a waste treatment system whereby an influent fluid may be selectively introduced through the inlet into the bioreactor tank for removal of waste material therefrom. This produces an effluent fluid which can be returned through the outlet to the waste treatment system. The method comprises processing a quantity of influent fluid through the bioreactor tank to produce a quantity of effluent fluid and removing the effluent fluid from the bioreactor tank through the outlet. The method further comprises isolating the bioreactor tank from the waste treatment system and establishing a set of dry cycle conditions in the bioreactor tank. The dry cycle conditions are selected to effect endogenous growth within at least a portion of the biomass whereby an average age of the at least a portion of the biomass may be tailored. The method also comprises restoring the bioreactor tank connection to the waste treatment system.

Inventors: **Baskis; Paul Thomas** (Rantoul, IL)**, Atkinson; Keith** (Norcross, GA)**, Camanse; Windell** (***LexingtonKY***, ***KY***)**, Neustedter; Glen** (Lake St. Louis, MO)**, Mullinix; F. David** (Rantoul, IL)

Assignee: **Baswood, LLC** (Atlanta, GA)

Appl. No.: **11/294,777**

Filed: **December 6, 2005**

United States Patent **6,852,224**

Jagtoyen , et al. **February 8, 2005**

Carbon fiber filters

Abstract

Disclosed is a filter comprised of activated carbon fibers, wherein said filter has a Virus Removal Index (hereafter "VRI") of at least about 99%, as measured in accordance with the test method described in the specification. The filter may comprise unbound fibers, or the fibers may be bound with a binder to form a composite of fibers. Also disclosed is a method of removing viruses from a liquid, the method comprising contacting the liquid with a filter comprising activated carbon fibers wherein said filter has a VRI of at least about 99%. Also described is an article of manufacture comprising: (a) a filter comprising activated carbon fibers, wherein said filter has a VRI of at least about 99%; and (b) instructions which inform a user that the filter may be used to remove viruses from a liquid.

Inventors: **Jagtoyen; Marit** (Leawood, KS)**, Derbyshire; Francis John** (late of ***LexingtonKY, KY), Derbyshire; Rosemary Anne Alexander (LexingtonKY, KY), Tremblay; Mario E. (West Chester, OH), Fishter; Steve G. (Harrison, OH), Collias; Dimitris I. (Mason, OH)***

Assignee: **The Procter & Gamble Company** (Cincinnati, OH)

The University of Kentucky Research Foundation (Lexington, KY)
Appl. No.: **10/649,710**
Filed: **August 27, 2003**

United States Patent **6,702,875**
Jagtoyen , et al. **March 9, 2004**

Carbon fiber filters for air filtration

Abstract

Described are filters containing free-activated carbon fibers or activated carbon fibers in the form of a composite used for filtering a variety of contaminants, including pathogens, from air. These filters can provide effective and efficient removal of contaminants from air, requiring only short contact time between the air being filtered and the filter itself, with only a minimum pressure drop across the filter. The characteristics of these filters allow for effective filtration with only thin filter layers being required. The process of filtering air utilizing these filters is also disclosed.

Inventors: **Jagtoyen; Marit** (***LexingtonKY***, ***KY***)**, Derbyshire; Francis John** (late of ***LexingtonKY, KY)***
Assignee: **University of Kentucky Research Foundation** (Lexington, KY)
Appl. No.: **09/960,085**
Filed: **September 21, 2001**

United States Patent **6,586,600**
Atwood , et al. **July 1, 2003**

Multidentate sulfur-containing ligands

Abstract

Novel sulfur-containing ligands for binding of heavy metals are disclosed. The ligands incorporate a central ring structure and pendant alkyl-thiol chains. The ligands are of the general structure: ##STR1## where n is an integer from 1-4, and X is selected from the group consisting of hydrogen, lithium, sodium, potassium, rubidium, cesium, and francium. The ligands of the present invention are suitable for binding any metal in or capable of being placed in a positive oxidation state, such as cadmium, lead, nickel, zinc, mercury, copper, and the like. Additionally, methods for removal of heavy metals from various substances are disclosed, comprising separating selected heavy metals from selected substances by contacting the substances with an effective amount of the novel sulfur-containing chelate ligands for a sufficient time to form stable, irreversible ligand-metal precipitates, and removing such precipitates.

Inventors: **Atwood; David A.** (***LexingtonKY***, ***KY***)**, Howerton; Brock S.** (***LexingtonKY***, ***KY***)**, Matlock; Matthew** (***LexingtonKY***, ***KY***)

Assignee: **University of Kentucky Research Foundation** (Lexington, KY)

Appl. No.: **09/730,622**

Filed: **December 6, 2000**

United States Patent **6,495,023**

Zeikus , et al. **December 17, 2002**

Electrochemical methods for generation of a biological proton motive force and pyridine nucleotide cofactor regeneration

Abstract

Disclosed are methods using neutral red to mediate the interconversion of chemical and electrical energy. Electrically reduced neutral red has been found to promote cell growth and formation of reduced products by reversibly increasing the ratio of the reduced:oxidized forms of NAD(H) or NADP(H). Electrically reduced neutral red is able to serve as the sole source of reducing power for microbial, cell growth. Neutral red is also able to promote conversion of chemical energy to electrical energy by facilitating the transfer of electrons from microbial reducing power to a fuel cell cathode.

Inventors: **Zeikus; Gregory J.** (Okemos, MI)**, Shin; Hyoun S.** (Lansing, MI)**, Jain; Mahendra K.** (***LexingtonKY***, ***KY***)

Assignee: **Michigan State University** (East Lansing, MI)

Appl. No.: **09/793,025**

Filed: **February 26, 2001**

United States Patent **6,433,163**

Ho **August 13, 2002**

Combined supported liquid membrane/strip dispersion process for the removal and recovery of penicillin and organic acids

Abstract

The present invention provides a novel process for the removal and recovery of penicillin and organic acids from process streams and waste waters. The process of the present invention utilizes a combination of a supported liquid membrane (SLM) and a strip dispersion to improve extraction of the penicillin and organic acids while increasing membrane stability and reducing processing costs.

Inventors: **Ho; W. S. Winston** (***LexingtonKY***, ***KY***)
Assignee: **Commodore Separation Technoligies, Inc.** (New York, NY)
Appl. No.: **09/541,925**
Filed: **April 3, 2000**

United States Patent **6,397,661**
Grimes , et al. **June 4, 2002**

Remote magneto-elastic analyte, viscosity and temperature sensing apparatus and associated methods of sensing

Abstract

An analyte, viscosity, or temperature sensing apparatus for operative arrangement within a time-varying magnetic field, including a sensor with an outer surface that is chemically, frictionally, or thermally responsive and adhered to a base magnetostrictive element, and a receiver to measure a first and second value for magneto-elastic emission intensity of the sensor taken at, respectively, a first and second interrogation frequency. A change in mass or a change in material stiffness of the sensor due to the responsiveness, the viscosity and mass density of a fluid therearound, or the temperature, can be identified. The receiver, alternatively, measures a plurality of successive values for magneto-elastic emission intensity of the sensor taken over an operating range of successive interrogation frequencies to identify a value for the sensor's magneto-elastic resonant frequency (a fundamental frequency or harmonic thereof). Several sensors in an ordered array will provide a "package" of information.

Inventors: **Grimes; Craig A.** (***LexingtonKY***, ***KY***)**, Stoyanov; Plamen G.** (***LexingtonKY***, ***KY***)
Assignee: **University of Kentucky Research Foundation** (Lexington, KY)
Appl. No.: **09/223,689**
Filed: **December 30, 1998**

United States Patent **6,393,921**
Grimes , et al. **May 28, 2002**

Magnetoelastic sensing apparatus and method for remote pressure query of an environment

Abstract

A pressure sensing apparatus for operative arrangement within an environment, having: a sensor comprising a hermetically-sealed receptacle, at least one side of which has an flexible membrane to which a magnetically hard element is attached. Enclosed within the receptacle is a

magnetostrictive element that vibrates in response to a time-varying magnetic field. Also included is a receiver to measure a plurality of successive values for magneto-elastic emission intensity of the sensor taken over an operating range of successive interrogation frequencies to identify a resonant frequency value for the sensor. Additional features include: (a) the magnetically hard element may be adhered to an inner or outer side of, or embedded within, the membrane; (b) the magnetostrictive element can include one or more of a variety of different pre-formed, hardened regions; (c) the magneto-elastic emission may be a primarily acoustic or electromagnetic emission; and (d) in the event the time-varying magnetic field is emitted as a single pulse or series of pulses, the receiver unit can detect a transitory time-response of the emission intensity of each pulse (detected after a threshold amplitude value for the transitory time-response is observed). A Fourier transform of the time-response can yield results in the frequency domain. Also, an associated method of sensing pressure of an environment is included that uses a sensor having a magnetostrictive element to identify a magneto-elastic resonant frequency value therefore. Using the magneto-elastic resonant frequency value identified, a value for the pressure of the environment can be identified.

Inventors: **Grimes; Craig A.** (***LexingtonKY***, ***KY***)**, Stoyanov; Plamen G.** (Worcester, MA)**, Kouzoudis; Dimitris** (***LexingtonKY***, ***KY***)

Assignee: **University of Kentucky Research Foundation** (Lexington, KY)

Appl. No.: **09/502,663**

Filed: **February 11, 2000**

United States Patent **6,359,444**

Grimes **March 19, 2002**

Remote resonant-circuit analyte sensing apparatus with sensing structure and associated method of sensing

Abstract

A resonant sensing apparatus for operative arrangement within a test environment to sense an analyte. A sensing structure is included having an antenna in electrical communication with a resonant circuit and a structural element made of a material that selectively responds to the analyte. This sensing structure will resonate at a particular characteristic resonant frequency in the presence of an applied interrogation electromagnetic field and the analyte upon the occurrence of the selective response. A receiver is used for remotely identifying a value for the characteristic resonant frequency by measuring a plurality of values for electromagnetic emission intensity of the sensing structure taken over an operating range of frequencies. A length of a conductive segment of any component of the resonant circuit may also function as the antenna. A method of sensing an analyte with the sensing structure includes arranging the sensing structure within a test environment and applying an interrogation electromagnetic field causing the sensing structure to resonate. A pre-correlation made between a series of resonant frequency values taken for the sensing structure and a corresponding series of analyte sensing values can be used for the sensing.

Inventors: **Grimes; Craig A.** (***LexingtonKY***, ***KY***)
Assignee: **University of Kentucky Research Foundation** (Lexington, KY)
Appl. No.: **09/322,403**
Filed: **May 28, 1999**

United States Patent **6,352,088**
Stegall **March 5, 2002**

Vehicle ***wastewater*** drainage system

Abstract

A ***wastewater*** drainage system for a vehicle, such as a recreational vehicle (RV), is provided. The system includes a pump, such as a macerator pump, in selective fluid communication with the black water tank and the gray water tank, and a drainage hose connected to the exit end of the pump for directing ***wastewater to a wastewater*** storage area. The system allows the RV user to clean the black water tank using water from the gray water tank, and allows gray water to be stored in the black water tank so that less time is spent draining the tanks and more time is spent enjoying the RV experience.

Inventors: **Stegall; Lannie L.** (***LexingtonKY***, ***KY***)
Appl. No.: **09/691,002**
Filed: **October 18, 2000**

United States Patent **6,350,419**
Ho **February 26, 2002**

Combined supported liquid membrane/strip dispersion process for the removal and recovery of metals

Abstract

The present invention provides a novel process for the removal and recovery of metals from waste waters and process streams. The process of the present invention utilizes a combination of a supported liquid membrane (SLM) and a strip dispersion to improve extraction of the target species while increasing membrane stability and reducing processing costs. The process is illustrated with cobalt removal and recovery with unexpected results, such as unexpectedly high cobalt fluxes and a very high cobalt concentration in the strip solution recovered. This process can remove other metals, such as copper, zinc, nickel, mercury, lead, cadmium, silver, europium, lanthanum, neodymium, praseodymium, gadolinium, and selenium, from the feed stream to provide a concentrated strip solution of the target species.

Inventors: **Ho; W. S. Winston** (***LexingtonKY***, ***KY***)
Assignee: **Commodore Separation Technologies Inc.** (New York, NY)
Appl. No.: **09/499,065**
Filed: **February 4, 2000**

United States Patent **6,291,705**
Ho , et al. **September 18, 2001**

Combined supported liquid membrane/strip dispersion process for the removal and recovery of metals

Abstract

The present invention provides a novel class of extractants and a method of manufacture for the extractants. The extractants are useful for the removal and recovery of metals from waste waters and process streams. The removal process utilizes a combination of a supported liquid membrane (SLM) and a strip dispersion to improve extraction of the target species while increasing membrane stability and reducing processing costs. The new class of extractants include dialkyl phosphoric acids containing alkyl chains of at least 8-12 carbon atoms. The method of manufacture includes mixing phosphorus pentasulfide with an alcohol, followed by hydrolysis of the intermediate reactants with a mineral acid.

Inventors: **Ho; W. S. Winston** (***LexingtonKY***, ***KY***)**, Wang; Bing** (Richmond, VA)
Assignee: **Commodore Separation Technologies, Inc.** (New York, NY)
Appl. No.: **09/535,283**
Filed: **March 24, 2000**

United States Patent **6,139,742**
Bhattacharyya , et al. **October 31, 2000**

Membrane-based sorbent for heavy metal sequestration

Abstract

A process is provided for making membrane-based sorbents with enhanced binding activity that are particularly useful for heavy metal sequestration. The process includes the step of selectively hydrolyzing a polyacetylated membrane in order to deacetylated a surface layer of said membrane including the pore surfaces and expose free hydroxyl groups. This is followed by the oxidizing of the hydroxyl groups to aldehyde groups. This is then followed by the attaching of a polycarboxylic acid such as a polyamino acid, polyalkenoic acid or polypeptide to the membrane

through the aldehyde groups. Preferably, the hydrolyzing step is completed under alkaline conditions and the oxidizing step is completed using an aqueous solution of sodium periodate.

Inventors: **Bhattacharyya; Dibakar** (Lextington, ***KY***), **Bachas; Leonidas G.** (Lextington, ***KY***), **Cullen; Lawrence** (Newport, **GB**), **Hestekin; Jamie A.** (***LexingtonKY***, ***KY***), **Sikdar; Subhas K.** (Blue Ash, OH)

Assignee: **University of Kentucky Research Foundation** (Lexington, KY)

Appl. No.: **09/084,631**

Filed: **May 26, 1998**

United States Patent **6,103,121**

Bhattacharyya , et al. **August 15, 2000**

Membrane-based sorbent for heavy metal sequestration

Abstract

A process is provided for making membrane-based sorbents with enhanced binding activity that are particularly useful for heavy metal sequestration. The process includes the step of selectively hydrolyzing a polyacetylated membrane in order to deacetylate a surface layer of said membrane and expose free hydroxyl groups. This is followed by the oxidizing of the hydroxyl groups to aldehyde groups. This is then followed by the attaching of a polycarboxylic acid such as a polyamino acid, polyalkenoic acid or polypeptide to the membrane through the aldehyde groups. Preferably, the hydrolyzing step is completed under alkaline conditions and the oxidizing step is completed using an aqueous solution of sodium periodate.

Inventors: **Bhattacharyya; Dibakar** (***LexingtonKY***, ***KY***), **Bachas; Leonidas G.** (***LexingtonKY***, ***KY***), **Cullen; Lawrence** (Leeds, **GB**), **Hestekin; Jamie A.** (***LexingtonKY***, ***KY***), **Sikdar; Subhas K.** (Blue Ash, OH)

Assignee: **University of Kentucky Research Foundation** (Lexington, KY)

Appl. No.: **09/076,204**

Filed: **May 12, 1998**

United States Patent **6,057,262**

Derbyshire , et al. **May 2, 2000**

Activated carbon and process for making same

Abstract

A process is described for the manufacture of activated carbon in the form of a powder, as granules or as extrudates. The process includes treating a biomass feedstock, such as woods, coconut shells, fruit pits, peats, lignites and all ranks of coal with a processing agent and an activation agent. The processing agent may be a natural or synthetic monomer, oligomer, polymer or mixtures thereof capable of interacting or co-polymerizing with the biomass feedstock. The activation agent may be, for example, phosphoric acid, zinc chloride or mixtures thereof. A high surface area, high hardness extruded activated carbon may be produced by this process. The activated carbon is generally characterized by a BET surface area between 600-2500 m.sup.2 /g, a mesopore surface area between 80-900 m.sup.2 /g and for extruded or granular carbons, a Takeda hardness of between 10-50%.

Inventors: **Derbyshire; Francis J.** (***LexingtonKY***, ***KY***)**, Jagtoyen; Marit** (***LexingtonKY***, ***KY***)

Assignee: **University of Kentucky Research Foundation** (Lexington, KY)

Appl. No.: **09/088,297**

Filed: **June 1, 1998**

United States Patent **7,813,971**

Mazzella , et al. **October 12, 2010**

Method of generating a recommendation or maintaining a supply of a type of coating composition considering environmental conditions

Abstract

A system and method are provided for recommending at least one coating composition for coating substrates considering the particular geographical location and the environmental conditions associated with that location. The computer based system and the method can also consider the particular performance and optionally the appearance features desired by the end user.

Inventors: **Mazzella; Joseph F.** (Naperville, IL)**, Holzknecht; Louis F.** (***Louisville*</B*KY*, *KY***)**, Porcellato; Larry (Akron, OH)**

Assignee: **The Glidden Company** (Strongsville, OH)

Appl. No.: **11/339,345**

Filed: **January 25, 2006**

United States Patent **7,635,398**

Bertram , et al. **December 22, 2009**

Purification of biodiesel with adsorbent materials

Abstract

A method of purifying a biodiesel fuel by contacting the biodiesel fuel with at least one adsorbent material, such as magnesium silicate. Such method removes impurities, such as soap, formed during the production of biodiesel fuels.

Inventors: **Bertram; Bryan** (Floyds Knobs, IN)**, Abrams; Christopher** (***Louisville*</B*KY*, *KY*), Cooke; Brian S. (Clarksville, IN)**
Assignee: **The Dallas Group of America, Inc.** (Whitehouse, NJ)
Appl. No.: **10/956,856**
Filed: **October 1, 2004**

United States Patent **7,465,839**
Ladebeck **December 16, 2008**

Method for the hydrogenation of ketones

Abstract

The invention relates to a process for hydrogenating ketones, wherein the ketone is fed in a mixture with hydrogen to a catalyst bed which comprises a copper chromite catalyst which has a proportion of SiO.sub.2 as catalyst.

Inventors: **Ladebeck; Jurgen** (***Louisville*</B*KY*, *KY*)**
Assignee: **Sud-Chemie AG** (Munich, **DE**)
Appl. No.: **11/718,356**
Filed: **November 16, 2005**
PCT Filed: **November 16, 2005**
PCT No.: **PCT/EP2005/012294**
371(c)(1),(2),(4) Date: **May 01, 2007**
PCT Pub. No.: **WO2006/053735**
PCT Pub. Date: **May 26, 2006**

United States Patent **7,390,413**
Zentner , et al. **June 24, 2008**

Water softener system and method

Abstract

a water softening system includes a water softening resin tank, an anion resin tank in flow communication with the water softening resin tank, an in-line water heater in flow communication with the water softening resin tank and a heat exchanger in flow communication with the in-line heater. A water heater is in flow communication with the heat exchanger and the in-line heater. A plurality of flow control valves are operatively connected to the water heater heat exchanger, in-line water heater, anion resin tank, and water softening resin tank. The flow control valves are configured to control the flow of water through the water softening system.

Inventors: **Zentner; Martin M.** (Prospect, ***KY***), **Tarr; Scott** (***Louisville*</B*KY*, *KY*), Schroeder; Jessica (Oshkosh, WI), Cosgrove; James (La Grange, *KY*)**

Assignee: **General Electric Company** (Schenectady, NY)

Appl. No.: **11/290,009**

Filed: **November 30, 2005**

United States Patent **7,272,953**

Masterson **September 25, 2007**

Method and apparatus for separating and neutralizing ammonia

Abstract

The present invention is a method and apparatus to provide for the safe and effective removal and neutralization of ammonia from a stream of waste oil or other liquid. The apparatus consists of a receiving tank, a treatment tank, circulation piping, associated controls, pumping and monitoring mechanisms. The primary utility for the invention is with commercial and industrial refrigeration units. The neutralizing solution in the treatment tank is circulated through the piping which includes a venturi that is used to induce a negative gauge pressure in the receiving tank by creating a suction that draws gases from the receiving tank. The negative pressure allows the receiving tank to pull the mixture of waste oil and entrained ammonia from the drain port of the refrigeration system even when the system is below atmospheric pressure. The venturi also removes ammonia gas from the receiving tank. The system provides for the introduction of a neutralizing agent such as carbon dioxide to be mixed with liberated ammonia as it is drawn into the circulation piping and returned to the treatment tank. Other paths in the circulation piping pass the neutralizing solution through a heat exchanger in the receiving tank or just return it to the treatment tank for mixing. Heat transfer cools the treatment tank and heats the receiving tank which facilitates evaporation of liquid ammonia.

Inventors: **Masterson; James A.** (***Louisville*</B*KY*, *KY*)**

Appl. No.: **10/875,053**

Filed: **June 23, 2004**

United States Patent **7,271,126**

Smith , et al. **September 18, 2007**

Catalyst for the dehydrogenation of ethyl benzene to STYRENE prepared with a high purity iron precursor

Abstract

A method for producing a catalyst for use in the dehydrogenation of ethylbenzene to styrene is disclosed. The catalyst of the present invention comprises a high purity metal and at least one promoter in the form of solid oxides, oxide hydrates, hydroxides, hydroxycarbonates or metals. The catalyst is prepared via a method which comprises the preparation of at least one high purity iron precursor with or without an additional support material and which uses a nominal amount of water in the catalyst production. The catalyst pellets prepared with the high purity metal precursor are essentially free of sulfur and chloride contaminants.

Inventors: **Smith; Dennis J.** (Jeffersontown, ***KY***)**, O'Brien; Robert J.** (***Louisville*</B*KY*, *KY*)**, Hu; X. D. (*Louisville*</B*KY*, *KY*)**

Assignee: **Sud-Chemie Inc.** (Louisville, KY)

Appl. No.: **10/876,150**

Filed: **June 24, 2004**

United States Patent **7,211,235**

Eisgruber , et al. **May 1, 2007**

Method for producing hydrotalcites

Abstract

A method is described for the manufacture of hydrotalcites by using at least one compound of a bivalent metal (Component A) and at least one compound of a trivalent metal (Component B), wherein at least one of these components is not used in the form of a solution, characterized in that a) at least one of the Components A and/or B which is not used in the form of a solution, shortly before or during mixing of the components, and/or b) the mixture containing the Components A and B is subjected to intensive grinding until an average particle size (D.sub.50) in the range of approx. 0.1 to 5 .mu.m is obtained, and optionally, after aging treatment or hydrothermal treatment, the resulting hydrotalcite product is separated, dried, and optionally calcinated. The hydrotalcite precursors and/or fine-particle crystalline hydrotalcites which can be obtained by using the method in accordance with this present invention may be used in particular as catalysts or catalyst carriers or as nanocomposite filling agents or co-stabilizers in a polymer matrix.

United States Patent **7,203,976**

Weller , et al. **April 17, 2007**

Floor level waste pumping system for toilets

Abstract

A floor level pumping system, that is non-disruptive to the existing flooring, including a conventional rear outlet toilet, a floor level tank for receiving waste and fluid from the outlet of the toilet including a tank chamber containing a designated area with a sensing system which activates a discharge pump when the level or quantity of the waste and fluid within the tank chamber reaches a predetermined level, wherein the chamber further includes one or more baffles extending upward from a floor of the tank chamber, which baffles at least partially segregate the designated area from the remaining area of the tank chamber, wherein at least one of said baffles contains a curved surface, and a discharge pump for pumping waste from the floor level tank out through a discharge pipe, wherein the discharge pump is secured to the floor level tank.

Inventors: **Weller; Paul A.** (***Louisville*</B*KY*, *KY*), Burch, Jr.; Thomas J. (*Louisville*</B*KY*, *KY*), Henderson, legal representative; Monica (*Louisville*</B*KY*, *KY*), Zoeller, deceased; Kenneth E. (*Louisville*</B*KY*, *KY*)**

Assignee: **Zoeller Company** (Louisville, KY)

Appl. No.: **10/893,408**

Filed: **July 16, 2004**

United States Patent **7,199,077**

Hu , et al. **April 3, 2007**

Fischer-tropsch catalyst prepared with a high purity iron precursor

Abstract

A Fischer-Tropsch catalyst comprising iron and at least one promoter is prepared via a method which comprises the preparation of a high purity iron precursor and which uses a nominal amount of water in the catalyst production. The catalyst particles prepared with the high purity iron precursor have an essentially spherical particle shape, a relatively narrow particle size distribution range, and a high surface area.

Inventors: **Hu; X. D** (***Louisville*</B*KY*, *KY*), O'Brien; Robert J. (*Louisville*</B*KY*, *KY*), Tuell; Richard (Elizabeth, IN), Conca; Esternio (Novara, IT), Rubini; Carlo (San Fermo della Battaglia, IT), Petrini; Guido (Galliate, IT)**

Assignee: **Sud-Chemie Inc.** (Louisville, KY)

Appl. No.: **10/343,935**

Filed: **May 15, 2002**
PCT Filed: **May 15, 2002**
PCT No.: **PCT/US02/15310**
371(c)(1),(2),(4) Date: **May 29, 2003**
PCT Pub. No.: **WO03/097236**
PCT Pub. Date: **November 27, 2003**

United States Patent **7,182,599**
Stone , et al. **February 27, 2007**

Method and apparatus for removing particulate metals from dental ***waste water***

Abstract

An inline filter assembly to be used in conjunction with surgical or other procedures, near the patient or chairside in dental operations, that is capable of removing, by filtration, particulate matter from ***waste-water***. The filter assembly is configured to permit easy and rapid changing of filters. The filter assembly also contains a series of stopcocks to permit easy and quick changing of filters while maintaining suction to the patient.

Inventors: **Stone; Mark E.** (Wilmette, IL)**, Gullett; Jeffrey M.** (***Louisville*</B*KY, KY*), Kuehne; John C. (Bisbee, AZ)**
Assignee: **The United States of America as represented by the Secretary of the Navy** (Washington, DC)
Appl. No.: **11/152,340**
Filed: **June 15, 2005**

United States Patent **7,037,876**
O'Brien , et al. **May 2, 2006**

High temperature shift catalyst prepared with a purity iron precursor

Abstract

A high temperature water gas shift catalyst comprising iron and at least one promoter is prepared via a method which comprises the preparation of a high purity iron precursor and which uses a nominal amount of water in the catalyst production. The catalyst prepared according to the inventive method is more efficient in hydrogen production under the high temperature water gas shift reaction conditions in a fixed bed test than prior art catalysts of similar composition.

Inventors: **O'Brien; Robert** (***Louisville*</B*KY*, *KY*), Hu; X. D. (*Louisville*</B*KY*, *KY*), Tuell; Richard (Elizabeth, IN), Cai; Yeping (*Louisville*</B*KY*, *KY*)**
Assignee: **Sud-Chemie Inc.** (Louisville, KY)
Appl. No.: **10/642,805**
Filed: **August 18, 2003**

United States Patent **6,935,838**
Wang **August 30, 2005**

High pressure multi-stage centrifugal blower

Abstract

A high pressure centrifugal blower having vertically split casing and aluminum or steel impellers mounted on a common shaft housed within the casing, and at least two oil-enclosing bearing housings to rotatably support the rotors, where an integral gearbox is formed as part of the blower casing so as to increase the impeller rotational speed to achieve higher pressure, and axial impeller eye seals are utilized to reduce the clearance and enhance reliability for higher pressure applications.

Inventors: **Wang; Qi** (***Louisville*</B*KY*, *KY*)**
Assignee: **Hi-Bar Blowers, Inc.** (Fayetteville, GA)
Appl. No.: **10/391,439**
Filed: **March 19, 2003**

United States Patent **6,881,272**
Black , et al. **April 19, 2005**

Selective removal of photoreceptor coatings by ultrasonification

Abstract

A method for recycling photoconductors is disclosed. In this method, the charge transport layer is selectively removed from the photoconductor without adversely affecting the electrical properties of the charge generating layer. The recycled drum may then be recoated with a new charge transport layer and reused in an electrophotographic process. In this method, the photoconductor to be recycled is placed in a specifically selected solvent, such as a dibasic ester, and is subjected to ultrasonic energy, preferably for a period not to exceed about 15 minutes.

Inventors: **Black; David G.** (Longmont, CO)**, Gheleta; Weimei Luo** (***Louisville*, Levin; Ronald H. (Lafayette, CO), Nguyen; Dat Q. (Flatteville, *KY*)**

Assignee: **Lexmark International, Inc.** (Lexington, KY)
Appl. No.: **10/164,676**
Filed: **June 6, 2002**

United States Patent **6,817,844**
Wang **November 16, 2004**

Rotary blower with forced external air cooling

Abstract

A rotary blower with forced external air cooling having multiple interconnected and synchronized parallel multi-lobe rotors with the same number of straight lobes for propelling flow from a suction port to a discharge port of an inner casing without internal compression. The blower also has an outer cover with cooling air inlet and outlet openings and added centrifugal cooling fans mounted on the rotor shafts adjacent to the cooling air inlet openings for circulating cooling air through the space between the outer cover and the inner casing. The blower further utilizes wearable strip seal devices applied on the rotors for preventing internal leakage and accidental mechanical contact.

Inventors: **Wang; Qi** (***Louisville*</B*KY, KY*)**
Assignee: **Hi-Bar Blowers, Inc.** (Fayetteville, GA)
Appl. No.: **10/264,470**
Filed: **October 4, 2002**

United States Patent **6,772,789**
Terry, III , et al. **August 10, 2004**

Flow leveling device

Abstract

A flow leveling device for use in a liquid distribution system that can be attached to the end of a conduit The device has an eccentrically placed opening on the face of the device whose vertical position can be varied so as to equalize the flow of liquid dispersed from a central point. The device is secured to the conduit by a double-walled skirt depending from the face of the device. The skirt has a central gap defined by the double walls which securely holds the conduit walls therein.

Inventors: **Terry, III; Theophilus B.** (Hodgenville, ***KY***)**, Hornback; Michael J.** (***Louisville*</B*KY, KY*)**

Assignee: **Nurse, Jr.; Harry L.** (Goshen, KY)
Appl. No.: **10/124,921**
Filed: **April 18, 2002**

United States Patent **6,755,029**
Bertrand, Jr. , et al. **June 29, 2004**

Ammonia separator and neutralizer

Abstract

The present invention is a method and apparatus to provide for the safe and effective removal and neutralization of ammonia from a stream of waste oil or other liquid. The apparatus consists of a receiving tank, a treatment tank, transfer piping, associated controls, pumping and monitoring mechanisms. The primary utility for the invention is with commercial and industrial refrigeration units. The mixture of waste oil and entrained ammonia is removed from the drain port of the refrigeration system and placed into the receiving tank. The receiving tank includes aeration piping and nozzles and is in fluid communication with the treatment tank. The system provides for the introduction of an acid such as carbon dioxide as a neutralizing agent to be mixed with liberated ammonia as it is pumped into the treatment tank for recirculation.

Inventors: **Bertrand, Jr.; Marvin Ralph** (***Louisville*</B*KY, KY*), Masterson; James A. (*Louisville*</B*KY, KY*)**
Appl. No.: **10/338,504**
Filed: **January 8, 2003**

United States Patent **6,495,040**
Zoeller , et al. **December 17, 2002**

Septic tank filtering system

Abstract

A filtering system for filtering effluent in a septic tank including an outer secondary filter secured within a pipe fitting, wherein the outer secondary filter includes a central opening passing therethrough; an inner primary filter, wherein the inner primary filter is slidingly engaged within the central opening in the outer secondary filter; and a filtering connection element, secured between the outer secondary filter and an inner surface of the pipe fitting, wherein the filtering connection element filters effluent passing upward through the filter pipe fitting and wherein upon removal of the inner primary filter, the outer secondary filter filters the effluent entering the pipe fitting before discharge. Either or both of the outer secondary filter or the inner primary filter may be formed with a biocide to retard the growth of biological material on their surfaces.

Inventors: **Zoeller; Kenneth E.** (***Louisville</B**KY*, *KY*), **Byers; Matthew E. (Lawrenceburg, *KY*), West; William V. (Greenville, IN), Fletcher; Jason (*Louisville</B**KY*, *KY*)**
Assignee: **Zoeller Co.** (Louisville, KY)
Appl. No.: **09/992,945**
Filed: **November 6, 2001**

United States Patent **6,461,523**
Greenrose **October 8, 2002**

Solids separation mechanism

Abstract

A mechanism and method for separating solids from a slurry includes a screen, and an extractor screw connected to the screen outlet by means of a flexible conduit, wherein the outlet of the extractor screw is at a higher elevation than the outlet of the screen.

Inventors: **Greenrose; John** (***Louisville</B**KY*, *KY*)
Appl. No.: **09/788,889**
Filed: **February 20, 2001**

United States Patent **6,375,388**
Zoeller , et al. **April 23, 2002**

Affluent distribution system capable of being horizontally offset or curved

Abstract

An effluent distribution system for distributing effluent from a source of ***waste water,*** wherein the system includes a chamber, a cover or lid for the chamber, an effluent flow system, a pair of curved end sections secured at one end of the chamber for adjusting the position of one chamber in relation to another chamber, and treatment media wherein the chamber may include as an integral component thereof, the cover or lid and alternatively spray nozzles secured to the cover or lid to assist in the distribution of effluent.

Inventors: **Zoeller; Kenneth E.** (***Louisville</B**KY*, *KY*), **Byers; Matthew E. (Lawrenceburg, *KY*)**
Assignee: **Zoeller Company** (Louisville, KY)
Appl. No.: **09/528,139**
Filed: **March 17, 2000**

United States Patent **6,364,620**
Fletcher , et al. **April 2, 2002**

Submersible pump containing two levels of moisture sensors

Abstract

A dual moisture alarm system for use in submersible pumps, including a pump housing, a motor for running the pump which includes a shaft attached to an impeller. Secured to and located within the pump housing are a series of power control and sensing cords. Attached to these cords are both a lower liquid sensing probe and an upper liquid sensing probe which can sense the presence of fluids, both in a lower sealing chamber located below the motor and an upper chamber located above the motor. The upper liquid sensing probe senses the presence of fluids within the upper chamber before the power terminals also located in the upper chamber are contacted by the fluids.

Inventors: **Fletcher; Jason** (***Louisville</B KY, KY*****), Zoeller; John (*****Louisville</B KY, KY*****)**
Assignee: **Zoeller Company** (Louisville, KY)
Appl. No.: **09/650,184**
Filed: **August 29, 2000**

United States Patent **6,360,898**
Nurse, Jr. , et al. **March 26, 2002**

Filtration device for a ***waste water*** treatment system

Abstract

A filter and housing for ***waste water*** treatment includes a housing having a plurality of coaxially mounted vertically extending sections adaptable to receive a filter cartridge therein. An upper section is provided with an outlet consisting of at least two coaxially aligned rings of preselected diameters wherein the thickness of the rings and the spacing between the rings is sufficient to receive ***waste water*** treatment outlets of different diameters. The filter cartridge is comprised of a stacked arrangement of a plurality of disc-dam units wherein each disc-dam unit is provided with a serpentine configured first dam, the first dam extending upwardly from an upper surface of the disc-dam unit, the first dam having terminating ends spaced at outer terminating edges of the disc dam unit to define a cord segment therebetween. The terminating ends are connected by a second dam having a height less than the first dam. The serpentine configured first dam divides the disc-dam unit into an upstream side along the outer periphery and a downstream side along the inner periphery. Slots are positioned within the serpentine configured dam on the upstream side thereby providing flow communication with underlying disc-dam units. The top of the first dam

is of a preselected height so as to provide a preselected spacing between the top of the first dam and the under surface of an overlying disc-dam unit.

Inventors: **Nurse, Jr.; Harry L.** (Crestwood, ***KY***)**, Christensen; John** (***Louisville*</B*KY, KY*)**
Assignee: **Nurse, Jr.; Harry L.** (Goshen, KY)
Appl. No.: **09/543,485**
Filed: **April 6, 2000**

United States Patent **6,343,611**
El-Shoubary , et al. **February 5, 2002**

Reduced energy cleaning appliance

Abstract

The appliance comprises a container for receiving the soiled articles, a circulation pump for distributing a hot liquid to the container, a drain positioned in the container and connected to the pump for emptying the liquid from the container upon completion of a cycle and a hydroclone connected to the drain and the pump, for removing soil from the liquid such that about ninety percent (90%) of the liquid distributed to the container during one cycle can be utilized during at least one subsequent cycle. Another embodiment includes a dishwasher having a normal operating cycle, the dishwasher comprising a container for accommodating a plurality of articles, a circulation pump for delivering a liquid to the container and for circulating the liquid within the container, a diverter connected to the circulation pump for diverting at least a portion of the circulating liquid to a hydroclone while returning at least about ninety percent (90%) of the liquid diverted to the hydroclone to the circulating liquid, the returned liquid having at most about 0.02% solids contained therein.

Inventors: **El-Shoubary; Youssef** (North Brunswick, NJ)**, Kim; Bang Mo** (Schenectady, NY)**, Jacobus; Dwight William** (***Louisville*</B*KY, KY*)**, Spanyer; Andrew Joseph (*Louisville*</B*KY, KY*)**, Tobbe; Joseph Duane (Taylorsville, *KY*)**, Dausch; Mark Edward (Latham, NY)**
Assignee: **General Electric Company** (Schenectady, NY)
Appl. No.: **09/170,233**
Filed: **October 13, 1998**

United States Patent **6,331,247**
Zoeller , et al. **December 18, 2001**

Septic tank filtering system

Abstract

A filtering system for filtering effluent in a septic tank including an outer secondary filter secured within a pipe fitting, wherein the outer secondary filter includes a central opening passing therethrough; an inner primary filter, wherein the inner primary filter is slidingly engaged within the central opening in the outer secondary filter; and a filtering connection element, secured between the outer secondary filter and an inner surface of the pipe fitting, wherein the filtering connection element filters effluent passing upward through the filter pipe fitting and wherein upon removal of the inner primary filter, the outer secondary filter filters the effluent entering the pipe fitting before discharge. Either or both of the outer secondary filter or the inner primary filter may be formed with a biocide to retard the growth of biological material on their surfaces.

Inventors: **Zoeller; Kenneth E.** (***Louisville</B**KY**, KY***), **Byers; Matthew E. (Lawrenceburg, *KY*), West; William V. (Greenville, IN), Fletcher; Jason (*Louisville</B**KY**, KY***)

Assignee: **Zoeller Company** (Louisville, KY)

Appl. No.: **09/639,545**

Filed: **August 16, 2000**

United States Patent **6,306,299**

Nurse, Jr. , et al. **October 23, 2001**

Filtration device for a ***waste water*** treatment system

Abstract

A filter and housing for ***waste water*** treatment includes a housing having a plurality of coaxially mounted vertically extending sections adaptable to receive a filter cartridge therein. An upper section is provided with an outlet consisting of at least two coaxially aligned rings of preselected diameters wherein the thickness of the rings and the spacing between the rings is sufficient to receive ***waste water*** treatment outlets of different diameters. The filter cartridge is comprised of a stacked arrangement of a plurality of disc-dam units wherein each disc-dam unit is provided with a serpentine configured first dam, the first dam extending upwardly from an upper surface of the disc-dam unit, the first dam having terminating ends spaced at outer terminating edges of the disc dam unit to define a cord segment therebetween. The terminating ends are connected by a second dam having a height less than the first dam. The serpentine configured first dam divides the disc-dam unit into an upstream side along the outer periphery and a downstream side along the inner periphery. Slots are positioned within the serpentine configured dam on the upstream side thereby providing flow communication with underlying disc-dam units. The top of the first dam is of a preselected height so as to provide a preselected spacing between the top of the first dam and the under surface of an overlying disc-dam unit.

Inventors: **Nurse, Jr.; Harry L.** (Crestwood, ***KY***), **Christensen; John** (***Louisville</B**KY**, KY***)

Assignee: **Nurse, Jr.; Harry L.** (Goshen, KY)
Appl. No.: **09/544,200**
Filed: **April 6, 2000**

United States Patent **6,136,190**
Zoeller , et al. **October 24, 2000**

Septic tank filtering system

Abstract

A filtering system for filtering effluent in a septic tank including an outer secondary filter secured within a pipe fitting, wherein the outer secondary filter includes a central opening passing therethrough; an inner primary filter, wherein the inner primary filter is slidingly engaged within the central opening in the outer secondary filter; and a filtering connection element, secured between the outer secondary filter and an inner surface of the pipe fitting, wherein the filtering connection element filters effluent passing upward through the filter pipe fitting and wherein upon removal of the inner primary filter, the outer secondary filter filters the effluent entering the pipe fitting before discharge. Either or both of the outer secondary filter or the inner primary filter may be formed with a biocide to retard the growth of biological material on their surfaces.

Inventors: **Zoeller; Kenneth E.** (***Louisville*</B*KY*, *KY*), Byers; Matthew E. (Lawrenceburg, *KY*), West; William V. (Greenville, IN), Fletcher; Jason (*Louisville*</B*KY*, *KY*)**
Assignee: **Zoeller Co.** (Louisville, KY)
Appl. No.: **09/334,249**
Filed: **June 16, 1999**

United States Patent **6,129,837**
Nurse, Jr. **October 10, 2000**

Waste water treatment filter including a ***waste water*** level control alert device

Abstract

A filtration device for a ***waste water*** treatment tank is provided with a level alert device positioned within the filter to provide a warning or alarm when the filter becomes plugged. The level alarm device is positioned so that as the ***waste water*** level gets beyond a certain preselected limit an alarm will actuate a micro-switch which is in actuating relation with an alarm device outside the ***waste water*** treatment tank.

Inventors: **Nurse, Jr.; Harry L.** (***Louisville*</B*KY, KY*)**
Appl. No.: **09/187,765**
Filed: **November 6, 1998**

United States Patent **6,112,766**
Zoeller , et al. **September 5, 2000**

Low flow ***wastewater*** and effluent distribution system

Abstract

A liquid distribution system for distributing effluent from a source of ***waste water***. This liquid distribution system is contained within a distribution box and includes liquid inlet piping, a ramp system, and a low capacity liquid flow splitting system, including slots and capillary grooves. A high capacity flow splitting system may also be included. In addition, an adjustment system is incorporated into the liquid distribution system for maintaining the level of the liquid distribution system in the ground.

Inventors: **Zoeller; Kenneth E.** (***Louisville*</B*KY, KY*), West; William (*Louisville*</B*KY, KY*), Byers; Matthew (*Louisville*</B*KY, KY*)**
Assignee: **Zoeller Co.** (Louisville, KY)
Appl. No.: **09/160,055**
Filed: **September 24, 1998**

United States Patent **6,047,724**
Nurse, Jr. **April 11, 2000**

Risers for a ***waste water*** treatment facility

Abstract

A riser for use with an access opening in a ***waste water*** treatment tank is mounted in a top opening in the ***waste water*** treatment tank. The riser includes a top portion and an integral bottom portion wherein the top portion is provided with a downwardly extending side wall and the bottom portion is provided with a downwardly extending skirt. The bottom portion is provided with an inner diameter greater than the outer diameter of the top portion and a ring connects the bottom portion to the top portion. The bottom portion is also provided with an inwardly extending flange having an inner terminating end engagable with the outer surface of the top portion. The top portion is provided with lugs at circumferentially spaced positions for engaging relation with slots in the flange portion for connecting adjacent risers in tandem. A plurality of risers may be connected to each other and in turn, the bottommost riser is connectable to the access opening and the uppermost riser is connectable to a cover usually at ground surface.

Inventors: **Nurse, Jr.; Harry L.** (***Louisville</B KY, KY*)**
Appl. No.: **09/022,176**
Filed: **February 11, 1998**

United States Patent **7,777,006**
Kee , et al. **August 17, 2010**

Method for purification of alpha-1-antitrypsin

Abstract

A streamlined method for purifying alpha-1-antitrypsin (AAT) from an AAT-containing protein mixture, such as a Cohn fraction IV precipitate, is provided. In the method of the invention, contaminating proteins are destabilized by cleavage of disulfide bonds with a reducing reagent, such as a dithiol, which does not affect AAT. The destabilized proteins are then preferentially adsorbed on a solid protein-adsorbing material, without the addition of a salt as a precipitant. Separation of the solid adsorbent from the solution leaves a purified AAT solution that is directly suitable for chromatographic purification, without the need for extensive desalting as in prior art processes. A process incorporating this method, which provides pharmaceutical grade AAT in high yield on a commercial scale, is also described.

Inventors: **Kee; Scott M.** (Bourbonnais, IL)**, Cook; Paul I.** (Kankakee, IL)**, Smith; James R.** (Bourbonnais, IL)**, Kling; Robert** (Bourbonnais, IL)**, Fowler; Scott A.** (***Indianapolis<IN, IN*)**, Weber; David (Bradley, IL)**
Assignee: **CSL Behring L.L.C.** (King of Prussia, PA)
Appl. No.: **10/334,303**
Filed: **December 31, 2002**

United States Patent **7,657,950**
Robert , et al. **February 9, 2010**

System and method for providing tempered fluid

Abstract

The present invention is directed to methods and apparatus for tempering the temperature of a liquid in a fluid conducting system. More particularly, some embodiments of the invention relates to tempering the temperature of water supplied to a fixture from a water heater in a fluid conducting system. The system can include a heater for heating the fluid and a diffuser for slowing the rate at which water provided to a decontamination fixture is heated.

Inventors: **Robert; Eveleigh** (***Indianapolis<IN, IN***), **Gary; Cook** (***Indianapolis<IN, IN***)
Assignee: **Margarl, LLC** (Indianapolis, IN)
Appl. No.: **11/180,380**
Filed: **July 13, 2005**

United States Patent **7,424,374**
Schutzbach , et al. **September 9, 2008**

Flow transport analysis method and system

Abstract

A method and system for analyzing flow of a substance in a sewer system determines a first flow velocity at a first location and a second flow velocity at a second location. Using a processor, the travel time between the two locations is determined using only the flow velocities and a constant. The travel time may then be used to provide a substantially accurate determination of net flow between the two locations.

Inventors: **Schutzbach; James S.** (Madison, AL)**, Stevens; Patrick L.** (***Indianapolis<IN, IN***)
Assignee: **ADS, LLC** (Huntsville, AL)
Appl. No.: **10/757,446**
Filed: **January 15, 2004**

United States Patent **7,335,897**
Takats , et al. **February 26, 2008**

Method and system for desorption electrospray ionization

Abstract

A new method and system for desorption ionization is described and applied to the ionization of various compounds, including peptides and proteins present on metal, polymer, and mineral surfaces. Desorption electrospray ionization (DESI) is carried out by directing charged droplets and/or ions of a liquid onto the surface to be analyzed. The impact of the charged particles on the surface produces gaseous ions of material originally present on the surface. The resulting mass spectra are similar to normal ESI mass spectra in that they show mainly singly or multiply charged molecular ions of the analytes. The DESI phenomenon was observed both in the case of conductive and insulator surfaces and for compounds ranging from nonpolar small molecules such as lycopene, the alkaloid coniceine, and small drugs, through polar compounds such as peptides and proteins. Changes in the solution that is sprayed can be used to selectively ionize particular compounds, including those in biological matrices. In vivo analysis is demonstrated.

Inventors: **Takats; Zoltan** (Budapest, **HU**)**, Gologan; Bogdan** (Lafayette, ***IN***)**, Wiseman; Justin Michael** (***Indianapolis<IN, IN***)**, Cooks; Robert Graham (West Lafayette, *IN*)**

Assignee: **Purdue Research Foundation** (West Lafayette, IN)

Appl. No.: **11/090,455**

Filed: **March 25, 2005**

United States Patent **7,300,585**

Holzwarth , et al. **November 27, 2007**

Method of treatment of effluent stream

Abstract

A method for treating an effluent stream containing material which it is desired to remove from the effluent stream comprises treating the effluent stream with a solution of an acid and a first polymer to reduce the pH of the thus-treated stream to a range of about 5.5 to about 6.5 and to form a precipitate, treating the thus-treated stream with a second polymer to flocculate the precipitate, filtering the thus-treated effluent to remove the flocculated precipitate, treating the filtered effluent with at least one of a cationic resin, an anionic resin and carbon filtration, and discharging the resultant stream into a public waste treatment facility. Another method for treating an effluent stream having a pH in the range of about pH 2 to about pH 6.5 containing material which it is desired to remove from the effluent stream comprises treating the effluent stream with a solution of acid and hydrated polymer to form a precipitate, filtering the precipitate, collecting the filtered solids, disposing of the filtered solids, passing the resulting filtrate through at least one of an anionic exchange device, a cationic exchange device and a carbon filter, and discharging the resultant stream into a public waste treatment facility.

Inventors: **Holzwarth; Thomas R.** (Greenwood, ***IN***)**, Samuel; Bashir** (***Indianapolis<IN, IN***)

Assignee: **Mays Chemical Company, Inc.** (Indianapolis, IN)

Appl. No.: **11/182,349**

Filed: **July 15, 2005**

United States Patent **6,991,593**

Price , et al. **January 31, 2006**

Hazardous waste stabilization methods, products and testing procedures

Abstract

A process for the stabilization of metal bearing waste is provided that is based upon the discovery that landfills have anaerobic environments. This process includes adjusting the pH of the waste and adding a sulfide containing reducing agent to the waste to achieve a reducing environment. In one embodiment, electric arc furnace dust is stabilized for landfill disposal. Also provided is a method for a determination of landfilled waste leachability. This method is performed under conditions that simulate the chemical characteristics of landfills. In one embodiment, stabilized metal bearing waste is deoxygenated and a simulated leachate is prepared under anaerobic conditions.

Inventors: **Price; Kenneth S.** (Zionsville, ***IN***)**, Kurek; Joe** (***Indianapolis<IN, IN***)**, Whitfield; Kurt (*Indianapolis<IN, IN*), Wissel; Herbert I. (*Indianapolis<IN, IN*)**

Assignee: **Heritage Environmental Services, LLC** (Indianapolis, IN)

Appl. No.: **10/309,834**

Filed: **December 4, 2002**

United States Patent **6,920,394**

Johnson **July 19, 2005**

Method and apparatus for determining the elevation of an underground structure

Abstract

A survey device for determining an elevation of a subterranean architectural feature includes a distance sensor operable to generate a first signal indicative of a line-of-sight distance from the survey device to the subterranean architectural feature. The device also includes an angle sensor operable to generate a second signal indicative of an angular position of the survey device relative to a vertical reference. A processor is electrically coupled to both the distance sensor and the angle sensor. A method of operating a survey device is also disclosed.

Inventors: **Johnson; Orwic Antony** (***Indianapolis<IN, IN***)

Assignee: **The Schneider Corporation** (Indianapolis, IN)

Appl. No.: **10/664,521**

Filed: **September 17, 2003**

United States Patent **6,807,494**

Schutzbach , et al. **October 19, 2004**

Sewer flow monitoring method and system

Abstract

A method and system for monitoring and analyzing flow in a sewer system includes the steps of using a monitoring assembly to collect data representative of actual flow volume of a fluid substance in a first location such as a sewer pipe, storing the actual flow volume data in a memory, maintaining previously stored data in the memory, determining a predicted flow volume and comparing the actual flow volume with the predicted flow volume to yield a difference value. The predicted flow volume is dependent on the data selected from the previously stored data and a day and time that corresponds to both the actual flow volume data and the data selected from the previously stored data. The predicted flow volume may also be dependent upon additional data corresponding to a rain event.

Inventors: **Schutzbach; James S.** (Madison, AL)**, Stevens; Patrick L.** (***Indianapolis<IN, IN***)
Assignee: **ADS Corporation** (Huntsville, AL)
Appl. No.: **10/092,950**
Filed: **March 8, 2002**

United States Patent **6,755,234**
Blejde , et al. **June 29, 2004**

Model-based system for determining casting roll operating temperature in a thin strip casting process

Abstract

A model-based strategy is provided for determining casting roll operating temperature in a continuous thin strip casting process. A first temperature sensor produces a first temperature signal indicative of the temperature of cooling liquid supplied to the casting rolls and a second temperature sensor produces a second temperature signal indicative of the temperature of cooling liquid temperature exiting the casting rolls. A computer determines a heat flux value as a function of the first and second temperature signals, and computes the operating temperature of the casting rolls as a function of the heat flux value, the second temperature signal and a number of constants defined by fixed-valued operating parameters of the continuous thin strip casting process. A control strategy is also provided to modify one or more operating parameters of the continuous thin strip casting process as a function of the casting roll temperature.

Inventors: **Blejde; Walter** (Brownsburg, ***IN***)**, Mahapatra; Rama** (***Indianapolis<IN, IN***)
Assignee: **Nucor Corporation** (Charlotte, NC)
Appl. No.: **10/407,261**
Filed: **April 4, 2003**

United States Patent **6,743,361**
Doege , et al. **June 1, 2004**

Method for bacterially treating tank toilet systems and apparatus for using same

Abstract

The present invention relates in general to a method for bacterially treating small-tank toilet systems and an apparatus for using same, and in particular, bacterially treating small-tank portable toilets, such as toilet systems in airplanes, busses, campers, trains, boats, and free-standing portable toilets.

Inventors: **Doege; Brian** (Austin, TX)**, Krell; Saul** (Houston, TX)**, Brodowicz; Mark** (***Indianapolis<IN, IN*****), Cooney; Michael (Greenwood, *IN*)**

Assignee: **Biological Systems, Inc.** (Austin, TX)

Appl. No.: **09/723,549**

Filed: **November 27, 2000**

United States Patent **6,695,953**

Locke , et al. **February 24, 2004**

Accelerated methods of oxidizing organic contaminants in aqueous mediums using corona induced reactions and particles therewith

Abstract

Novel accelerated methods involving corona discharge, and preferably pulsed streamer high voltage corona discharge, in combination with an effective amount of suitable particles to break down organic contaminants, such as phenol and phenol red, in aqueous mediums are disclosed. More particularly, it has been discovered that the addition of an effective amount of suitable particles to the aqueous phase of a corona reactor greatly affects the properties of the corona discharge, i.e., streamer length, intensity, number of streamers and sparkover voltage, thereby significantly increasing the breakdown voltage (i.e., the maximum voltage prior to sparkover), so that the removal of organic contaminants may be accelerated, since the production of hydroxyl radicals, aqueous electrons and hydrogen peroxide increases with increases in the applied discharge voltage. As a result, it has been discovered that the addition of such particles to the fluid in the corona reactor leads to a decrease in exposure time and increase in efficiency. The methods may be practiced in a corona reactor containing a grounded plane electrode suspended above a hollow needle point electrode connected to a high voltage rotating spark gap pulsed power supply.

Inventors: **Locke; Bruce R.** (Tallahassee, FL)**, Finney; Wright C.** (Tallahassee, FL)**, Grymonpre; David R.** (***Indianapolis<IN, IN*****)**

Assignee: **Florida State University** (Tallahassee, FL)

Appl. No.: **08/416,393**
Filed: **April 6, 1995**

United States Patent **6,638,558**
Brubacher , et al. **October 28, 2003**

Masa flavored cereal germ and a process for making same

Abstract

The present invention provides a germ-based additive for enhancing masa flavor in food products produced from flour for dough which includes the additive. The additive includes alkaline cooked cereal germ. The additive may be milled and may be added to food products in an amount effective for producing a masa flavor without the use of masa flour.

Inventors: **Brubacher; Edward** (***Indianapolis<IN, IN*****), Pause; James (Avon, *IN*), Sheehan; Steve (Fishers, *IN*), Xu; Ansui (Carmel, *IN*)**
Assignee: **Cargill, Incorporated** (Wayzata, MN)
Appl. No.: **09/965,642**
Filed: **September 27, 2001**

United States Patent **6,610,349**
Delrue , et al. **August 26, 2003**

Milled cereal by-product which is an additive for increasing total dietary fiber

Abstract

The present invention provides a high fiber additive composition which is a by-product of milling processes wherein the high fiber additive enhances the fiber content of a variety of products including flour, yoghurts, beverages, baking items, snack foods such as pretzels, cereal products such as breakfast cereals, and salsa. The additive is provided from a high fiber, low starch source of plant material.

Inventors: **Delrue; Rita M.** (Minnetonka, MN)**, Burianek; Mark D.** (Greenwood, ***IN***)**, Xenides; Carol J.** (***Indianapolis<IN, IN*****), Sheehan; Steve T. (Fishers, *IN*), Valle; Sergio (*Indianapolis<IN, IN*)**
Assignee: **Cargill, Incorporated** (Minneapolis, MN)
Appl. No.: **09/424,008**
Filed: **June 2, 2000**
PCT Filed: **May 15, 1998**

PCT No.: **PCT/US98/09913**
PCT Pub. No.: **WO98/51165**
PCT Pub. Date: **November 19, 1998**

United States Patent **6,588,493**
Bleide , et al. **July 8, 2003**

Model-based system for determining casting roll operating temperature in a thin strip casting process

Abstract

A model-based strategy is provided for determining casting roll operating temperature in a continuous thin strip casting process. A first temperature sensor produces a first temperature signal indicative of the temperature of cooling liquid supplied to the casting rolls and a second temperature sensor produces a second temperature signal indicative of the temperature of cooling liquid temperature exiting the casting rolls. A computer determines a heat flux value as a function of the first and second temperature signals, and computes the operating temperature of the casting rolls as a function of the heat flux value, the second temperature signal and a number of constants defined by fixed-valued operating parameters of the continuous thin strip casting process. A control strategy is also provided to modify one or more operating parameters of the continuous thin strip casting process as a function of the casting roll temperature.

Inventors: **Bleide; Walter** (Brownsburg, ***IN***)**, Mahapatra; Rama** (***Indianapolis<IN, IN***)
Assignee: **Nucor Corporation** (Charlotte, NC)
Appl. No.: **10/027,495**
Filed: **December 21, 2001**

United States Patent **6,383,547**
Delrue , et al. **May 7, 2002**

Process for preparing aspirated bran as a flour additive

Abstract

The present invention provides an additive composition made from milled cereal by-products. The additive is for enhancing the strength and/or stability of food products. The additive composition comprises a cooked cereal by-product which includes gelatinized edible starch. The starch is gelatinized to an extent, and is present in an amount, such that when the composition additive is added to masa or other cereal grain flour or dough at a level of at least about 0.5 weight percent, the composition additive is effective for increasing the strength and/or the shelf life of food products made from the additive and flour.

Inventors: **Delrue; Rita M.** (Minnetonka, MN)**, Burianek; Mark D.** (Greenwood, ***IN***)**, Xenides; Carol J.** (***Indianapolis<IN, IN***)**, Sheehan; Steven T. (Fishers, *IN*), Valle; Sergio (*Indianapolis<IN, IN*)**

Assignee: **Cargill, Incorporated** (Wazzatn, MN)

Appl. No.: **09/441,167**

Filed: **November 15, 1999**

United States Patent **6,375,904**

Skillman , et al. **April 23, 2002**

Wastewater collection system gas emission control

Abstract

A ***wastewater*** collection system is provided with a gas withdrawal vent including a gas suction apparatus. The gas is preferably withdrawn at a rate in excess of the gas production by microbes in the ***wastewater*** collection system so that a slight negative pressure is created in the immediate vicinity of the gas withdrawal vent. A gas mixing chamber is coupled to the fan or blower to receive the gas withdrawn from the ***wastewater*** collection system. An ozone generation apparatus is also coupled to the gas mixing chamber that is adjusted to provide sufficient ozone to react with any noxious or malodorous components of the withdrawn gas. A reaction conduit is provided at an output of the gas mixing chamber to receive the withdrawn gas and ozone. The reaction conduit has surface features assuring turbulent flow of the gasses through the length of the conduit. The reaction conduit is also of sufficient length as to assure complete decomposition and removal of the noxious or malodorous components from the withdrawn gas, and reduction of the ozone to a negligible concentration in the gas emitted from the reaction conduit.

Inventors: **Skillman; David B.** (Franklin, ***IN***)**, Berman; Henry A.** (***Indianapolis<IN, IN***)**, Weaver; William C. (Carmel, *IN*)**

Assignee: **Airtex Manufacturing, Inc.** (DeSoto, KS)

Appl. No.: **09/467,187**

Filed: **December 20, 1999**

United States Patent **6,355,162**

Longardner **March 12, 2002**

Apparatus for increasing the flocculation rate of suspended solids from ***wastewater***

Abstract

A ***wastewater*** aerating system that conditions air inlet to a blower of the system to adjust the condition of air discharged into the ***wastewater*** so as to increase the flocculation rate of suspended solids from the ***wastewater***. The ***wastewater*** aeration system includes a conduit having an outlet submerged within a bath of ***wastewater*** to be treated, an air duct inlet in flow communication with a source of ambient air, a blower operable to cause air to pass through the air duct and through the conduit to be output through the conduit outlet into the bath of ***wastewater,*** and at least one heat exchanger installed in the air duct and adapted to condition, such as condense its vapor and sensibly cool, the air passing through the air duct. A method of treating a bath of ***wastewater*** is also disclosed.

Inventors: **Longardner; Robert L.** (***IndianapolisIN, IN***)
Assignee: **RWI** (Indianapolis, IN)
Appl. No.: **09/456,356**
Filed: **December 8, 1999**

United States Patent **6,085,475**
Parks , et al. **July 11, 2000**

Portable severe weather storm shelter

Abstract

A portable storm shelter is disclosed. The shelter includes a thin plastic tank surrounded by a horizontal frame that includes anchor legs. The shell and frame are covered with a protective layer such as fiber-filled concrete. Two ventilation conduits extend through the protective layer and into the tank. A window is attached over apertures in the protective layer and the tank. A door is attached to the protective layer and situated over an aperture in the tank and in the concrete layer. A battery provides power to a fan disposed in fluid communication with one of the ventilation conduits. A solar cell is attached to the outer surface of the concrete layer and provides a charging signal to the battery. A fluid basin attached to a fluid drain conduit is also provided. The fluid drain conduit extends through the tank and concrete layer. In a second embodiment, a tank is surrounded by a horizontal rectangular frame. Attached to the frame are a plurality of vertical rods having lifting eyes. A protective layer is formed over the tank, frame and rods with the lifting eyes exposed. An inclined enclosed chute is attached to the protective layer over an aperture in the protective layer and tank. Ventilation and drainage conduits extend through the protective layer into the interior of the tank. A battery, electric lights and ventilation fans are disposed within the tank. Another embodiment includes vertical support ribs molded into the side walls of the enclosure and reinforcement rods inserted horizontally through apertures in the vertical ribs to provide enhanced structural support.

Inventors: **Parks; James B.** (***Indianapolis<IN, IN***), **Boles; Wiley O. (Greenfield, *IN*)**
Appl. No.: **09/239,278**

Filed: **January 29, 1999**

United States Patent **6,056,990**
Delrue , et al. **May 2, 2000**

United States Patent **7,820,445**
Jarosch , et al. **October 26, 2010**

Fluidization and solids processing in microchannel devices

Abstract

This invention describes gas-solid, liquid-solid and gas-solid-liquid processes in microchannels devices including such processes as heterogeneous catalysis, particle formation, particle attrition, particle separation and adsorption or desorption of selected species. Various processes can be enhanced by the unique properties of microchannels such as the predominance of laminar flow, high rates of shear, high rates of heat transfer and high rates of mass transfer. Also encompassed by this invention are methods for the introduction to and removal from microchannels of particle containing fluid streams.

Inventors: **Jarosch; Kai** (Bexley, ***OH***)**, Tonkovich; Anna Lee** (Marysville, ***OH***)**, Hesse; David J.** (***Columbus***, ***OH***)**, Daymo; Eric** (Marysville, ***OH***)**, Perry; Steven T.** (Galloway, ***OH***)**, Silva; Laura J.** (Dublin, ***OH***)

Assignee: **Velocys** (Plain City, OH)

Appl. No.: **10/830,710**

Filed: **April 22, 2004**

United States Patent **7,790,427**
Chauhan , et al. **September 7, 2010**

Method of treating biocells

Abstract

A method of treating biocells includes the steps of: a. providing biocells; b. applying at least one stressor to the biocells sufficient to cause nonlethal and reparable cell wall damage to the biocells, thereby putting the biocells in a catabolic state during which catabolic metabolic functions predominate over anabolic metabolic functions; and c. obtaining at least one product produced by the biocells during the catabolic state. In another embodiment, the method includes the steps of: a. providing biocells that are mammalian cells; b. applying at least one stressor to the biocells sufficient to cause nonlethal and reparable cell wall damage to the biocells, the reparable cell wall damage comprising openings that allow increased passage of materials through the cells walls; and c. inserting foreign DNA through the openings into the biocells.

Inventors: **Chauhan; Satya P.** (***Columbus***, ***OH***)**, Usinowicz; Paul J.** (Powell, ***OH***)
Assignee: **Battelle Memorial Institute** (Columbus, OH)
Appl. No.: **11/523,171**
Filed: **September 19, 2006**

United States Patent **7,645,382**
Gallagher , et al. **January 12, 2010**

Apparatus for converting biological materials into energy resources

Abstract

A method of converting biological material into energy resources includes transmitting biological material to a pulsed electric field (PEF) station, and applying a PEF to the biological material within a treatment zone in the PEF station to generate treated biological material. The method also includes transmitting the treated biological material to a biogenerator, and processing the treated biological material in the biogenerator to produce an energy resource. A converter may carry out this process, and may include the PEF station and the biogenerator.

Inventors: **Gallagher; Michael T.** (Highland Park, IL)**, Held; Jeffrey** (Chicago, IL)**, Chauhan; Satya P.** (***Columbus***, ***OH***)**, Tomasello; Anthony J.** (Libertyville, IL)
Assignee: **OPENCELL LLC** (Glencoe, IL)
Appl. No.: **12/409,457**
Filed: **March 23, 2009**

United States Patent **7,507,341**
Gallagher , et al. **March 24, 2009**

Method of and apparatus for converting biological materials into energy resources

Abstract

A method of converting biological material into energy resources includes transmitting biological material to a pulsed electric field (PEF) station, and applying a PEF to the biological material within a treatment zone in the PEF station to generate treated biological material. The method also includes transmitting the treated biological material to a biogenerator, and processing the treated biological material in the biogenerator to produce an energy resource. A converter may carry out this process, and may include the PEF station and the biogenerator.

Inventors: **Gallagher; Michael T.** (Highland Park, IL)**, Held; Jeffrey** (Chicago, IL)**, Chauhan;**

Satya P. (***Columbus***, ***OH***)**, Tomasello; Anthony J.** (Libertyville, IL)
Assignee: **Opencel LLC** (Glencoe, IL)
Appl. No.: **11/198,703**
Filed: **August 5, 2005**

United States Patent **7,269,862**
Rooke , et al. **September 18, 2007**

Configurable shower system

Abstract

A shower system is provided that includes a configurable enclosure at least partially defining a shower area. The shower system also includes a basin having a first channel sized to receive a lower edge of the enclosure such that the enclosure is configurable with respect to the basin in at least one functional arrangement.

Inventors: **Rooke; Georgina E.** (London, **GB**)**, Furtak; Cheryl A.** (Birmingham, MI)**, Grider; Keith A.** (***Columbus***, ***OH***)**, Begin; Mark D.** (Worthington, ***OH***)**, Wilgus; Frank J.** (Ostrander, ***OH***)
Assignee: **Sculptured Homes, LLC** (Birmingham, MI)
Sculptured Homes Limited (London, **GB**)
Appl. No.: **10/935,143**
Filed: **September 7, 2004**

United States Patent **7,268,317**
Tenaglia , et al. **September 11, 2007**

Laser peening process and apparatus using a liquid erosion-resistant opaque overlay coating

Abstract

The invention relates to a method and apparatus for improving properties of a solid material by providing shockwaves there through. Laser shock processing is used to provide the shockwaves. The method includes applying a liquid energy-absorbing overlay, which is resistant to erosion and dissolution by the transparent water overlay and which is resistant to drying to a portion of the surface of the solid material and then applying a transparent overlay to the coated portion of the solid material. A pulse of coherent laser energy is directed to the coated portion of the solid material to create a shockwave. Advantageously, at least a portion of the unspent energy-absorbing overlay can be reused in situ at a further laser treatment location and/or recovered for later use.

Inventors: **Tenaglia; Richard D.** (***Columbus***, ***OH***)**, Dulaney; Jeff L.** (Dublin, ***OH***)**, Lahrman; David F.** (Powell, ***OH***)

Assignee: **LSP Technologies, Inc.** (Dublin, OH)

Appl. No.: **10/654,369**

Filed: **September 2, 2003**

United States Patent **7,001,520**

Held , et al. **February 21, 2006**

Method for treating waste-activated sludge using elecroporation

Abstract

A method of treating of municipal sludge, paper-pulp sludge, animal and plant waste, and the like, whereby the treatment thereof via electroporation causes the breakdown of waste activated sludge, which is then recycled back to a bioreactor, or to one or more additional bioreactors such as aerobic, facultative, anoxic, or strictly anaerobic.

Inventors: **Held; Jeffrey** (Chicago, IL)**, Chauhan; Satya P.** (***Columbus***, ***OH***)

Assignee: **Opencel LLC.** (Highland Park, IL)

Appl. No.: **10/795,944**

Filed: **March 8, 2004**

United States Patent **6,908,555**

Arnett , et al. **June 21, 2005**

Biosolids flow-through thermophilic treatment process

Abstract

A method of treating ***wastewater*** sludge includes pumping, continuously, raw sludge into a first digester and treating the raw sludge at a specific temperature of between about 51.degree. C. to 60.degree. C.; transferring the treated ***wastewater*** sludge to a batch tank; treating the ***wastewater*** sludge in the batch tank, anaerobically, at a thermophilic temperature which is not more than 2.degree. C. warmer than the specific temperature in the first digester; and disposing of the treated ***wastewater*** sludge as a Class A biosolid. A ***wastewater*** sludge treatment system includes a first thermophilic digester for treating raw ***wastewater*** sludge at a specific temperature in a range of between about 51.degree. C. to 60.degree. C., and discharging a treated ***wastewater*** sludge; a batch tank for receiving the treated ***wastewater*** sludge discharged from the first digester and for thermophilically treating sludge at a temperature in a range of between about 51.degree. C. to 60.degree. C. and not more than 2.degree. C. warmer than the specific temperature in the

first digester, for between about 0.5 hours and 5 hours; and a disposal mechanism for disposing of the treated ***wastewater*** sludge as a Class A biosolid.

Inventors: **Arnett; Clifford J.** (***Columbus*, Farrell; Joseph B. (Cincinnati, *OH*), Hull, III; Daniel T. (Atlanta, GA), Krugel; Steven J. (Seattle, WA), Schafer; Perry L. (Sacramento, CA), Turner; Billy G. (*Columbus*, Uhte; Warren R. (Fort Jones, CA), Willis; John L. (Norcross, GA)**

Assignee: **Columbus Water Works** (Columbus, GA)

Appl. No.: **10/425,131**

Filed: **April 28, 2003**

United States Patent **6,835,307**

Talbert , et al. **December 28, 2004**

Thermal water treatment

Abstract

A thermal treatment system for supplying thermally conditioned or purified water for human or animal consumption, industrial processes, environmental containment, or removal of foreign species. The water purifier includes a heat exchanger for exchanging heat between outgoing thermally conditioned or purified water and incoming makeup water; a water heater is connected to the heat exchanger so as to receive pre-heated incoming makeup water, where the water heater subsequently heats the incoming preheated makeup water to a set-point temperature in the case of thermally conditioned water and for purified water also holds the water for a period of time sufficient to inactivate selected organisms to a predetermined level. The heat exchanger has one or more treated water outlets for supplying thermally conditioned or purified water at selected temperatures.

Inventors: **Talbert; Sherwood G.** (***Columbus*, *OH*), Paul; Darrell D.** (Upper Arlington, ***OH*), Millett; Stephen M.** (***Columbus*, *OH*), Evers; David P.** (Canal Winchester, ***OH*), Dvorsky; James E.** (Norwich Township, ***OH*), George, II; Paul E.** (Powell, ***OH*), Haubert; Thomas D.** (***ColumbusOH*, *OH*), Schelhorn; Jean E.** (Granville Township, ***OH*), Wiesmann; Klaus H.** (Upper Arlington, ***OH***)

Assignee: **Battelle Memorial Institute** (Columbus, OH)

Appl. No.: **09/921,344**

Filed: **August 2, 2001**

United States Patent **6,752,849**

Logan , et al. **June 22, 2004**

Method for disinfecting and stabilizing organic wastes with mineral by-products

Abstract

Disclosed is a method of disinfecting and stabilizing organic wastes wherein organic waste is intimately mixed with one or more mineral by-products to produce a mixture having a pH of less than about 9. The mixture is heated and dried to produce a stable, granular bio-mineral product that may be used for example, as a fertilizer, soil amendment or as a soil substitute. In some embodiments, at least a portion of the heat for heating and/or drying the mixture is provided by residual heat in at least one of the one or more mineral by-products. Also provided are stable, granular bio-mineral products formed by the methods of the present invention and fertilizers, soil amendments, and soil substitutes that include these stable, granular bio-mineral products. Further provided are systems for disinfecting and stabilizing organic waste, and systems for making a stable, granular bio-mineral product.

Inventors: **Logan; Terry J.** (***Columbus***, ***OH***)**, Faulmann; Ervin L.** (Toledo, ***OH***)
Assignee: **N-Viro International Corporation** (Toledo, OH)
Appl. No.: **10/298,958**
Filed: **November 19, 2002**

United States Patent **6,752,848**
Logan , et al. **June 22, 2004**

Method for disinfecting and stabilizing organic wastes with mineral by-products

Abstract

A method of disinfecting and stabilizing organic wastes where organic waste is intimately mixed with one or more mineral by-products to produce a mixture having a pH of less than about 9. The mixture is heated and dried to produce a stable, granular bio-mineral product that may be used for example, as a fertilizer, soil amendment or as a soil substitute. Also provided are stable, granular bio-mineral products formed by the methods of the present invention and fertilizers, soil amendments, and soil substitutes that include these stable, granular bio-mineral products. Further provided are systems for disinfecting and stabilizing organic waste, and systems for making a stable, granular bio-mineral product.

Inventors: **Logan; Terry J.** (***Columbus***, ***OH***)**, Faulmann; Ervin L.** (Toledo, ***OH***)
Assignee: **N-Viro International Corporation** (Toledo, OH)
Appl. No.: **09/923,531**
Filed: **August 8, 2001**

United States Patent **6,740,731**

Bigg , et al. **May 25, 2004**

Degradation control of environmentally degradable disposable materials

Abstract

The present invention is directed to a method for reducing waste accumulation by using an environmentally degradable disposable material. The disposable material, which includes a hydroxycarboxylic acid-containing polymer, degrades hydrolytically during operative and disposal stages in a controlled manner such that the disposal degradation rate of the material is accelerated relative to the operative degradation rate of the material.

Inventors: **Bigg; Donald M.** (***Columbus***, ***OH***)**, Sinclair; Richard G.** (***Columbus***, ***OH***)**, Lipinsky; Edward S.** (Worthington, ***OH***)**, Litchfield; John H.** (Worthington, ***OH***)**, Allen; Billy R.** (Greenwood, IN)

Assignee: **Cargill Dow Polymers LLC** (Midland, MI)

Appl. No.: **09/782,183**

Filed: **February 12, 2001**

United States Patent **6,709,594**

Held , et al. **March 23, 2004**

Method for treating waste-activated sludge using electroporation

Abstract

A method of treating of municipal sludge, paper-pulp sludge, animal and plant waste, and the like, whereby the treatment thereof via electroporation causes the breakdown of waste activated sludge, which is then recycled back to a bioreactor, or to one or more additional bioreactors such as aerobic, facultative, anoxic, or strictly anaerobic.

Inventors: **Held; Jeffrey** (Chicago, IL)**, Chauhan; Satya P.** (***Columbus***, ***OH***)

Assignee: **DH20, L.L.C.** (Chicago, IL)

Appl. No.: **10/270,420**

Filed: **October 15, 2002**

United States Patent **6,540,919**

Held , et al. **April 1, 2003**

Method of treating waste-activated sludge using electroporation

Abstract

A system that allows the flexibility of primary and secondary treatment of municipal sludge, paper-pulp sludge, animal and plant waste, whereby the treatment thereof via electroporation may be used either as the primary dewatering treatment, secondary dewatering treatment, direct WAS-treatment, and combinations with other conventional dewatering techniques, in order to provide the municipal treatment plant, or the paper-pulp treatment plant, with the most cost-effective and efficient system as possible. The electroporated-treated sludge releases hitherto unreleased biosolids exiting from the PEF-electroporation system, which are returned to aeration tanks. The electroporation process causes the release of intracellular dissolved/organic matter, which is used as "food" for the bacteria of the aeration tanks.

Inventors: **Held; Jeffry** (Chicago, IL)**, Chauhan; Satya P.** (***Columbus***, ***OH***)
Assignee: **DH20 L.L.C.** (Chicago, IL)
Appl. No.: **10/107,614**
Filed: **March 26, 2002**

United States Patent **6,491,820**
Held , et al. **December 10, 2002**

Method for the molecular destruction of waste-activated sludge using high electrical voltage

Abstract

The present invention is directed to a pulsed electric-field system for rupturing and destroying molecular cellular units of waste-activated sludge to thereby liberate intracellular water molecules from the solids-content thereof. The waste-activated sludge is contained in waste sludge, such as paper-pulp sludge, municipal waste sludge, animal or plant waste sludge. The pulsed-electric field is generated by an electroporating device producing a non-arcing pulsed electric field. The released intracellular dissolved/organic matter may be recycled back to an aeration tank for supplying food to bacteria of the aeration tank for performing aerobic digestion thereon, whereby the intracellular, dissolved organic matter is used as food for the bacteria of the aeration tank, whereby the aerobic digestion process is accelerated.

Inventors: **Held; Jeffry** (Chicago, IL)**, Chauhan; Satya P.** (***Columbus***, ***OH***)
Assignee: **DH20 L.L.C.** (Chicago, IL)
Appl. No.: **09/998,651**
Filed: **December 3, 2001**

United States Patent **6,402,801**

Faulmann , et al. **June 11, 2002**

Method for treating ammonia-containing organic waste

Abstract

A method is described for treating animal manures and other organic wastes to destroy pathogens, reduce noxious odors, and immobilize water-soluble pollutants, thereby producing a pasteurized, granular product useful as a soil amendment. In a described implementation, the solids content of the organic waste is raised to a predetermined level to create air-filled pore space, and the pH is raised sufficiently to liberate endogenous gaseous ammonia in the air-filled pores for a predetermined time. The level of gaseous ammonia is sufficient to significantly destroy pathogens in the manure. In addition, alkaline material and/or iron salts are added to the organic waste to render certain water-soluble pollutants insoluble.

Inventors: **Faulmann; Ervin Louis** (Maumee, ***OH***)**, Logan; Terry J.** (***Columbus***, ***OH***)
Assignee: **N-Viro International Corp.** (Toledo, OH)
Appl. No.: **09/632,945**
Filed: **August 4, 2000**

United States Patent **6,395,176**
Held , et al. **May 28, 2002**

Method for treating waste-activated sludge using electroporation

Abstract

A system that allows the flexibility of primary and secondary treatment of municipal sludge, paper-pulp sludge, animal and plant waste, whereby the treatment thereof via electroporation may be used either as the primary dewatering treatment, secondary dewatering treatment, direct WAS-treatment, and combinations with other conventional dewatering techniques, in order to provide the municipal treatment plant, or the paper-pulp treatment plant, with the most cost-effective and efficient system as possible. The electroporated-treated sludge releases hitherto unreleased biosolids exiting from the PEF-electroporation system, which are returned to aeration tanks. The electroporation process causes the release of intracellular dissolved/organic matter, which is used as "food" for the bacteria of the aeration tanks.

Inventors: **Held; Jeffry** (Chicago, IL)**, Chauhan; Satya P.** (***Columbus***, ***OH***)
Assignee: **D-H2O L.L.C.** (Chicago, IL)
Appl. No.: **09/612,776**
Filed: **July 10, 2000**

United States Patent **6,344,146**
Moorehead , et al. **February 5, 2002**

Portable water purification device

Abstract

A portable, self-contained, fully integrated water purification device which includes a receptacle modified to accommodate a filtration assembly for purifying water, and to store water following purification. The receptacle provides separate openings for water intake, and water outflow. The filtration assembly includes a pump and a multistage filter cartridge. Pump action draws water into the water purification device and forces the water through the multistage filter and into the receptacle. Purified water may be stored in the receptacle until consumption.

Inventors: **Moorehead; John S.** (Westerville, ***OH***), **Pettenski; Thomas A.** (***Columbus***, ***OH***), **Searle; John F.** (Millersport, ***OH***), **Larson; Eric J.** (Saint George, UT)
Assignee: **Battelle Memorial Institute** (Columbus, OH)
Appl. No.: **09/456,663**
Filed: **December 9, 1999**

United States Patent **6,248,148**
Faulmann , et al. **June 19, 2001**

Method for treating ammonia-containing organic waste

Abstract

A method is described for disinfecting and deodorizing animal manures and other organic wastes to produce a pasteurized, granular product for use as a soil amendment. The solids content of the animal manure is raised to a predetermined level to create air-filled pore space, and the pH is raised sufficient to liberate endogenous gaseous ammonia in the air-filled pores for a predetermined time. The level of gaseous ammonia is sufficient to significantly destroy pathogens in the manure.

Inventors: **Faulmann; Ervin Louis** (Maumee, ***OH***), **Logan; Terry J.** (***Columbus***, ***OH***)
Assignee: **N-Viro International Corporation** (Toledo, OH)
Appl. No.: **09/071,205**
Filed: **May 1, 1998**

United States Patent **6,089,258**
Busick , et al. **July 18, 2000**

Float valve assembly for a water purification system

Abstract

An improved float valve assembly is provided for regulating water inflow to a purification module of a water purification system, such as a reverse osmosis purification module or the like. The float valve assembly is mounted within a reservoir for receiving and storing relatively purified water produced by the purification module, and includes a valve unit defining a vertically extending flow path from a tap water source to the purification module. A primary float carried on a float arm responds to rising and falling water level within the reservoir for respectively closing and opening a primary banjo valve mounted along the flow path. An over-center switch provides snap-action closure of the primary valve in response to rising water level, and the primary float is mounted on the float arm for a limited range of lost motion to accommodate this snap-action valve closure. A secondary banjo valve is mounted along the flow path at a location above the primary valve, and, in the event of primary valve malfunction, is closed by a secondary float carried on a float arm and responsive to rising reservoir water level. In a preferred form, the secondary valve remains closed upon subsequent descent of the water level, and is manually re-opened by depression of a reset button.

Inventors: **Busick; Louis M.** (***Columbus***, ***OH***)**, Gerig; Galen L.** (***Columbus***, ***OH***)

Assignee: **Oasis Corporation** (Columbus, OH)

Appl. No.: **09/270,955**

Filed: **March 17, 1999**

United States Patent **6,062,255**

Busick **May 16, 2000**

Float valve assembly for a water purification system

Abstract

A float valve assembly is provided for regulating water inflow to a purification module of a water purification system, such as a reverse osmosis purification module or the like. The float valve assembly is mounted within a reservoir for receiving and storing relatively purified water produced by the purification module, and includes a valve unit defining a vertically extending flow path from a tap water source to the purification module. A primary float responds to rising and falling water level within the reservoir for respectively closing and opening a primary banjo valve mounted along the flow path. A secondary banjo valve is mounted along the flow path at a location above the primary valve, and, in the event of primary valve malfunction, is closed by a secondary float responsive to rising reservoir water level. In a preferred form, the secondary valve remains closed upon subsequent descent of the water level, and is manually re-opened by depression of a reset button.

Inventors: **Busick; Louis M.** (***Columbus***, ***OH***)
Assignee: **Oasis Corporation** (Columbus, OH)
Appl. No.: **09/141,293**
Filed: **August 27, 1998**

APPENDIX 3. STORM WATER PATENTS – CINCINNATI REGION

[listed with the most recently-granted patents first]

United States Patent **7,749,394**
Mitchell , et al. **July 6, 2010**

Methods of treating water

Abstract

Disclosed is a method of providing potable water that includes providing a filter, passing water through the filter, and removing bacteria and viruses from the water with the filter. The filter comprises a housing having an inlet and an outlet and a filter material disposed within the housing, the filter material formed at least in part from a plurality of filter particles consisting of mesoporous activated carbon wherein at least a portion of the plurality of filter particles is at least partially coated with silver or a silver-containing material. A sum of mesopore and macropore volumes of the filter particles may be between about 0.2 mL/g and about 2 mL/g, wherein mesopore means an intra-particle pore having a diameter between 2 nm and 50 nm, and macropore means an intra-particle pore having a diameter greater than 50 nm, a total pore volume of the filter particles is greater than about 0.4 mL/g and less than about 3 mL/g, and a ratio of the sum of the mesopore and macropore volumes to the total pore volume of the filter particles is greater than about 0.3. The filter removes bacteria and viruses from the water at a level of Filter Bacteria Log Removal of greater than about 2 logs and a Filter Viruses Log Removal of greater than about 1 log.

Inventors: **Mitchell; Michael Donovan** (***Cincinnati*</B*OH*, *OH*), Collias; Dimitris Ioannis (Mason, *OH*), Bjorkquist; David William (Wyoming, *OH*), Zaveri; Piyush Narendra (Mason, *OH*), Woolley; Matthew Morgan (Chapel Hill, NC)**

Assignee: **The Procter & Gamble Company** (Cincinnati, OH)

Appl. No.: **12/465,216**

Filed: **May 13, 2009**

United States Patent **7,740,766**
Mitchell , et al. **June 22, 2010**

Methods for treating water

Abstract

Disclosed is a method of providing potable water that includes providing a filter, passing water through the filter, and removing bacteria and viruses from the water with the filter. The filter

comprises a housing having an inlet and an outlet and a filter material disposed within the housing, the filter material formed at least in part from a plurality of mesoporous wood activated carbon filter particles and particles selected from the group consisting of mesoporous wood activated carbon filter particles coated entirely with a cationic polymer, mesoporous wood activated carbon filter particles partially coated with a cationic polymer, and mixtures thereof. A sum of mesopore and macropore volumes of the filter particles may be between about 0.2 mL/g and about 2 mL/g, wherein mesopore means an intra-particle pore having a diameter between 2 nm and 50 nm, and macropore means an intra-particle pore having a diameter greater than 50 nm, a total pore volume of the filter particles is greater than about 0.4 mL/g and less than about 3 mL/g, and a ratio of the sum of the mesopore and macropore volumes to the total pore volume of the filter particles is greater than about 0.3. The filter removes bacteria and viruses from the water at a level of Filter Bacteria Log Removal of greater than about 2 logs and a Filter Viruses Log Removal of greater than about 1 log.

Inventors: **Mitchell; Michael Donovan** (***Cincinnati</B**OH**, OH***), **Collias; Dimitris Ioannis (Mason, *OH*), Bjorkquist; David William (Wyoming, *OH*), Zaveri; Piyush Narendra (Mason, *OH*), Woolley; Matthew Morgan (Chapel Hill, NC)**

Assignee: **The Procter & Gamble Company** (Cincinnati, OH)

Appl. No.: **12/465,238**

Filed: **May 13, 2009**

United States Patent **7,740,765**

Mitchell , et al. **June 22, 2010**

Methods for treating water

Abstract

Disclosed is a method of providing potable water that includes providing a filter, passing water through the filter, and removing bacteria and viruses from the water with the filter. The filter comprises a housing having an inlet and an outlet and a filter material disposed within the housing, the filter material formed at least in part from a plurality of filter particles consisting of mesoporous activated carbon. A sum of mesopore and macropore volumes of the filter particles may be between about 0.2 mL/g and about 2 mL/g, wherein mesopore means an intra-particle pore having a diameter between 2 nm and 50 nm, and macropore means an intra-particle pore having a diameter greater than 50 nm, a total pore volume of the filter particles is greater than about 0.4 mL/g and less than about 3 mL/g, and a ratio of the sum of the mesopore and macropore volumes to the total pore volume of the filter particles is greater than about 0.3. The filter removes bacteria and viruses from the water at a level of Filter Bacteria Log Removal of greater than about 2 logs and a Filter Viruses Log Removal of greater than about 1 log.

Inventors: **Mitchell; Michael Donovan** (***Cincinnati</B**OH**, OH***), **Collias; Dimitris Ioannis (Mason, *OH*), Bjorkquist; David William (Wyoming, *OH*), Zaveri; Piyush**

Narendra (Mason, *OH*), Woolley; Matthew Morgan (Chapel Hill, NC)
Assignee: **The Procter & Gamble Company** (Cincinnati, OH)
Appl. No.: **12/465,193**
Filed: **May 13, 2009**

United States Patent **7,712,613**
Bahm , et al. **May 11, 2010**

Water filter materials and water filters containing a mixture of microporous and mesoporous carbon particles

Abstract

A filter and filter material for providing or treating potable water is provided. The filter includes a housing having an inlet and an outlet, a filter material disposed within the housing, the filter material formed at least in part from a mixture of a plurality of mesoporous and microporous activated carbon particles. Preferably, at least some of the mesoporous activated carbon filter particles are coated with a cationic polymer, and even more preferably, at least some of the particles are coated with a cationic polymer and silver or a silver containing material. Kits comprising filters and information relating to the reduction, killing or removal of bacteria, viruses, microbials, and TTHM are also provided.

Inventors: **Bahm; Jeannine Rebecca** (Milford, ***OH***), **Pearks; Andrew Thomas** (***Cincinnati*</B*OH*, *OH***), **Vidal; Guillermo Matias (*Cincinnati*</B*OH*, *OH*), Collias; Dimitris Ioannis (Mason, *OH*), Mitchell; Michael Donovan (*Cincinnati*</B*OH*, *OH*), Astle; Robert E. (Middlefield, CT), Faye; Katharine L. K. (Moodus, CT), Governal; Robert Andrew (Middletown, CT), Hamlin; Thomas J. (Vernon, CT), Lucht; Rebecca A. (Rocky Hill, CT), Patel; Hemang (Wallingford, CT)**
Assignee: **PUR Water Purification Products, Inc.** (Cincinnati, OH)
Appl. No.: **12/211,200**
Filed: **September 16, 2008**

United States Patent **7,645,909**
Mao , et al. **January 12, 2010**

Linear and branched alcohol ethoxylates for controlling insects

Abstract

Compounds for controlling aquatic breeding insects including an ethoxylated alcohol with a carbon chain length of about 10 to about 24 carbon atoms and about 0 to about 16 moles of

ethylene oxide per mole of alcohol, where the carbon chain is linear or branched with an alkyl group are provided. Methods for making branched alcohol ethoxylated compounds and linear secondary alcohol ethoxylated compounds are also provided. Methods for controlling insects with the compounds are also provided.

Inventors: **Mao; Jianhua** (***Cincinnati</B**OH**, OH***), **Oester; Dean (*Cincinnati</B*OH*, OH*)**
Assignee: **Cognis IP Management GmbH** (Duesseldorf, **DE**)
Appl. No.: **11/830,962**
Filed: **July 31, 2007**

United States Patent **6,997,201**
Preul **February 14, 2006**

Wastewater source control system

Abstract

A wastewater control system for use with a sewer service line conducting a flow of wastewater from a building to a sewer main. A flow control device is installed in the sewer service line; and an actuator, in electrical communication with the sensor, is connected to the flow control device. The actuator in response to an output signal from a hydrologic sensor causes the flow control device to block the flow of wastewater to the sewer main and detain the wastewater in the sewer service line.

Inventors: **Preul; Herbert C.** (***Cincinnati</B**OH**, OH***)
Appl. No.: **10/678,009**
Filed: **October 2, 2003**

United States Patent **6,821,425**
Venosa , et al. **November 23, 2004**

Biomass concentrator reactor

Abstract

A gravity-flow Biomass Concentrator Reactor (BCR) is provided which uses a porous barrier having pore sizes averaging from about 1 to about 50 microns through which treated water permeates under the pressure of gravity. Solids suspended in water treated with the BCR are effectively retained and concentrated.

Inventors: **Venosa; Albert D.** (***Cincinnati</B**OH**, OH***)**, Suidan; Makram T.** (***Cincinnati</B**OH**, OH***)**

Assignee: **U.S. Environmental Protection Agency** (Washington, DC)

Appl. No.: **10/358,260**

Filed: **February 5, 2003**

United States Patent **6,749,366**

Chinn , et al. **June 15, 2004**

Environmental filter and flow control device

Abstract

The present invention relates generally to a system for use in filtering a variety of environmental substances, and more particularly to a method and apparatus for filtering such substances as soil, sediment, and debris from such things as water runoff that may be entering storm drains or catch basins for example. The filter may be comprised of a base and a readily visible top portion. A storm sewer grate may then be inserted within the filter and placed in an opening of the inlet. Water may then be filtered, through either or both the top portion and/or through the base, before entering the inlet. The top portion functions as a visual aid, thereby allowing workers, inspectors and equipment operators to easily locate the storm sewer grate.

Inventors: **Chinn; Andrew W.** (Grove City, ***OH***)**, Chinn; Geralde M.** (***Columbus***, ***OH***)

Assignee: **Dandy Products, Inc.** (Dublin, OH)

Appl. No.: **10/082,374**

Filed: **February 25, 2002**

United States Patent **6,551,505**

Chinn , et al. **April 22, 2003**

Environmental filter

Abstract

A filter for removing particulate matter from water flowing into an inlet, such as a catch basin is disclosed. The filter may comprise an envelope of filter material adapted to receive an inlet cover device, such as a catch basin grate. The inlet device may be inserted within the envelope and placed in an opening of the inlet. Water, for example, may then be double filtered before entering the inlet. A roll filter comprising porous material is also disclosed that may be used in combination or alone when filtering runoff entering a curb drain or other inlet.

Inventors: **Chinn; Andrew W.** (Grove City, ***OH***), **Strawser, Sr.; Daniel M.** (Grove City, ***OH***), **Chinn; Geralde M.** (***Columbus***, ***OH***)

Assignee: **Dandy Enterprises, Limited** (Grove City, OH)

Appl. No.: **09/450,349**

Filed: **November 29, 1999**

United States Patent **6,221,243**

Flanagan **April 24, 2001**

Device for removing hydrocarbons from ***storm water***

Abstract

A hydrocarbon capturing device includes a retainer that is inserted into the end of an outlet pipe in a storm sewer catch basin. The retainer includes a ring that expands under a bias against the inner surface of the outlet pipe and radially extending fingers mounted to the ring that prevent insertion of the ring into the pipe too far. Two hooks are mounted to the retainer near the upper side of the outlet pipe to fasten one end of a hydrophobic, hydrocarbon-absorbing fabric sheet to the retainer. The opposite end of the sheet extends into the passageway of the outlet pipe, thereby floating atop any water that flows through the pipe during and after a rainfall or snowfall.

Inventors: **Flanagan; Terry L.** (***Columbus***, ***OH***)

Appl. No.: **09/521,289**

Filed: **March 8, 2000**

United States Patent **6,010,622**

Chinn , et al. **January 4, 2000**

Environmental filter

Abstract

A filter for removing particulate matter from water flowing into an inlet, such as a catch basin is disclosed. The filter may comprise an envelope of filter material adapted to receive an inlet cover device, such as a catch basin grate. The inlet device may be inserted within the envelope and placed in an opening of the inlet. Water, for example, may then be double filtered before entering the inlet. A roll filter comprising porous material is also disclosed that may be used in combination or alone when filtering runoff entering a curb drain or other inlet.

Inventors: **Chinn; Andrew W.** (Grove City, ***OH***), **Strawser, Sr.; Daniel M.** (Grove City, ***OH***), **Chinn; Geralde M.** (***Columbus***, ***OH***)

Assignee: **Dandy Enterprises Limited** (Grove City, OH)
Appl. No.: **08/982,754**
Filed: **December 2, 1997**

APPENDIX 4. MOST HIGHLY CITED DRINKING WATER PATENTS – WORLDWIDE

United States Patent **6,182,453**
Forsberg **February 6, 2001**

Portable, potable water recovery and dispensing apparatus

Abstract

A portable, potable-water generator for producing high-purity liquid water by condensation of dew from ambient air. The generator employs an air filter to remove particulates and aerosols from the incoming air. An enclosed heat absorber cools the filtered air to its dew point and collects droplets of condensate into a combined condensate collector and storage reservoir. Before discharge, the collected dew is treated in a bacteriostat loop to destroy adventitious living organisms and to filter out undesirable and dangerous contaminants. A recirculation loop provides the ability to recirculate stored condensate during periods of inactivity. Further, quick disconnect fittings and variable length flexible tubing allows use of the invention to serve remote dispensers and/or appliances and allows use of municipal water treated through the apparatus in low condensate situations. All the subsystems are fail safe-interlocked to disable the generator immediately and prevent delivery of water if any one of them stops functioning within predetermined safe limits.

Inventors: **Forsberg; Francis C.** (Boerne, TX)
Assignee: **Worldwide Water, Inc.** (Boerne, TX)
Appl. No.: **09/544,407**
Filed: **April 6, 2000**

United States Patent **6,289,286**
Andersson , et al. **September 11, 2001**

Surface regeneration of biosensors and characterization of biomolecules associated therewith

Abstract

Surface regeneration of affinity biosensors and characterization of biomolecules associated therewith by multivariate technique employing cocktails of regeneration agents to optimize regeneration of biosensor surface and/or characterize biomolecules associated therewith. Kits and stock solutions for use in the context of this invention, as well as associated computer algorithms are also disclosed.

Inventors: **Andersson; Karl** (Uppsala, **SE**)**, Hamalainen; Markku** (Uppsala, **SE**)**, Malmqvist; Magnus** (Uppsala, **SE**)**, Roos; H.ang.kan E.** (Uppsala, **SE**)

Assignee: **Biacore AB** (Uppsala, **SE**)

Appl. No.: **09/087,402**

Filed: **May 29, 1998**

United States Patent **6,468,741**
Massey , et al. **October 22, 2002**

Electrochemiluminescent rhenium moieties

Abstract

A labeled substance comprising a biological substance linked to a luminescent rhenium-containing label. Qualitative and quantitative electrochemiluminescent assays using the same. These methods comprise contacting a sample with a reagent labeled with an electrochemiluminescent chemical moiety containing rhenium and capable of combining with the analyte of interest, exposing the resulting sample to chemical, electrochemical, or electromagnetic energy and detecting electromagnetic radiation emitted by the electrochemiluminescent chemical moiety.

Inventors: **Massey; Richard J.** (Rockville, MD)**, Powell; Michael J.** (Gaithersburg, MD)**, Dressick; Walter J.** (Gaithersburg, MD)**, Leland; Jonathan K.** (Gaithersburg, MD)**, Hino; Janel K.** (Arlington, VA)**, Poonian; Mohindar S.** (Gaithersburg, MD)**, Ciana; Leopoldo Della** (Gaithersburg, MD)

Assignee: **IGEN International, Inc.** (Gaithersburg, MD)

Appl. No.: **09/157,788**

Filed: **September 21, 1998**

United States Patent **6,565,749**
Hou , et al. **May 20, 2003**

Microorganism filter and method for removing microorganism from water

Abstract

A filter for removing microorganisms from a fluid is provided by the invention. The filter includes a substrate having a reactive surface, and a polymer covalently bonded to the reactive surface of the substrate. The polymer includes a plurality of cationic groups for attracting microorganisms. Faucet mounted filters and pour through filters containing the polymer coated substrate are provided. Also disclosed are methods for using and manufacturing filters for removing microorganisms from a fluid.

Inventors: **Hou; Kenneth C.** (West Chester, OH)**, Bretl; Donald S.** (West Chester, OH)**, Hembree; Richard D.** (Edina, MN)

Assignee: **The Procter & Gamble Company** (Cincinnati, OH)

Appl. No.: **09/628,632**

Filed: **July 31, 2000**

United States Patent **6,254,894**
Denkewicz, Jr. , et al. **July 3, 2001**

Silver self-regulating water purification compositions and methods

Abstract

The present invention relates to water purification compositions comprising silver and a second material, such as aluminum or zinc metal, to methods of treating or purifying water using this composition.

Inventors: **Denkewicz, Jr.; Raymond P.** (Warwick, RI)**, Rafter; John D.** (Providence, RI)**, Bollinger; Mark A.** (Warwick, RI)**, Grenier; Joseph W.** (Warwick, RI)**, Souza; Therese R.** (Cranston, RI)

Assignee: **Zodiac Pool Care, Inc.** (Smithfield, RI)

Appl. No.: **09/349,826**

Filed: **July 8, 1999**

United States Patent **7,150,995**
Xie , et al. **December 19, 2006**

Methods and systems for point of care bodily fluid analysis

Abstract

The invention provides a system for quantitative measurement of percent glycated hemoglobin as hemoglobin A1c in whole blood having extended shelf life at room temperature. The system comprising a blood dilution solution and a device adapted for receiving at least a portion of diluted blood solution, for contacting the blood solution with a dry reagent system, for detecting a change in the reagent system and for providing an indication of the analytical result to the user, and the extended shelf life and the elimination of a requirement for refrigeration for storage is achieved by having the blood dilution solution which comprises a first surfactant for hemolysis and a second surfactant for stability. The system of this invention is useful in other analysis kits and systems as well.

Inventors: **Xie; Zongcen Charles** (Sunnyvale, CA)**, Pierce; Jeffrey A.** (Redwood City, CA)**, Stivers; Carole R.** (Palo Alto, CA)

Assignee: **Metrika, Inc.** (Sunnyvale, CA)

Appl. No.: **10/759,547**

Filed: **January 16, 2004**

United States Patent **6,241,893**
Levy **June 5, 2001**

Water filtration media, apparatus and processes

Abstract

An amorphous potassium aluminosilicate filtration media which may be mixed with activated carbon filters water to remove oxygen, chlorines, hardness, alkalinity, ammonia, hydrogen, hydrogen sulfide, sodium sulfite and other contaminants. The particular sodium aluminosilicate is a porous amorphous material formed under ultraviolet light or sunlight to produce pore sizes of 60 .ANG. to 250 .ANG. at ambient temperatures (20.degree. C.-35.degree. C.) and low relative humidity (5%-20%). The media is initially formed as a microporous primarily amorphous gel containing Na.sub.2 O, Al.sub.2 O.sub.3, SiO.sub.2 and H.sub.2 O. The sodium therein is displaced by potassium, whereby the filter removes impurities from water without introducing sodium. The potassium aluminosilicate may be a second stage filter to a first stage filter composed of a strong base anion media charged with potassium carbonate and/or bicarbonate. The filtration media may be used in any type gravity filter including that in an inverted bottle type dispenser for filtering water the flowing from the bottle to the spigot and also filtering air which bubbles back into the bottle in response to opening the spigot. The media as blended with activated carbon may be composed of molded particles having diameters from 1 to 100 microns and preferably 1-20 microns with an average diameter of about 10 microns. It also may be blended with zirconium oxide without carbon for reducing anion and cation species from drinking water.

Inventors: **Levy; Ehud** (Norcross, GA)
Appl. No.: **08/819,999**
Filed: **March 18, 1997**

United States Patent **6,371,717**
Grams , et al. **April 16, 2002**

Device for mechanically gripping and loading cylindrical objects

Abstract

A device for mechanically gripping, transporting, loading and unloading cylindrical containers of various sizes for attachment to a robotic arm. The containers may be bottles including drinking water bottles. The device includes a plurality of gripping mechanisms for gripping the containers. Support pins are also provided for supporting the rotational motion of full bottles. A system for efficiently removing empty containers from racks and simultaneously loading full containers is also disclosed.

Inventors: **Grams; Robert S.** (Waukesha, WI)**, Haddix; Scott K.** (Waukesha, WI)
Assignee: **ABB Automation Inc.** (New Berlin, WI)
Appl. No.: **09/568,749**
Filed: **May 11, 2000**

United States Patent **6,197,193**
Archer **March 6, 2001**

Drinking water filter

Abstract

A water filter used for treating tap water. The water filter provides a consumer with protection against major water contaminants found in municipal water supplies. The filter includes a cylindrical filter cartridge with a number of filter layers therein. The filter cartridge includes an upper filter cap and a lower filter cap received in opposite ends of the cartridge. The cartridge includes a plurality of filter pads which may or may not be used as dividers between the various layers of filter material. The filter pads are designed to remove large and small sediments in the water. In an upstream upper portion of the cartridge is layer of a granulated zinc and copper alloy. The zinc and copper alloy is used for removing chlorine and some heavy metals in the water and acting as a bacteriostat for keeping bacteria from growing inside said cartridge. In a center portion of the filter cartridge is a layer of granulated activated carbon. The activated carbon is used for removing chlorine, odor, color and other pollutants. Downstream from the activated carbon is a layer of a granulated ion exchange resin. The resin is used for removing lead. In a downstream bottom portion of the cartridge is a layer of granulated calcite. The calcite is used to raise the water's pH. The last stage of the filter is a one micron absolute depth filter material. This filter material is used for screening out cysts and protozoa.

Inventors: **Archer; Virgil L.** (Englewood, CO)
Appl. No.: **09/422,810**
Filed: **October 21, 1999**

United States Patent **6,187,193**
Ozama **February 13, 2001**

Grease trap and method of decomposing edible oils and fats in the grease trap

Abstract

The invention provides a grease trap and a method of decomposing edible oils and fats using the grease trap. The grease trap for storing the drainage includes a drain inlet for introducing drainage from a kitchen through a drainpipe and a drain exit for discharging the drainage to a sewer, and accommodates an impeller unit having an impeller which continuously rotates to stir and splash the drainage surface, or a sprinkler unit which continuously sprinkles the drainage onto the drainage surface. The decomposing method comprises the steps of storing the drainage from a kitchen in the grease trap, supplying aerobic microorganisms into the drainage, and continuously stirring and splashing the surface of the drainage using the impeller unit or continuously sprinkling the drainage onto the drainage surface using the sprinkler unit, thereby activating the aerobic microorganisms.

Inventors: **Ozama; Hideya** (Ibaragi, **JP**)
Assignee: **Kikunori Tsukasako** (Hiroshima, **JP**)
Kabushiki, Kaisha, Eiburu, Kurieichon (Hiroshima, **JP**)
Appl. No.: **09/264,869**
Filed: **March 9, 1999**

United States Patent **6,368,504**
Kuennen , et al. **April 9, 2002**

Carbon block water filter

Abstract

An activated carbon block filter including a unique bonded carbon mixture. The carbon mixture preferably includes a mean particle diameter in the range of about 60 microns to about 80 microns and a particle size distribution having less than 10% by weight of particles larger than 140 mesh and less than 10% by weight of particles smaller than 500 mesh. More preferably, the carbon mixture includes a mean particle diameter in the range of about 65 microns to about 75 microns. Even more preferably, the carbon mixture includes a mean particle diameter of about 70 microns and a particle size distribution having less than 7% by weight of particles larger than 140 mesh and less than 7.5% by weight of particles smaller than 500 mesh.

Inventors: **Kuennen; Roy W.** (Caledonia, MI)**, VanderKooi; Karen J.** (Grand Rapids, MI)**, Taylor, Jr.; Roy M.** (Rockford, MI)**, Conrad; Kenneth E.** (Ada, MI)

Assignee: **Alticor Inc.** (Ada, MI)

Appl. No.: **09/706,973**

Filed: **November 6, 2000**

APPENDIX 5. MOST HIGHLY CITED WASTE WATER PATENTS– WORLDWIDE

United States Patent **6,729,395**
Shahin, Jr. , et al. **May 4, 2004**

In situ thermal processing of a hydrocarbon containing formation with a selected ratio of heat sources to production wells

Abstract

A hydrocarbon containing formation may be treated using an in situ thermal process. A mixture of hydrocarbons, H.sub.2, and/or other formation fluids may be produced from the formation. Heat may be applied to the formation to raise a temperature of a portion of the formation to a pyrolysis temperature. The mixture may be produced from the formation through a plurality of production wells. A selected number of heat sources may be positioned in the formation for each production well.

Inventors: **Shahin, Jr.; Gordon Thomas** (Bellaire, TX)**, Vinegar; Harold J.** (Houston, TX)**, Wellington; Scott Lee** (Belliare, TX)**, de Rouffignac; Eric Pierre** (Houston, TX)**, Berchenko; Ilya Emil** (Friendswood, TX)**, Stegemeier; George Leo** (Houston, TX)**, Zhang; Etuan** (Houston, TX)**, Fowler; Thomas David** (Katy, TX)**, Ryan; Robert Charles** (Houston, TX)

Assignee: **Shell Oil Company** (Houston, TX)

Appl. No.: **09/841,308**

Filed: **April 24, 2001**

United States Patent **6,722,430**
Vinegar , et al. **April 20, 2004**

In situ thermal processing of a coal formation with a selected oxygen content and/or selected O/C ratio

Abstract

A coal formation may be treated using an in situ thermal process. A mixture of hydrocarbons, H.sub.2, and/or other formation fluids may be produced from the formation. Heat may be applied to the formation to raise a temperature of a portion of the formation to a pyrolysis temperature. A formation may be selected that will produce a relatively large amount of condensable hydrocarbons and/or a relatively large amount of non-condensable hydrocarbons. Hydrocarbons within the formation may have a relatively low initial elemental oxygen weight percentage. The formation to be treated may be selected based on initial elemental oxygen to carbon ratio of the formation.

Inventors: **Vinegar; Harold J.** (Houston, TX)**, Wellington; Scott Lee** (Belliare, TX)**, de Rouffignac; Eric Pierre** (Houston, TX)**, Karanikas; John Michael** (Houston, TX)**, Berchenko; Ilya Emil** (Friendswood, TX)**, Stegemeier; George Leo** (Houston, TX)**, Maher; Kevin Albert** (Bellaire, TX)**, Zhang; Etuan** (Houston, TX)**, Fowler; Thomas David** (Katy, TX)**, Ryan; Robert Charles** (Houston, TX)

Assignee: **Shell Oil Company** (Houston, TX)

Appl. No.: **09/841,429**

Filed: **April 24, 2001**

United States Patent **6,356,205**
Salvo , et al. **March 12, 2002**

Monitoring, diagnostic, and reporting system and process

Abstract

A monitoring system determines characteristics of a fluid in a well. The system comprises a well module adapted to be disposed in a well, where the module comprises a probe and at least one sensor that senses characteristics of the fluid. The well module is capable of transmitting information concerning fluid characteristics. The system further comprises a data collection center, which is capable of receiving well information from the well module and generating information concerning characteristics of the fluid, a monitoring site, and a communication link that enables a user at the monitoring site to obtain information such as, but not limited to, real-time, historical, and a combination of real-time and historical concerning the characteristics.

Inventors: **Salvo; Joseph James** (Schenectady, NY)**, Mackenzie; Patricia Denise** (Clifton Park, NY)

Assignee: **General Electric** (Schenectady, NY)

Appl. No.: **09/201,385**

Filed: **November 30, 1998**

United States Patent **6,929,067**
Vinegar , et al. **August 16, 2005**

Heat sources with conductive material for in situ thermal processing of an oil shale formation

Abstract

The oil shale formation may be treated using an in situ thermal process. Heat may be provided to a section of the formation from one or more heat sources. A portion of a heat source may include conductive material. In some embodiments, the conductive portion may reduce heat loss to a non-hydrocarbon containing layer in the formation. Heat may be allowed to transfer from the heat sources to a section of the formation. Hydrocarbons, H.sub.2, and/or other formation fluids may be produced from the formation.

Inventors: **Vinegar; Harold J.** (Houston, TX)**, Bass; Ronald Marshall** (Houston, TX)**, Hunsucker; Bruce Gerard** (Katy, TX)

Assignee: **Shell Oil Company** (Houston, TX)

Appl. No.: **10/128,698**

Filed: **April 24, 2002**

United States Patent **7,004,247**
Cole , et al. **February 28, 2006**

Conductor-in-conduit heat sources for in situ thermal processing of an oil shale formation

Abstract

An oil shale formation may be treated using an in situ thermal process. Hydrocarbons, H.sub.2, and/or other formation fluids may be produced from the formation. Heat may be applied to the formation from one or more heat sources to raise a temperature of a portion of the formation to a desired temperature. Some of the heat sources may be conductors placed within conduits. The conductors may be resistively heated so that the conductors radiantly heat the conduits. The generated heat may transfer to the formation.

Inventors: **Cole; Anthony Thomas** (Den Haag, **NL**)**, Bielamowicz; Lawrence James** (Bellaire, TX)**, Carl, Jr.; Fredrick Gordon** (Houston, TX)**, Coles; John Matthew** (Katy, TX)**, de Rouffignac; Eric Pierre** (Houston, TX)**, Hunsucker; Bruce Gerard** (Katy, TX)**, Karanikas; John Michael** (Houston, TX)**, Menotti; James Louis** (Dickinson, TX)**, Pratt; Christopher Arnold** (Cochrane, **CA**)**, Vinegar; Harold J.** (Houston, TX)**, Wellington; Scott Lee** (Bellaire, TX)

Assignee: **Shell Oil Company** (Houston, TX)

Appl. No.: **10/131,234**

Filed: **April 24, 2002**

United States Patent **6,246,972**
Klimasauskas **June 12, 2001**

Analyzer for modeling and optimizing maintenance operations

Abstract

A first model or first analyzer having a series of filters is provided to represent time-varying effects of maintenance events. The first model or analyzer further enhances the selection of derived variables which are used as inputs to the first analyzer. Additionally, a combination of fuzzy logic and statistical regression analyzers are provided to better model the equipment and the maintenance process. An optimizer with a bi-modal optimization process which integrates discrete maintenance events with continuous process variables is also provided. The optimizer determines the time and the type of maintenance activities which are to be executed, as well as the extent to which the maintenance activities can be postponed by changing other process variables. Thus, potential modifications to process variables are determined to improve the current performance of the processing equipment as it drifts out of tolerance.

Inventors: **Klimasauskas; Casimir C.** (Sewickley, PA)
Assignee: **Aspen Technology, Inc.** (Cambridge, MA)
Appl. No.: **09/321,145**
Filed: **May 27, 1999**

United States Patent **7,114,566**
Vinegar , et al. **October 3, 2006**

In situ thermal processing of a hydrocarbon containing formation using a natural distributed combustor

Abstract

An in situ process for treating a hydrocarbon containing formation is provided. The process may include providing heat from one or more heat sources to at least a portion of the formation. Heat sources may include a natural distributed combustor. The natural distributed combustor may include an oxidizing fluid source to provide oxidizing fluids to a reaction zone in the formation to generate heat within the reaction zone. The heat may be allowed, in some embodiments, to transfer from the reaction zone to a selected section of the formation such that heat from one or more heat sources pyrolyzes at least some hydrocarbons within the selected section. Hydrocarbons may be produced from the formation.

Inventors: **Vinegar; Harold J.** (Bellaire, TX)**, de Rouffignac; Eric Pierre** (Houston, TX)**, Wellington; Scott Lee** (Bellaire, TX)**, Van Hardeveld; Robert Martijn** (Amsterdam, **NL**)

Assignee: **Shell Oil Company** (Houston, TX)

Appl. No.: **10/279,220**

Filed: **October 24, 2002**

United States Patent **7,156,176**
Vinegar , et al. **January 2, 2007**

Installation and use of removable heaters in a hydrocarbon containing formation

Abstract

In an embodiment, a system may be used to heat a hydrocarbon containing formation. The system may include a heater placed in an opening in the formation. The system may allow heat to transfer from the heater to a part of the formation. The transferred heat may pyrolyze at least some hydrocarbons in the formation. The heater may be removable from the opening in the formation and redeployable in at least one alternative opening in the formation.

Inventors: **Vinegar; Harold J.** (Bellaire, TX)**, Coles; John Matthew** (Katy, TX)**, de Rouffignac; Eric Pierre** (Houston, TX)**, Hunsucker; Bruce Gerard** (Katy, TX)**, Menotti; James Louis** (Dickinson, TX)**, Pratt; Christopher Arnold** (Cochrane, CA)**, Wellington; Scott Lee** (Bellaire, TX)

Assignee: **Shell Oil Company** (Houston, TX)

Appl. No.: **10/279,223**

Filed: **October 24, 2002**

United States Patent **6,994,169**
Zhang , et al. **February 7, 2006**

In situ thermal processing of an oil shale formation with a selected property

Abstract

An oil shale formation may be treated using an in situ thermal process. A mixture of hydrocarbons, H.sub.2, and/or other formation fluids may be produced from the formation. Heat may be applied to the formation to raise a temperature of a portion of the formation to a desired temperature. In some embodiments, the formation to be treated may be selected based on formation characteristics.

Inventors: **Zhang; Etuan** (Houston, TX)**, Berchenko; Ilya Emil** (Friendswood, TX)**, de Rouffignac; Eric Pierre** (Houston, TX)**, Fowler; Thomas David** (Houston, TX)**, Maher; Kevin Albert** (Bellaire, TX)**, Ryan; Robert Charles** (Houston, TX)**, Shahin, Jr.; Gordon Thomas** (Bellaire, TX)**, Stegemeier; George Leo** (Houston, TX)**, Vinegar; Harold J.** (Houston, TX)**, Wellington; Scott Lee** (Bellaire, TX)

Assignee: **Shell Oil Company** (Houston, TX)

Appl. No.: **10/131,122**

Filed: **April 24, 2002**

United States Patent **7,165,615**
Vinegar , et al. **January 23, 2007**

In situ recovery from a hydrocarbon containing formation using conductor-in-conduit heat sources with an electrically conductive material in the overburden

Abstract

In an embodiment, a system may be used to heat a hydrocarbon containing formation. The system may include a conduit placed within an opening in the formation. A conductor may be placed within the conduit. The conductor may provide heat to a portion of the formation. In some embodiments, an electrically conductive material may be coupled to a portion of the conductor in the overburden. The electrically conductive material may lower the electrical resistance of the portion of the conductor in the overburden. Lowering the electrical resistance of the portion of the conductor in the overburden may reduce the heat output of the portion in the overburden. The system may allow heat to transfer from the conductor to a section of the formation.

Inventors: **Vinegar; Harold J.** (Bellaire, TX)**, Bass; Ronald Marshall** (Houston, TX)
Assignee: **Shell Oil Company** (Houston, TX)
Appl. No.: **10/279,288**
Filed: **October 24, 2002**

APPENDIX 6. MOST HIGHLY CITED STORM WATER PATENTS– WORLDWIDE

United States Patent **6,277,274**
Coffman **August 21, 2001**

Method and apparatus for treating stormwater runoff

Abstract

A water treatment system, method and apparatus for removing sediment, chemical pollutants and debris from contaminated stormwater runoff using physical, chemical and biological processes by passing runoff water preferably through a two-stage filtering and treatment system. The apparatus includes a first stage chamber filter system comprising a water storage area, a mulch layer, a soil mixture of aggregate, organic material, soil, and live woody and/or herbaceous plants. The second stage treatment system is a water-filled lower chamber with baffles to increase the flow path of treated runoff through the chamber. Contaminated stormwater runoff or wastewater effluent is directed to and passes through the first stage chamber by gravity where the contaminated water is filtered and treated by the mulch, soil and plant filter media under aerobic conditions. The treated water from the first stage is directed to the second stage water-filled chamber where it is further treated through physical means (sedimentation) and anaerobic biological processes and discharged to the receiving waters or drainage system. The first stage chamber can be used without the second stage chamber when conditions warrant.

Inventors: **Coffman; Larry Steven** (Bowie, MD)
Appl. No.: **09/533,380**
Filed: **March 22, 2000**

United States Patent **6,531,059**
Morris , et al. **March 11, 2003**

Suspended runoff water filter

Abstract

One of the exemplary filter systems described includes a bracket and a filter module that can be suspended from the bracket by a plurality of flexible supports. The bracket can support the filter system beneath the grate of a storm drain without the need for the filter system to be attached to the grate. The grate can be lifted out of the storm drain separately from the filter unit, which allows the filter system to be lifted without the added weight of the grate. When the grate has been lifted out of the way, a suitable fastener structure can be attached to the bracket of the filter system to make the use of mechanical lifting devices more convenient. The bracket can be manufactured to known dimensions, or it can be offered from among a set of brackets that are pre-configured for known storm drain dimensions or as a standard bracket that can be modified to fit the dimensions of a particular storm drain.

Inventors: **Morris; James F.** (Tucson, AZ)**, Stelpstra; Stephen C.** (Tuscon, AZ)
Assignee: **Abtech Industries, Inc.** (Scottsdale, AZ)
Appl. No.: **09/711,829**
Filed: **November 13, 2000**

United States Patent **6,214,216**
Isaacson **April 10, 2001**

Drain filter support

Abstract

A catch basin insert or filter is supported in an open type curb inlet storm drain found on streets and in parking lots. Catch basin filters and inserts are designed to collect coarse sediments, oil, grease and debris from storm water runoff. Such filters normally require support on all four sides of a grate using the weight of the grate. A loop and rod attaches one or more sides of a filter or insert inside a curb inlet storm sewer vault instead of using the weight of the grate.

Inventors: **Isaacson; Ronald** (Morganville, NJ)
Appl. No.: **09/411,279**
Filed: **October 4, 1999**

United States Patent **6,231,758**
Morris , et al. **May 15, 2001**

Curb-inlet storm drain systems for filtering trash and hydrocarbons

Abstract

A modular insert for curb-inlet storm drains creates a composite collection system for trash and for oil or other hydrocarbons and related chemicals. A hopper contains a multitude of irregular, macroscopic fragments of a hydrophobic, compliant, oil-absorbent, copolymer material having high surface area. Preferably, the material is formed with a binder in a novel extrusion process. The fragments absorb and retain permanently a high quantity of oil and other chemicals passing through the hopper, while permitting a high water flow-through rate. The fragments are held in place by a removable bottom plate, which allows replacement of the filtering fragments, and an internal basket. Trash and debris are collected in the internal basket. The hopper is configured to be suspended in a storm drain adjacent to a curb inlet on a bracket and can be installed or serviced through a conventional manhole entry. The hopper has a side cutout that permit lateral overflow from one of the modular units to an adjacent one.

Inventors: **Morris; James F.** (Tucson, AZ)**, Stelpstra; Stephen C.** (Tucson, AZ)
Assignee: **Abtech Industries, Inc.** (Scottsdale, AZ)
Appl. No.: **09/644,137**
Filed: **August 22, 2000**

United States Patent **6,558,077**
Colson **May 6, 2003**

Selective suspension drain closure apparatus

Abstract

An apparatus for controlling a flow of a liquid into a sewer drain comprising a catch basin having a catch basin drain coupled with the sewer drain. In addition, a housing element that is positioned within the catch basin, whereby the housing element is coupled with the catch basin drain in a first fluid-tight manner. The housing element having a porous surface positioned below a predetermined level. A column having a proximal end and a distal end, whereby the column is positioned within the housing element and the proximal end is coupled with the catch basin drain in a second fluid tight manner. The distal end is positioned above the predetermined level and an actuator mechanism is coupled with the column and configured to selectively open and close the column to the flow of the liquid that is entering the catch basin drain.

Inventors: **Colson; Cameron M.** (Sunnyvale, CA)
Appl. No.: **09/811,034**
Filed: **March 16, 2001**

United States Patent **6,350,374**
Stever , et al. **February 26, 2002**

Stormwater treatment apparatus

Abstract

A liquid purification and separation apparatus for separation of pollutants in stormwater runoff is disclosed. This apparatus utilizes gravitational separation and tortuosity, resulting from a plurality of baffles both perpendicular to and oblique to the primary water flow direction, to trap substances less-dense and more-dense than water. The apparatus features improved resistance to pollutant remobilization through an interactive hydraulic design process resulting in greater pollutant retention.

Inventors: **Stever; R. Russell** (Sparks, NV)**, Urbonas; Ben R.** (Denver, CO)**, Jones; Jonathan E.** (Boulder, CO)**, Earles; Andrew** (Boulder, CO)

Assignee: **Jensen Enterprises, Inc.** (Sparks, NV)

Appl. No.: **09/487,097**

Filed: **January 19, 2000**

United States Patent **6,361,248**
Maestro **March 26, 2002**

Stormwater dispensing chamber

Abstract

An elongated plastic chamber utilized for disposal of stormwater has a corrugated wall structure having successive peaks and valleys. The peaks and valleys are connected by upstream and downstream web panels. A series of apertures is disposed in the upstream web panels. The associated facing downstream web panel is smoothly integrated with the corresponding valley to form a curved surface which is concave with respect to the associated peak and serves to deflect outwardly from the chamber water emergent from the apertures. The effect of the interaction of the apertures with the curved surface is to minimize deposition of sediment within the chamber.

Inventors: **Maestro; Robert M.** (Woodbridge, VA)
Appl. No.: **09/645,269**
Filed: **August 25, 2000**

United States Patent **6,428,692**
Happel **August 6, 2002**

In-line storm water drain filter system

Abstract

An in-line storm water drain filter and baffle box is installed within a storm water drain pipe to direct storm water runoff through the storm water drain pipe and through the filter and baffle box prior to the storm water drain water passing through an outfall into a lake, pond or retention area. The filter system includes a housing having an inlet and an outlet and a plurality of chambers formed therein. A housing cover allows for access into the housing and a plurality of filter screens are mounted over each of the plurality of housing chambers for collecting trash from the storm water passing therethrough. The housing has a generally arcuate bottom. The filter system also has inlet and outlet cover frames for holding removably mounted blocker dampers for blocking the ingress and egress of storm drain water during cleaning of the filter system. An oil collection boom is removably mounted in the housing adjacent the inlet for collecting oil in the drain water entering the housing inlet. A method of cleaning the storm water drain filter system selects the filter system apparatus and blocks the egress and ingress of drain water while the system is being cleaned.

Inventors: **Happel; Henry** (Rockledge, FL)
Appl. No.: **09/859,714**
Filed: **May 17, 2001**

United States Patent **6,783,683**
Collings **August 31, 2004**

Stormwater pollutant separation system and method of stormwater management

Abstract

A stormwater pollutant separator system is provided with the system having a stormwater pollutant separator, a by-pass system, an intake conduit and an outflow conduit connected together. The stormwater pollutant separator includes a chamber with a weir plate and siphon plate therein. The chamber has first, second, and third sections. The first section is located between the chamber first end and the weir plate. The second section is located between the weir plate and siphon plate. The third section is located between the siphon plate and the chamber second end. In one embodiment the third section has filter material placed intermediate the siphon (sometimes referred to as the second weir) plate and the second end plate. A method for separating material and pollutants from stormwater drainage is also disclosed with the method including the steps of inducing the stormwater drainage initially into a stormwater pollutant separator, containing the majority of all non-floating and floating material by the use of the weir plate and siphon plate respectively, discharging the stormwater drainage therefrom, providing a by-pass system for introduction of stormwater drainage overflow thereinto, and combining all the discharging stormwater drainage together.

Inventors: **Collings; Patrick X.** (Powell, OH)
Assignee: **Advanced Drainage Systems, Inc.** (Hilliard, OH)
Appl. No.: **10/237,118**
Filed: **September 9, 2002**

United States Patent **6,294,095**
Lewis **September 25, 2001**

Silt filtration system

Abstract

A silt filtration system for use with storm water catch basins of the type which include a fixed frame with a drain opening at the top of the catch basin and a grate covering the drain opening and includes a base frame having a pair of end rails and a pair of side rails adapted to fit within the fixed frame at the top of the catch basin. The silt filtration system also includes a pair of lengthwise support bars or rods which are removably positioned within the base frame and a pair of transverse support bars or rods which are removably positioned over the lengthwise support bars and supported by the side rails. The lengthwise and transverse bars suspend a filter bag within the catch basin which includes a pocket at the top end for receiving the lengthwise support bars and the transverse support bars. The silt filtration system may include a deflector for deflecting silt and/or sediment and the like over the grate and into the filter bag. A method for installing the silt filtration system includes the steps of: lifting the grate from the drain and placing the base frame on the fixed frame of the catch basin, inserting the lengthwise support bars through the pockets of one pair of opposite sides at the top end of the filter bag and dropping the filter bag into the catch basin with the lengthwise bars positioned in the holders to support the sides of the bag. Further steps include: inserting the transverse support bars into the pockets of the remaining opposite sides at the top end of the filter bag, replacing the grate on top of the silt filtration system and installing the deflector on the grate.

Inventors: **Lewis; Randy** (Charlotte, NC)
Assignee: **Erosion Control Services, Inc.** (Charlotte, NC)
Appl. No.: **09/556,668**
Filed: **April 24, 2000**

APPENDIX 7. MOST HIGHLY CITED DRINKING WATER PAPERS – CINCINNATI

A review of pervaporation for product recovery from biomass fermentation processes

Author(s): Vane LM

Source: JOURNAL OF CHEMICAL TECHNOLOGY AND BIOTECHNOLOGY **Volume:** 80 **Issue:** 6 **Pages:** 603-629 **Published:** JUN 2005

Times Cited: 65 **References:** 238 **Citation Map**

Abstract: Although several separation technologies are technically capable of removing volatile products from fermentation broths, distillation remains the dominant technology. This is especially true for the recovery of biofuels such as ethanol. In this paper, the status of an emerging membrane-based technology, called pervaporation, for this application is reviewed. Several issues and research priorities which will impact the ability of pervaporation to be competitive for biofuel recovery from fermentation systems are identified and discussed. They include: increased energy efficiency; reduction of capital cost for pervaporation systems; longer term trials with actual fermentation broths; optimized integration of pervaporation with fermentor; synergy of performing both alcohol recovery and solvent dehydration by pervaporation with dephlegmation fractional condensation technology; and updated economic analyses of pervaporation at various biofuel production scales. Pervaporation is currently viable for biofuel recovery in a number of situations, but more widespread application will be possible when progress has been made on these issues.

Document Type: Review

Language: English

Author Keywords: pervaporation; biofuels; product recovery; fermentation

KeyWords Plus: ACETONE-BUTANOL-ETHANOL; CROSS-FLOW MICROFILTRATION; VIBRATING MEMBRANE MODULE; EXTRACTIVE ALCOHOLIC FERMENTATION; SILICONE-RUBBER MEMBRANES; B-ZSM-5 ZEOLITE MEMBRANES; GRAFT COPOLYMER MEMBRANE; DRINKING-WATER TREATMENT; HIGH GAS-PERMEABILITY; SILICALITE MEMBRANE

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Publisher: JOHN WILEY & SONS LTD, THE ATRIUM, SOUTHERN GATE, CHICHESTER PO19 8SQ, W SUSSEX, ENGLAND

Subject Category: Biotechnology & Applied Microbiology; Chemistry, Multidisciplinary; Engineering, Chemical

IDS Number: 930UE

ISSN: 0268-2575

Sources of pathogenic microorganisms and their fate during land

application of wastes

Author(s): Gerba CP, Smith JE

Source: JOURNAL OF ENVIRONMENTAL QUALITY **Volume:** 34 **Issue:** 1 **Pages:** 42-48 **Published:** JAN-FEB 2005

Times Cited: 62 **References:** 49 **Citation Map**

Abstract: The hazards associated with pathogens in land-applied animal and human wastes have long been recognized. Management of these risks requires an understanding of sources, concentrations, and removal by processes that may be used to treat the wastes; survival in the environment; and exposure to sensitive populations. The major sources are animal feeding operations, municipal wastewater treatment plant effluents, biosolids, and on-site treatment systems. More than 150 known enteric pathogens may be present in the untreated wastes, and one new enteric pathogen has been discovered every year over the past decade. There has been increasing demand that risks associated with the land treatment and application be better defined. For risks to be quantified, more data are needed on the concentrations of pathogens in wastes, the effectiveness of treatment processes, standardization of detection methodology, and better quantification of exposure.

Document Type: Proceedings Paper

Language: English

KeyWords Plus: RISK-ASSESSMENT; DRINKING-WATER; SEWAGE-SLUDGE; HEPATITIS-E; INACTIVATION; GUIDELINES; TRANSPORT; BIOSOLIDS; VIRUSES; HEALTH

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Publisher: AMER SOC AGRONOMY, 677 S SEGOE RD, MADISON, WI 53711 USA

Subject Category: Environmental Sciences

IDS Number: 889FF

ISSN: 0047-2425

Rapidly measured indicators of recreational water quality are predictive of swimming-associated gastrointestinal illness

Author(s): Wade TJ, Calderon RL, Sams E, Beach M, Brenner KP, Williams AH, Dufour AP

Source: ENVIRONMENTAL HEALTH PERSPECTIVES **Volume:** 114 **Issue:** 1 **Pages:** 24-28 **Published:** JAN 2006

Times Cited: 49 **References:** 36 **Citation Map**

Abstract: Standard methods to measure recreational water quality require at least 24 hr to obtain results, making it impossible to assess the quality of water within a single day. Methods to measure recreational water quality in ! 2 hr have been developed. Application of rapid methods could give considerably more accurate and timely assessments of recreational water quality. We conducted a prospective study of beachgoers at two Great Lakes beaches to examine the association between recreational water quality, obtained using rapid methods, and gastrointestinal (GI) illness after swimming. Beachgoers were asked about swimming and other beach activities and 10-12 days later were asked about the occurrence of GI symptoms. We tested water samples for Enterococcus and Bacteroides species using the quantitative polymerase chain reaction (PCR) method. We observed significant trends between increased GI illness and Enterococcus at the Lake Michigan beach and a positive trend for Enterococcus at the Lake Erie beach. The association remained significant for Enterococcus when the two beaches were combined. We observed a positive trend for Bacteroides at the Lake Erie beach, but no trend was observed at the Lake Michigan beach. Enterococcus samples collected at 0800 hr were predictive of GI illness that day. The association between Enterococcus and illness strengthened as time spent swimming in the water increased. This is the first study to show that water quality measured by rapid methods can predict swimming-associated health effects.

Document Type: Article

Language: English

Author Keywords: bathing beaches; cohort studies; diarrhea; gastrointestinal diseases; Great Lakes Region; recreational water; swimming; water quality

KeyWords Plus: DRINKING-WATER; HUNTINGTON-BEACH; SEWAGE; CONSUMPTION; CALIFORNIA; EXPOSURE; TRIAL

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Publisher: US DEPT HEALTH HUMAN SCIENCES PUBLIC HEALTH SCIENCE, NATL INST HEALTH, NATL INST ENVIRONMENTAL HEALTH SCIENCES, PO BOX 12233, RES TRIANGLE PK, NC 27709-2233 USA

Subject Category: Environmental Sciences; Public, Environmental & Occupational Health

IDS Number: 999NR

ISSN: 0091-6765

Comparison of a chemical and enzymatic extraction of arsenic from rice and an assessment of the arsenic absorption from contaminated water by cooked rice

Author(s): Ackerman AH, Creed PA, Parks AN, Fricke MW, Schwegel CA, Creed JT, Heitkemper DT, Vela NP

Source: ENVIRONMENTAL SCIENCE & TECHNOLOGY **Volume:** 39 **Issue:** 14 **Pages:** 5241-5246 **Published:** JUL 15 2005

Times Cited: 38 **References:** 13 **Citation Map**

Abstract: Rice is a target food for arsenic speciation based analyses because of its relatively high arsenic concentration and per capita consumption rates. Improved speciation data for rice can be helpful in estimating inorganic arsenic exposures in the U.S. and in endemic populations. The inorganic arsenic exposure for cooked rice should include both the arsenic in raw rice plus the arsenic absorbed from the water used to prepare it. The amount of arsenic absorbed from water by rice during preparation was assessed using five different types of rice cooked in both contaminated drinking water and arsenic-free reagent water. The rice samples were extracted using trifluoroacetic acid (TFA) and speciated using IC-ICP-MS. The TFA procedure was able to extract 84-104% of the arsenic (As) from the five different cooked rice samples. Chromatographic recoveries ranged from 99% to 116%. The dimethylarsinic acid (DMA) and inorganic arsenic concentration ranged from 22 to 270 ng of As/g of rice and from 31 to 108 ng of As/g of rice, respectively, for samples cooked in reagent water. The overall recoveries, which relate the sum of the chromatographic species back to the total digested concentration, ranged from 89% to 117%. The absorption of arsenic by rice from the total volume of water [1:1 to 4:1 (water:rice)] used in cooking was between 89% and 105% for two different contaminated drinking water samples. A comparison of the TFA extraction to an enzymatic extraction was made using the five rice samples and NIST 1568a rice flour. The two extraction procedures produced good agreement for inorganic arsenic DMAI and the overall recovery. Through the use of IC - ESI-MS/ MS with a parent ion of m/z 153 and fragment ions of m/z 138, 123, and 105, the structure dimethylthioarsinic acid was tentatively identified in two of the rice samples using the enzymatic extraction.

Document Type: Article

Language: English

KeyWords Plus: CELL-CULTURE MODEL; ION CHROMATOGRAPHY; FOOD; BANGLADESH; METABOLISM

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Publisher: AMER CHEMICAL SOC, 1155 16TH ST, NW, WASHINGTON, DC 20036 USA

Subject Category: Engineering, Environmental; Environmental Sciences

IDS Number: 945XL

ISSN: 0013-936X

Formation of Pb(IV) oxides a in chlorinated water

Author(s): Lytle DA, Schock MR

Source: JOURNAL AMERICAN WATER WORKS ASSOCIATION **Volume:** 97 **Issue:** 11 **Pages:** 102-114 **Published:** NOV 2005

Times Cited: 30 **References:** 45 **Citation Map**

Abstract: Recent research has shown that Pb(IV) oxides play a significant geochemical role in drinking water distribution systems. However, most of the guidance for lead control in drinking water is based on the presumption that Pb(II) solids control lead solubility. Therefore, a better understanding of the chemistry of Pb(IV) in water is needed. Long-term lead precipitation experiments were conducted in chlorinated water (1-3 mg/L Cl-2) at pH 6.5, 8, and 10, with and without sulfate. Results showed that two Pb(IV) dioxide polymorphs - plattnerite (beta-PbO2) and scrutinyite (alpha-PbO2) - formed overtime, as long as a high suspension redox potential was maintained with free chlorine. Neither mineral formed spontaneously, and the rate of formation increased with increasing pH. Hydrocerrusite and/or cerrusite initially precipitated out and overtime either disappeared or coexisted with PbO2. Water pH dictated mineralogical presence. High pH favored hydrocerrusite and scrutinyite; low pH favored cerrusite and plattnerite. Along with a transformation of Pb(II) to Pb(IV) came a change in particle color from white to a dark shade of red to dark grey (differing with pH) and a decrease in lead solubility. If free chlorine was permitted to dissipate, the aging processes (i.e., mineralogy, color, and solubility) were reversible.

Document Type: Article

Language: English

KeyWords Plus: LEAD-ACID-BATTERY; POSITIVE ELECTRODE; PHOSPHORIC-ACID; CORROSION; SOLUBILITY; REDUCTION; CARBONATE; PH

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Publisher: AMER WATER WORKS ASSOC, 6666 W QUINCY AVE, DENVER, CO 80235 USA

Subject Category: Engineering, Civil; Water Resources

IDS Number: 984HW

ISSN: 0003-150X

Combining drinking water treatment and hand washing for diarrhoea prevention, a cluster randomised controlled trial

Author(s): Luby SP, Agboatwalla M, Painter J, Altaf A, Billhimer W, Keswick B, Hoekstra RM

Source: TROPICAL MEDICINE & INTERNATIONAL HEALTH **Volume:** 11 **Issue:** 4 **Pages:** 479-489 **Published:** APR 2006

Times Cited: 26 **References:** 17 **Citation Map**

Abstract: OBJECTIVE To evaluate the effectiveness of point of use water treatment with flocculent-disinfectant on reducing diarrhoea and the additional benefit of promoting hand washing with soap.

METHODS The study was conducted in squatter settlements of Karachi, Pakistan, where diarrhoea is a leading cause of childhood death. Interventions were randomly assigned to 47 neighbourhoods. Households in 10 neighbourhoods received diluted bleach and a water vessel; nine neighbourhoods received soap and were encouraged to wash hands; nine neighbourhoods received flocculent-disinfectant water treatment and a water vessel; 10 neighbourhoods received disinfectant-disinfectant water treatment and soap and were encouraged to wash hands; and nine neighbourhoods were followed as controls. Field workers visited households at least once a week from April to December 2003 to promote use of the interventions and to collect data on diarrhoea.

RESULTS Study participants in control neighbourhoods had diarrhoea on 5.2% of days. Compared to controls, participants living in intervention neighbourhoods had a lower prevalence of diarrhoea: 55% (95% CI 17%, 80%) lower in bleach and water vessel neighbourhoods, 51% (95% CI 12%, 76%) lower in hand washing promotion with soap neighbourhoods, 64% lower (95% CI 29%, 90%) in disinfectant-disinfectant neighbourhoods, and 55% (95% CI 18%, 80%) lower in disinfectant-disinfectant plus hand washing with soap neighbourhoods.

CONCLUSIONS With an intense community-based intervention and supplies provided free of cost, each of the home-based interventions significantly reduced diarrhoea. There was no benefit by combining hand washing promotion with water treatment.

Document Type: Article

Language: English

Author Keywords: diarrhoea; water; soaps; disinfection; sodium hypochlorite; randomised controlled trial

KeyWords Plus: FLOCCULANT-DISINFECTANT; CHILDHOOD DIARRHEA; INTERVENTIONS; COUNTRIES; PAKISTAN; KARACHI; RISK

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Amperometric determination of live Escherichia coli using antibody-coated paramagnetic beads

Author(s): Boyaci IH, Aguilar ZP, Hossain M, Halsall HB, Seliskar CJ, Heineman WR

Source: ANALYTICAL AND BIOANALYTICAL CHEMISTRY **Volume:** 382 **Issue:** 5 **Pages:** 1234-1241 **Published:** JUL 2005

Times Cited: 26 **References:** 38 **Citation Map**

Abstract: Detecting and enumerating fecal coliforms, especially Escherichia coli, as indicators of fecal contamination, are essential for the quality control of supplied and recreational waters. We have developed a sensitive, inexpensive, and small-volume amperometric detection method for E. coli beta-galactosidase by bead-based immunoassay. The technique uses biotin-labeled capture antibodies (Ab) immobilized on paramagnetic microbeads that have been functionalized with streptavidin (bead-Ab). The bead-Ab conjugate captures E. coli from solution. The captured E. coli is incubated in Luria Bertani (LB) broth medium with the added inducer isopropyl beta-D-thiogalactopyranoside (IPTG). The induced beta-galactosidase converts p-aminophenyl beta-D-galactopyranoside (PAPG) into p-aminophenol (PAP), which is measured by amperometry using a gold rotating disc electrode. A good linear correlation (R-2=0.989) was obtained between log cfu mL(-1) E. coli and the time necessary to product a specific concentration of PAP. Amperometric detection enabled determination of 2x10(6)supercript stop cfu mL(-1) E. coli within a 30 min incubation period, and the total analysis time was less than 1 h. It was also possible to determine as few as 20 cfu mL(-1) E. coli under optimized conditions within 6-7 h. This process may be easily adapted as an automated portable bioanalytical device for the rapid detection of live E. coli.

Document Type: Article

Language: English

Author Keywords: immunoassay; amperometric detection; paramagnetic beads; Escherichia coli; beta-galactosidase

KeyWords Plus: HEMOLYTIC-UREMIC SYNDROME; RAPID DETECTION; IMMUNOMAGNETIC SEPARATION; TOTAL COLIFORMS; DRINKING-WATER; UNITED-STATES; O157; IDENTIFICATION; IMMUNOASSAY; OUTBREAK

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Subject Category: Biochemical Research Methods; Chemistry, Analytical

IDS Number: 942XK

ISSN: 1618-2642

DOI: 10.1007/s00216-005-3263

Lead exposures in US children, 2008: Implications for prevention

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Source: ENVIRONMENTAL HEALTH PERSPECTIVES **Volume:** 116 **Issue:** 10 **Pages:** 1285-1293 **Published:** OCT 2008

Times Cited: 24 **References:** 170 **Citation Map**

Abstract: OBJECTIVE: We reviewed the sources of lead in the environments of U.S. children, contributions to children's blood lead levels, source elimination and control efforts, and existing federal authorities. Our context is the U.S. public health goal to eliminate pediatric elevated blood lead levels (EBLs) by 2010.

DATA SOURCES: National, state, and local exposure assessments over the past half century have identified risk factors for EBLs among U.S. children, including age, race, income, age and location of housing, parental occupation, and season.

DATA EXTRACTION AND SYNTHESIS: Recent national policies have greatly reduced lead exposure among U.S. children, but even very low exposure levels compromise children's later intellectual development and lifetime achievement. No threshold for these effects has been demonstrated. Although lead paint and dust may still account for up to 70% of EBLs in U.S. children, the U.S. Centers for Disease Control and Prevention estimates that >= 30% of current EBLs do not have an immediate lead paint source, and numerous studies indicate that lead exposures result from multiple sources. EBLs and even deaths have been associated with inadequately controlled sources including ethnic remedies and goods, consumer products, and food-related items such as ceramics. Lead in public drinking water and in older urban centers remain exposure sources in many areas.

CONCLUSIONS: Achieving the 2010 goal requires maintaining current efforts, especially programs addressing lead paint, while developing interventions that prevent exposure before children are poisoned. It also requires active collaboration across all levels of government to identify and control all potential sources of lead exposure, as well as primary prevention.

Document Type: Review

Language: English

Author Keywords: children's health; environmental health; lead poisoning; primary prevention

KeyWords Plus: NUTRITION EXAMINATION SURVEY; 3RD NATIONAL-HEALTH; UNITED-STATES; REFUGEE CHILDREN; URBAN CHILDREN; DRINKING-WATER; RISK-FACTORS; BREAST-MILK; HOUSE-DUST; NEW-YORK

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Inorganic arsenic in cooked rice and vegetables from Bangladeshi households

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Source: SCIENCE OF THE TOTAL ENVIRONMENT **Volume:** 370 **Issue:** 2-3 **Pages:** 294-301 **Published:** NOV 1 2006

Times Cited: 23 **References:** 40 **Citation Map**

Abstract: Many Bangladeshi suffer from arsenic-related health concerns. Most mitigation activities focus on identifying contaminated wells and reducing the amount of arsenic ingested from well water. Food as a source of arsenic exposure has been recently documented. The objectives of this study were to measure the main types of arsenic in commonly consumed foods in Bangladesh and estimate the average daily intake (ADI) of arsenic from food and water. Total, organic and inorganic, arsenic were measured in drinking water and in cooked rice and vegetables from Bangladeshi households. The mean total arsenic level in 46 rice samples was 358 mu g/kg (range: 46 to 1110 mu g/kg dry weight) and 333 mu g/kg (range: 19 to 2334 mu g/kg dry weight) in 39 vegetable samples. Inorganic arsenic calculated as arsenite and arsenate made up 87% of the total arsenic measured in rice, and 96% of the total arsenic in vegetables. Total arsenic in water ranged from 200 to 500 mu g/L. Using individual, self-reported data on daily consumption of rice and drinking water the total arsenic ADI was 1176 mu g (range: 419 to 2053 mu g), 14% attributable to inorganic arsenic in cooked rice. The ADI is a conservative estimate; vegetable arsenic was not included due to limitations in self-reported daily consumption amounts. Given the arsenic levels measured in food and water and consumption of these items, cooked rice and vegetables are a substantial exposure pathway for inorganic arsenic. Intervention strategies must consider all sources of dietary arsenic intake. Published by Elsevier B.V.

Document Type: Article

Language: English

Author Keywords: Bangladesh; arsenite; arsenate; dimethylarsinic acid; food; average daily intake

KeyWords Plus: PERFORMANCE LIQUID-CHROMATOGRAPHY; ATOMIC FLUORESCENCE SPECTROMETRY; PLASMA-MASS SPECTROMETRY; WEST-BENGAL; DRINKING-WATER; FOOD COMPOSITES; AFFECTED AREA; INDIA; CONTAMINATION; SPECIATION

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Persistence of nontuberculous mycobacteria in a drinking water system after addition of filtration treatment

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Source: APPLIED AND ENVIRONMENTAL MICROBIOLOGY **Volume:** 72 **Issue:** 9 **Pages:** 5864-5869 **Published:** SEP 2006

Times Cited: 19 **References:** 36 **Citation Map**

Abstract: There is evidence that drinking water may be a source of infections with pathogenic nontuberculous mycobacteria (NTM) in humans. One method by which NTM are believed to enter drinking water distribution systems is by their intracellular colonization of protozoa. Our goal was to determine whether we could detect a reduction in the prevalence of NTM recovered from an unfiltered surface drinking water system after the addition of ozonation and filtration treatment and to characterize NTM isolates by using molecular methods. We sampled water from two initially unfiltered surface drinking water treatment plants over a 29-month period. One plant received the addition of filtration and ozonation after 6 months of sampling. Sample sites included those at treatment plant effluents, distributed water, and cold water taps (point-of-use [POU] sites) in public or commercial buildings located within each distribution system. NTM were recovered from 27% of the sites. POU sites yielded the majority of NTM, with > 50% recovery despite the addition of ozonation and filtration. Closely related electrophoretic groups of Mycobacterium avium were found to persist at POU sites for up to 26 months. Water collected from POU cold water outlets was persistently colonized with NTM despite the addition of ozonation and filtration to a drinking water system. This suggests that cold water POU outlets need to be considered as a potential source of chronic human exposure to NTM.

Document Type: Article

Language: English

KeyWords Plus: ACQUIRED-IMMUNODEFICIENCY-SYNDROME; AVIUM COMPLEX; AIDS PATIENTS; PLANT PERFORMANCE; POTABLE WATER; INFECTION; INTRACELLULARE; IDENTIFICATION; SIMIAE

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APPENDIX 8. MOST HIGHLY CITED DRINKING WATER PAPERS – INDIANAPOLIS

Human pharmaceuticals in US surface waters: A human health risk assessment

Author(s): Schwab BW, Hayes EP, Fiori JM, Mastrocco FJ, Roden NM, Cragin D, Meyerhoff RD, D'Aco VJ, Anderson PD

Source: REGULATORY TOXICOLOGY AND PHARMACOLOGY **Volume:** 42 **Issue:** 3 **Pages:** 296-312 **Published:** AUG 2005

Times Cited: 59 **References:** 104 **Citation Map**

Abstract: The detection of low levels of pharmaceuticals in rivers and streams, drinking water, and groundwater has raised questions as to whether these levels may affect human health. This report presents human health risk assessments for 26 active pharmaceutical ingredients (APIs) and/or their metabolites, representing 14 different drug classes, for which environmental monitoring data are available for the United States. Acceptable daily intakes (ADIs) are derived using the considerable data that are available for APIs. The resulting ADIs are designed to protect potentially exposed populations, including sensitive sub-populations. The ADIs are then used to estimate predicted no effect concentrations (PNECs) for two sources of potential human exposure: drinking water and fish ingestion. The PNECs are compared to measured environmental concentrations (MECs) from the published literature and to maximum predicted environmental concentrations (PECs) generated using the PhATE model. The PhATE model predictions are made under conservative assumptions of low river flow and no depletion (i.e., no metabolism, no removal during wastewater or drinking water treatment, and no instream depletion). Ratios of MECs to PNECs are typically very low and consistent with PEC to PNEC ratios. For all 26 compounds, these low ratios indicate that no appreciable human health risk exists from the presence of trace concentrations of these APIs in surface water and drinking water. (C) 2005 Elsevier Inc. All rights reserved.

Document Type: Review

Language: English

Author Keywords: risk assessment; PhATE; pharmaceutical; medicine; human health; environment; drinking water; fish consumption

KeyWords Plus: SOLID-PHASE EXTRACTION; TANDEM MASS-SPECTROMETRY; PERSONAL CARE PRODUCTS; SEWAGE-TREATMENT PLANTS; WASTE-WATER; AQUATIC ENVIRONMENT; DRINKING-WATER; NATIONAL RECONNAISSANCE; THERAPEUTIC DRUGS; CLOFIBRIC ACID

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Fluoride induces endoplasmic reticulum stress in ameloblasts responsible for dental enamel formation

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Source: JOURNAL OF BIOLOGICAL CHEMISTRY **Volume:** 280 **Issue:** 24 **Pages:** 23194-23202 **Published:** JUN 17 2005

Times Cited: 30 **References:** 64 **Citation Map**

Abstract: mechanism of how fluoride causes fluorosis remains unknown. Exposure to fluoride can inhibit protein synthesis, and this may also occur by agents that cause endoplasmic reticulum (ER) stress. When translated proteins fail to fold properly or become misfolded, ER stress response genes are induced that together comprise the unfolded protein response. Because ameloblasts are responsible for dental enamel formation, we used an ameloblast-derived cell line (LS8) to characterize specific responses to fluoride treatment. LS8 cells were growth-inhibited by as little as 1.9-3.8 ppm fluoride, whereas higher doses induced ER stress and caspase-mediated DNA fragmentation. Growth arrest and DNA damage-inducible proteins (GADD153/CHOP, GADD45 alpha), binding protein (BiP/glucose-responsive protein 78 (GRP78), the non-secreted form of carbonic anhydrase VI (CA-VI), and active X-box-binding protein-1 (Xbp-1) were all induced significantly after exposure to 38 ppm fluoride. Unexpectedly, DNA fragmentation increased when GADD153 expression was inhibited by short interfering RNA treatment but remained unaffected by transient GADD153 overexpression. Analysis of control and GADD153(-/-) embryonic fibroblasts demonstrated that caspase-3 mediated the increased DNA fragmentation observed in the GADD153 null cells. We also demonstrate that mouse incisor ameloblasts are sensitive to the toxic effects of high dose fluoride in drinking water. Activated Ire1 initiates an ER stress response pathway, and mouse ameloblasts were shown to express activated Ire1. Ire1 levels appeared induced by fluoride treatment, indicating that ER stress may play a role in dental fluorosis. Low dose fluoride, such as that present in fluoridated drinking water, did not induce ER stress.

Document Type: Article

Language: English

KeyWords Plus: UNFOLDED PROTEIN RESPONSE; RADIATION-INDUCED APOPTOSIS; MAXILLARY CENTRAL INCISORS; EPITHELIAL LUNG-CELLS; MESSENGER-RNA; TRANSCRIPTION FACTOR; TRANSLATIONAL CONTROL; DNA FRAGMENTATION; GENE-EXPRESSION; CRITICAL PERIOD

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Aluminum and copper in drinking water enhance inflammatory or oxidative events specifically in the brain

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Source: JOURNAL OF NEUROIMMUNOLOGY **Volume:** 176 **Issue:** 1-2 **Pages:** 16-23 **Published:** JUL 2006

Times Cited: 16 **References:** 39 **Citation Map**

Abstract: Inflammatory and oxidative events are up-regulated in the brain of AD patients. It has been reported that in animal models of AD, exposure to aluminum (Al) or copper (Cu) enhanced oxidative events and accumulation of amyloid beta (A ss) peptides. The present study was designed to evaluate the effect of a 3-month exposure of mice to copper sulfate (8 mu M), aluminum lactate (10 or 100 mu M), or a combination of the salts. Results suggest that although Al or Cu may independently initiate inflammatory or oxidative events, they may function cooperatively to increase APP levels. (c) 2006 Elsevier B.V. All rights reserved.

Document Type: Article

Language: English

Author Keywords: aluminum; Alzheimer's disease; amyloid beta; copper; neuroinflammation; oxidative stress

KeyWords Plus: AMYLOID-BETA-PEPTIDES; NITRIC-OXIDE SYNTHASE; ALZHEIMERS-DISEASE; LIPID-PEROXIDATION; GENE-EXPRESSION; CELLS; PROMOTION; EXPOSURE; STRESS; IRON

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Otosclerosis: Incidence of positive findings on high-resolution computed tomography and their correlation to audiological test data

Author(s): Naumann IC, Porcellini B, Fisch U

Source: ANNALS OF OTOLOGY RHINOLOGY AND LARYNGOLOGY **Volume:** 114 **Issue:** 9 **Pages:** 709-716 **Published:** SEP 2005

Times Cited: 14 **References:** 15 **Citation Map**

Abstract: Objectives: Computed tomographic (CT) scanning with slices of 1 mm. or more has not been sufficient to demonstrate otosclerotic foci in most cases to date.

Methods: We investigated the validity of CT scans with a 0.5-mm cubical scan technique, with and without planar reconstruction, and correlated these findings with audiological data. Forty-four temporal bone CT scans from 30 patients with conductive or mixed hearing loss were evaluated.

Results: Otosclerotic foci were visualized in 74% of the cases. With reconstruction at the workstation, the sensitivity increased to 85%. Whereas in fenestral otosclerosis a correlation was found between the size of the focus and the air-bone gap, no correlation was seen between the size of the focus and bone conduction thresholds with cochlear involvement. Otosclerotic foci in patients treated with sodium fluoride were smaller than those in patients without treatment. This finding may indicate a beneficial effect of sodium fluoride on otosclerotic growth.

Conclusions: High-resolution CT scans are a valid tool that can be used to confirm, localize, and determine the size of clinically suspected otosclerotic foci.

Document Type: Proceedings Paper

Language: English

Author Keywords: audiometry; computed tomography; otosclerosis

KeyWords Plus: DRINKING-WATER FLUORIDATION; SENSORINEURAL HEARING-LOSS; COCHLEAR OTOSCLEROSIS; CT ANALYSIS

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Acrylamide carcinogenicity

Author(s): Klaunig JE (Klaunig, James E.)

Source: JOURNAL OF AGRICULTURAL AND FOOD CHEMISTRY **Volume:** 56 **Issue:** 15 **Pages:** 5984-5988 **Published:** AUG 13 2008

Times Cited: 12 **References:** 32 **Citation Map**

Abstract: The induction of cancer by chemicals is a multiple-stage process. Acrylamide is carcinogenic to experimental mice and rats, causing tumors at multiple organ sites in both species when given in drinking water or by other means. In mice, acrylamide increased the incidence and multiplicity of lung tumors and skin tumors. In two bioassays in rats, acrylamide administered in drinking water consistently induced mesotheliomas of the testes, thyroid tumors, and mammary gland tumors. In addition, brain tumors appeared to be increased. In one of the rat bioassays, pituitary tumors, pheochromocytomas, uterine tumors, and pituitary tumors were noted. The conversion of acrylamide metabolically to the reactive, mutagenic, and genotoxic product, glycidamide, can occur in both rodent and humans. Glycidamide and frequently acrylamide have been positive for mutagenicity and DNA reactivity in a number of in vitro and in vivo assays. The effects of chronic exposure of glycidamide to rodents have not been reported. Epidemiologic studies of workers for possible health effects from exposures to acrylamide have not shown a consistent increase in cancer risk. Although an increase in the risk for pancreatic cancer (almost double) was seen in highly exposed workers, no exposure response relationship could be determined. The mode of action remains unclear for acrylamide-induced rodent carcinogenicity, but support for a genotoxic mechanism based on in vitro and in vivo DNA reactivity assays cannot be ruled out. In addition, the pattern of tumor formation in the rat following chronic exposure supports a genotoxic mode of action but also suggests a potential role of endocrine modification.

Document Type: Article

Language: English

Author Keywords: acrylamide; glycidamide; genotoxicity; mutation; carcinogenicity; neuro tumors; thyroid tumors; mammary tumors; testes mesotheliomas

KeyWords Plus: HEMOGLOBIN ADDUCT FORMATION; MALE-MICE; MORTALITY PATTERNS; BREAST-CANCER; DNA-SYNTHESIS; GLYCIDAMIDE; RAT; ACRYLONITRILE; RISK; ONCOGENICITY

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The acetochlor registration partnership surface water monitoring program for four corn herbicides

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Source: JOURNAL OF ENVIRONMENTAL QUALITY **Volume:** 34 **Issue:** 3 **Pages:** 877-889 **Published:** MAY-JUN 2005

Times Cited: 12 **References:** 33 **Citation Map**

Abstract: A surface drinking water monitoring program for four corn (Zea mays L.) herbicides was conducted during 1995-2001. Stratified random sampling was used to select 175 community water systems (CWSs) within a 12-state area, with an emphasis on the most vulnerable sites, based on corn intensity and watershed size. Finished drinking water was monitored at all sites, and raw water was monitored at many sites using activated carbon, which was shown capable of removing herbicides and their degradates from drinking water. Samples were collected biweekly from mid-March through the end of August, and twice during the off-season. The analytical method had a detection limit of 0.05 mu g L-1 for alachlor [2-chloro-N-(2,6-diethylphenyl)-N-(methoxymethyl)-acetamide] and 0.03 mu g L-1 for acetochlor [2-chloro-N-(ethoxymethyl)-N-(2-ethyl6-methylphenyl)-acelamide], atrazine [6-chloro-N-ethyl-N'-(1-methylethyl)-1,3,5-triazine-2,4-diamine], and metolachlor [2-chloro-N-(2-ethyl-6-meth methylphenyl)-N-(2-methoxy-1-methylethyl)-acetamide]. Of the 16 528 drinking water samples analyzed, acetochlor, alachlor, atrazine, and metolachlor were detected in 19, 7, 87, and 53% of the samples, respectively. During 1999-2001, samples were also analyzed for the presence of six major degradates of the chloroacetanilide herbicides, which were detected more frequently than their parent compounds, despite having higher detection limits of 0.1 to 0.2 mu g L-1. Overall detection frequencies were correlated with product use and environmental fate characteristics. Reservoirs were particularly vulnerable to atrazine, which exceeded its 3 mu g L-1 maximum contaminant level at 25 such sites during 1995-1999. Acetochlor annualized mean concentrations (AMCs) did not exceed its mitigation trigger (2 mu g L-1) at any site, and comparisons of observed levels with standard measures of human and ecological hazards indicate that it poses no significant risk to human health or the environment.

Document Type: Article

Language: English

KeyWords Plus: ETHANE SULFONATE METABOLITE; MIDWESTERN UNITED-STATES; MISSISSIPPI RIVER-BASIN; CHLOROACETANILIDE HERBICIDES; TRANSPORT; ALACHLOR; DEGRADATION; CHEMICALS; TOXICITY; HUMANS

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Calcimimetic Inhibits Late-Stage Cyst Growth in ADPKD

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Source: JOURNAL OF THE AMERICAN SOCIETY OF NEPHROLOGY **Volume:** 20 **Issue:** 7 **Pages:** 1527-1532 **Published:** JUL 2009

Times Cited: 7 **References:** 17 **Citation Map**

Abstract: In polycystic kidney disease (PKD), genetic mutations in polycystin 1 and 2 lead to defective intracellular trafficking of calcium, thereby decreasing intracellular calcium and altering cAMP signaling to favor proliferation. We hypothesized that calcimimetics, allosteric modulators of the calcium-sensing receptor, would reduce cyst growth by increasing intracellular calcium. We randomly assigned 20-wk-old male rats with a form of autosomal dominant PKD (heterozygote Cy/+) to one of four groups for 14 to 18 wk of treatment: (group 1) no treatment; (group 2) calcimimetic R-568 formulated in the diet; (group 3) R-568 plus calcium-supplemented drinking water (R-568 plus Ca); or (group 4) Ca-supplemented drinking water with a normal diet (Ca). Severity of PKD did not progress in any of the three treatment groups between 34 and 38 wk. Compared with no treatment, cyst growth was unaffected at 34 wk by all treatments, but cyst volume and fibrosis were lower at 38 wk, with both R-568-treated groups demonstrating a greater reduction than calcium alone. Between 34 and 38 wk, the total kidney weight increased by 78% in the control group ($P < 0.001$) and by 19% in the Ca group ($P < 0.01$), but did not increase in the R-568 or R-568 plus Ca groups, suggesting inhibition of disease progression despite equivalent suppression of parathyroid hormone. In summary, treatment of hyperparathyroidism halts late-stage progression of rodent cystic kidney disease. The benefit of R-568 alone suggests calcium-sensing receptor modulation may have additional inhibitory effects on late-stage cyst growth resulting from a direct modulation of intracellular calcium.

Document Type: Article

Language: English

KeyWords Plus: POLYCYSTIC KIDNEY-DISEASE; RAT-KIDNEY; AUTOSOMAL-DOMINANT; SENSING RECEPTOR; PROGRESSION; CALCIUM; LOCALIZATION

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Agrichemicals in surface water and birth defects in the United States

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Source: ACTA PAEDIATRICA **Volume:** 98 **Issue:** 4 **Pages:** 664-669 **Published:** APR 2009

Times Cited: 7 **References:** 29 **Citation Map**

Abstract: Objectives: To investigate if live births conceived in months when surface water agrichemicals are highest are at greater risk for birth defects.

Methods: Monthly concentrations during 1996-2002 of nitrates, atrazine and other pesticides were calculated using United States Geological Survey's National Water Quality Assessment data. Monthly United States birth defect rates were calculated for live births from 1996 to 2002 using United States Centers for Disease Control and Prevention natality data sets. Birth defect rates by month of last menstrual period (LMP) were then compared to pesticide/nitrate means using logistical regression models.

Results: Mean concentrations of agrichemicals were highest in April-July. Total birth defects, and eleven of 22 birth defect subcategories, were more likely to occur in live births with LMPs between April and July. A significant association was found between the season of elevated agrichemicals and birth defects.

Conclusion: Elevated concentrations of agrichemicals in surface water in April-July coincided with higher risk of birth defects in live births with LMPs April-July. While a causal link between agrichemicals and birth defects cannot be proven from this study an association might provide clues to common factors shared by both variables.

Document Type: Article

Language: English

Author Keywords: Atrazine; Birth defects; Nitrates; Pesticides

KeyWords Plus: PESTICIDE EXPOSURE; DEVELOPMENTAL TOXICITY; CONGENITAL-ANOMALIES; DRINKING-WATER; METABOLITES; MINNESOTA; ATRAZINE; QUALITY; NITRATE; RISK

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Biomarker discovery for arsenic exposure using functional data. Analysis and feature learning of mass spectrometry proteomic data

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Source: JOURNAL OF PROTEOME RESEARCH **Volume:** 7 **Issue:** 1 **Pages:** 217-224 **Published:** JAN 2008

Times Cited: 6 **References:** 24 **Citation Map**

Abstract: Plasma biomarkers of exposure to environmental contaminants play an important role in early detection of disease. The emerging field of proteomics presents an attractive opportunity for candidate biomarker discovery, as it simultaneously measures and analyzes a large number of proteins. This article presents a case study for measuring arsenic concentrations in a population residing in an As-endemic region of Bangladesh using plasma protein expressions measured by SELDI-TOF mass spectrometry. We analyze the data using a unified statistical method based on functional learning to preprocess mass spectra and extract mass spectrometry (MS) features and to associate the selected MS features with arsenic exposure measurements. The task is challenging due to several factors, the high dimensionality of mass spectrometry data, complicated error structures, and a multiple comparison problem. We use nonparametric functional regression techniques for MS modeling, peak detection based on the significant zero-downcrossing method, and peak alignment using a warping algorithm. Our results show significant associations of arsenic exposure to either under- or overexpressions of 20 proteins.

Document Type: Article

Language: English

KeyWords Plus: DRINKING-WATER; SERUM; CANCER; TOXICOLOGY; PROTEIN; SAMPLES

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Cancer dose-response assessment for acrylonitrile based upon rodent brain tumor incidence: Use of epidemiologic, mechanistic, and pharmacokinetic support for nonlinearity

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Source: REGULATORY TOXICOLOGY AND PHARMACOLOGY **Volume:** 43 **Issue:** 1 **Pages:** 85-103 **Published:** OCT 2005

Times Cited: 6 **References:** 95 **Citation Map**

Abstract: A cancer dose-response assessment was conducted for acrylonitrile (AN) using updated information on mechanism of action, epidemiology, toxicity, and pharmacokinetics. Although more than 10 chronic bioassays indicate that AN produces multiple tumors in rats and mice, a number of large, well-conducted epidemiology studies provide no evidence of a causal association between AN exposure and cancer mortality of any type. The epidemiological data include early industry exposures that are far higher than occur today and that approach or exceed levels found to be tumorigenic in animals. Despite the absence of positive findings in the epidemiology data, a dose-response assessment was conducted for AN based on brain tumors in rats. Mechanistic studies implicate the involvement of oxidative stress in rat brain due to a metabolite (2-cyanoethylene oxide or CEO, cyanide), but do not conclusively rule out a potential role for the direct genotoxicity of CEO. A PBPK model was used to predict internal doses (peak CEO in brain) for 12 data sets, which were pooled together to provide a consistent characterization of the dose-response relationship for brain tumor incidence in the rat. The internal dose corresponding to a 5% increase in extra risk (ED05 = 0.017 mg/L brain) and its lower confidence limit (LED05 = 0.014 mg/L brain) was used as the point of departure. The weight-of-evidence supports the use of a nonlinear extrapolation for the cancer dose-response assessment. A quantitative comparison of the epidemiology exposure-response data (lung and brain cancer mortality) to the rat brain tumor data in terms of internal dose adds to the confidence in the nonlinear extrapolation. Uncertainty factors of 200 and 220 (for the oral and inhalation routes, respectively) were applied to the LED05 to account for interspecies variation, intraspecies variation, and the severity of the response measure. Accordingly, oral doses below 0.009 mg/kg-day and air concentrations below 0.1 mg/m(3) are not expected to pose an appreciable risk to human populations exposed to AN. (c) 2004 Elsevier Inc. All rights reserved.

Document Type: Article

Author Keywords: acrylonitrile; cancer dose-response assessment; epidemiology; mode of action; PBPK modeling; species differences

KeyWords Plus: HAMSTER EMBRYO CELLS; SPRAGUE-DAWLEY RATS; RISK-ASSESSMENT; 2-CYANOETHYLENE OXIDE; CYTOCHROME-P450 2E1; OXIDATIVE STRESS; DRINKING-WATER; IRREVERSIBLE ASSOCIATION; GLUTATHIONE DEPLETION; TISSUE MACROMOLECULES

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APPENDIX 9. MOST HIGHLY CITED DRINKING WATER PAPERS – COLUMBUS

Analysis of perchlorate in human urine using ion chromatography and electrospray tandem mass spectrometry

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Source: ANALYTICAL CHEMISTRY **Volume:** 77 **Issue:** 8 **Pages:** 2475-2481 **Published:** APR 15 2005

Times Cited: 56 **References:** 39 **Citation Map**

Abstract: Because of health concerns surrounding widespread exposure to perchlorate, we developed a sensitive and selective method for quantifying perchlorate in human urine using ion chromatography coupled with electrospray ionization tandem mass spectrometry. Perchlorate was quantified using a stable isotope-labeled internal standard (O-18(4)-perchlorate) with excellent assay precision (coefficient of variation < 5% for repetitively analyzed quality control material). Analytical accuracy was established by blind analysis of certified proficiency testing materials prepared in synthetic urine matrix; calculated amounts deviated minimally from true amounts, with percent differences ranging from 2% to 5%. Selective chromatography and tandem mass spectrometry reduced the need for sample cleanup, resulting in a rugged and rapid method capable of routinely analyzing 75 samples/day. The lowest reportable level (0.025 ng/mL) was sufficiently sensitive to detect perchlorate in all human urine samples evaluated to date, with a linear response range from 0.025 to 100 ng/mL. This selective, sensitive, and rapid method will help elucidate any potential associations between human exposure to low levels of perchlorate and adverse health effects.

Document Type: Article

Language: English

KeyWords Plus: DRINKING-WATER; THYROID-FUNCTION; SAMPLES; PERFORMANCE; EXTRACTION; CHILDREN; HEALTH; PLANTS; ANION

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Endothelium-derived nitric oxide regulates postischemic myocardial oxygenation and oxygen consumption by modulation of mitochondrial electron transport

Author(s): Zhao X, He GL, Chen YR, Pandian RP, Kuppusamy P, Zweier JL

Source: CIRCULATION **Volume:** 111 **Issue:** 22 **Pages:** 2966-2972 **Published:** JUN 7 2005

Times Cited: 52 **References:** 44 **Citation Map**

Abstract: Background-Nitric oxide (NO) production is increased in postischemic myocardium, and NO can control mitochondrial oxygen consumption in vitro. Therefore, we investigated the role of endothelial NO synthase (eNOS)-derived NO on in vivo regulation of oxygen consumption in the postischemic heart.

Methods and Results-Mice were subjected to 30 minutes of coronary ligation followed by 60 minutes of reperfusion. Myocardial oxygen tension (Po-2) was monitored by electron paramagnetic resonance oximetry. In wild-type, N-nitro-L-arginine methyl ester (L-NAME)-treated (with 1 mg/mL in drinking water), and eNOS knockout (eNOS(-/-)) mice, no difference was observed among baseline myocardial Po-2 values (8.6 &PLUSMN; 0.7, 10.0 &PLUSMN; 1.2, and 10.1 &PLUSMN; 1.2 mm Hg, respectively) or those measured at 30 minutes of ischemia (1.4 &PLUSMN; 0.6, 2.3 &PLUSMN; 0.9, and 3.1 &PLUSMN; 1.4 mm Hg, respectively). After reperfusion, myocardial Po-2 increased markedly (P < 0.001 versus baseline in each group) but was much lower in L-NAME -treated and eNOS(-/-) mice (17.4 &PLUSMN; 1.6 and 20.4 &PLUSMN; 1.9 mm Hg) than in wild-type mice (46.5 &PLUSMN; 1.7 mm Hg; P < 0.001). A transient peak of myocardial Po-2 was observed at early reperfusion in wild-type mice. No reactive hyperemia was observed during early reperfusion. Endothelial NO decreased the rate-pressure product (P < 0.05), upregulated cytochrome c oxidase (CcO) mRNA expression (P < 0.01) with no change in CcO activity, and inhibited NADH dehydrogenase (NADH-DH) activity (P < 0.01) without alteration of NADH-DH mRNA expression. Peroxynitrite-mediated tyrosine nitration was higher in hearts from wild-type mice than in eNOS(-/-) or L-NAME-treated hearts.

Conclusions-eNOS-derived NO markedly suppresses in vivo O-2 consumption in the postischemic heart through modulation of mitochondrial respiration based on alterations in enzyme activity and mRNA expression of NADH-DH and CcO. The marked myocardial hyperoxygenation in reperfused myocardium may be a critical factor that triggers postischemic remodeling.

Document Type: Article

Language: English

Author Keywords: nitric oxide; enzymes; free radicals; reperfusion; ischemia

KeyWords Plus: CYTOCHROME-C-OXIDASE; REPERFUSION INJURY; MOUSE HEART; ISCHEMIA-REPERFUSION; EPR SPECTROSCOPY; MESSENGER-RNA; RAT HEARTS; SYNTHASE; GENERATION; TISSUES

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Influence of tap water quality and household water use activities on indoor air and internal dose levels of trihalomethanes

Author(s): Nuckols JR, Ashley DL, Lyu C, Gordon SM, Hinckley AF, Singer P

Source: ENVIRONMENTAL HEALTH PERSPECTIVES **Volume:** 113 **Issue:** 7 **Pages:** 863-870 **Published:** JUL 2005

Times Cited: 31 **References:** 39 **Citation Map**

Abstract: Individual exposure to trihalomethanes (THMs) in tap water can occur through ingestion, inhalation, or dermal exposure. Studies indicate that activities associated with inhaled or dermal exposure routes result in a greater increase in blood THM concentration than does ingestion. We measured blood and exhaled air concentrations of THM as biomarkers of exposure to participants conducting 14 common household water use activities, including ingestion of hot and cold tap water beverages, showering, clothes washing, hand washing, bathing, dish washing, and indirect shower exposure. We conducted our study at a single residence in each of two water utility service areas, one with relatively high and the other low total THM in the residence tap water. To maintain a consistent exposure environment for seven participants, we controlled water use activities, exposure time, air exchange, water flow and temperature, and nonstudy THM sources to the indoor air. We collected reference samples for water supply and air (pre-water use activity), as well as tap water and ambient air samples. We collected blood samples before and after each activity and exhaled breath samples at baseline and postactivity. All hot water use activities yielded a 2-fold increase in blood or breath THM concentrations for at least one individual. The greatest observed increase in blood and exhaled breath THM concentration in any participant was due to showering (direct and indirect), bathing, and hand dishwashing. Average increase in blood THM concentration ranged from 57 to 358 pg/mL due to these activities. More research is needed to determine whether acute and frequent exposures to THM at these concentrations have public health implications. Further research is also needed in designing epidemiologic studies that minimize data collection burden yet maximize accuracy in classification of dermal and inhalation THM exposure during hot water use activities.

Document Type: Article

Language: English

Author Keywords: biomarkers; chlorination; disinfection by-products; exposure; trihalomethane; water use

KeyWords Plus: DISINFECTION BY-PRODUCTS; VOLATILE ORGANIC-COMPOUNDS; ADVERSE PREGNANCY OUTCOMES; COMMUNITY DRINKING-WATER; BLADDER-CANCER; SPONTANEOUS-ABORTION; HUMAN BLOOD; EXPOSURE; CHLOROFORM; TEMPERATURE

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A method for determining the phosphorus sorption capacity and amorphous aluminum of aluminum-based drinking water treatment residuals

Author(s): Dayton EA, Basta NT

Source: JOURNAL OF ENVIRONMENTAL QUALITY **Volume:** 34 **Issue:** 3 **Pages:** 1112-1118 **Published:** MAY-JUN 2005

Times Cited: 24 **References:** 40 **Citation Map**

Abstract: A high amorphous aluminum or iron oxide content in drinking water treatment residuals (WTRs) can result in a high phosphorus (P) sorption capacity. Therefore, WTR may be used beneficially to adsorb P and reduce P loss to surface or ground water. The strong relationship between acid ammonium oxalate-extractable aluminum (Al-ox) and Langmuir phosphorus adsorption maximum (P-max) in WTR could provide a useful tool for determining P-max without the onus of the multipoint batch equilibrations necessary for the Langmuir model. The objectives of this study were to evaluate and/or modify an acid ammonium oxalate extraction of Al-ox and the experimental conditions used to generate P adsorption isotherms to strengthen the relationship between Al-ox and P-max. The oxalate extraction solution to WTR ratio varied from 40:1, 100:1, and 200:1. Batch equilibration conditions were also varied. The WTR particle size was reduced from < 2 mm to < 150 mu m, and batch equilibration was extended from 17 h to 6 d. Increasing the solution to WTR ratio to 100:1 extracted significantly greater Al-ox at levels of > 50 mg Al kg(-1). No additional increase was found at 200:1. Reducing WTR particle size from < 2 nun to < 150 mu m increased P-max 2.46-fold. Extending the equilibration time from 17 h to 6 d increased P-max by a mean of 5.83-fold. The resulting empirical regression equation between the optimized Al-ox and P-max (r(2) = 0.91, significant at the 0.001 probability level) may provide a tool to estimate the P-max of Al-based WTR simply by measuring Al-ox. The accurate determination of WTR P-max and Al-ox is essential in using WTR effectively to reduce P loss in runoff or to reduce the solubility of P in agricultural soils or organic waste materials (biosolids, manure).

Document Type: Article

Language: English

KeyWords Plus: EXTRACTABLE SOIL-PHOSPHORUS; LONG-TERM KINETICS; AGRICULTURAL PHOSPHORUS; SANDY SOILS; RUNOFF; PHOSPHATE; ADSORPTION; BIOSOLIDS; RELEASE; EUTROPHICATION

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Effect of process variables and natural organic matter on removal of microcystin-LR by PAC-UF

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Source: ENVIRONMENTAL SCIENCE & TECHNOLOGY **Volume:** 40 **Issue:** 23 **Pages:** 7336-7342 **Published:** DEC 1 2006

Times Cited: 22 **References:** 42 **Citation Map**

Abstract: The release of cyanobacterial toxins, such as microcystin-LR, in drinking water supplies is of increasing concern. In this study, we investigated the use of ultrafiltration (UF) combined with adsorption on powdered activated carbon (PAC) for the removal of microcystin-LR from drinking water. Process variables examined included PAC type, PAC dosage, membrane characteristics (material and pore size), and the presence of natural organic matter (NOM). Due to greater mesopore volume, wood-based activated carbon was up to 4-times more effective at removing microcystin-LR than coconut-based carbon, depending on contact time. Cellulose acetate (CA) membranes with a molecular weight cutoff (MWCO) of 20 000 Da did not reject or adsorb microcystin-LR. Membranes composed of polyethersulfone (PES) of similar pore size, on the other hand, adsorbed microcystin-LR presumably through hydrophobic interactions. A PES membrane with a MWCO of 5000 Da sorbed microcystin-LR, and also rejected 8.4% of the toxin through a size exclusion mechanism. When PAC was coupled to UF using PES membranes, greater removal of microcystin-LR occurred compared to when CA membranes were used due to sorption of the toxin to the PES membrane surface. The presence of Suwannee River fulvic acid (SRFA) reduced microcystin- LR removal by PAC-UF, primarily due to competition between SRFA and microcystin-LR for sites on the PAC surface.

Document Type: Article

Language: English

KeyWords Plus: POWDERED ACTIVATED CARBON; CYANOBACTERIAL HEPATOTOXINS; ULTRAFILTRATION MEMBRANES; REVERSE-OSMOSIS; WATER-TREATMENT; DRINKING-WATER; ADSORPTION; NANOFILTRATION; KINETICS; SYSTEM

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Metformin therapy in a transgenic mouse model of Huntington's disease

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Source: NEUROSCIENCE LETTERS **Volume:** 411 **Issue:** 2 **Pages:** 98-103 **Published:** JAN 10 2007

Times Cited: 20 **References:** 43 **Citation Map**

Abstract: Huntington's disease (HD) is a hereditary neurodegenerative disease that leads to striatal degeneration and a severe movement disorder. We used a transgenic mouse model of HD (the R6/2 line with similar to 150 glutamine repeats) to test a new therapy for this disease. We treated HD mice with metformin, a widely used anti-diabetes drug, in the drinking water (0, 2 or 5 mg/ml) starting at 5 weeks of age. Metformin treatment significantly prolonged the survival time of male HD mice at the 2 mg/ml dose (20.1% increase in lifespan) without affecting fasting blood glucose levels. This dose of metformin also decreased hind limb clasping time in 11-week-old mice. The higher dose did not prolong survival, and neither dose of metformin was effective in female HD mice. Collectively, our results suggest that metformin may be worth further investigation in additional HD models. (c) 2006 Published by Elsevier Ireland Ltd.

Document Type: Article

Language: English

Author Keywords: metformin; dimethylbiguanide; biguanides; Huntington's disease; huntingtin; neurodegeneration

KeyWords Plus: ACTIVATED PROTEIN-KINASE; RESPIRATORY-CHAIN; SKELETAL-MUSCLE; H-1-NMR SPECTROSCOPY; GLUCOSE-PRODUCTION; DIABETES-MELLITUS; ENERGY-METABOLISM; MOTOR DEFICITS; CAG REPEAT; IN-VIVO

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Changes in breath trihalomethane levels resulting from household water-use activities

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Source: ENVIRONMENTAL HEALTH PERSPECTIVES **Volume:** 114 **Issue:** 4 **Pages:** 514-521 **Published:** APR 2006

Times Cited: 18 **References:** 50 **Citation Map**

Abstract: Common household water-use activities such as showering, bathing, drinking, and washing clothes or dishes are potentially important contributors to individual exposure to trihalomethanes (THMs), the major class of disinfection by-products of water treated with chlorine. Previous studies have focused on showering or bathing activities. In this study, we selected 12 common water-use activities and determined which may lead to the greatest THM exposures and result in the greatest increase in the internal dose. Seven subjects performed the various water-use activities in two residences served by water utilities with relatively high and moderate total THM levels. To maintain a consistent exposure environment, the activities, exposure times, air exchange rates, water flows, water temperatures, and extraneous THM emissions to the indoor air were carefully controlled. Water, indoor air, blood, and exhaled-breath samples were collected during each exposure session for each activity, in accordance with a strict, well-defined protocol. Although showering (for 10 min) and bathing (for 14 min), as well as machine washing of clothes and opening mechanical dishwashers at the end of the cycle, resulted in substantial increases in indoor air chloroform concentrations, only showering and bathing caused significant increases in the breath chloroform levels. In the case of bromodichloromethane (BDCM), only bathing yielded a significantly higher air level in relation to the preexposure concentration. For chloroform from showering, strong correlations were observed for indoor air and exhaled breath, blood and exhaled breath, indoor air and blood, and tap water and blood. Only water and breath, and blood and breath were significantly associated for chloroform from bathing. For BDCM, significant correlations were obtained for blood and air, and blood and water from showering. Neither dibromochloromethane nor bromoform gave measurable breath concentrations for any of the activities investigated because of their much lower tap-water concentrations. Future studies will address the effects that changes in these common water-use activities may have on exposure.

Document Type: Article

Language: English

Author Keywords: biomarkers; breath analysis; disinfection; by-products; exposure; trihalomethane; water use

KeyWords Plus: VOLATILE ORGANIC-COMPOUNDS; DISINFECTION BY-PRODUCTS; CHLORINATED TAP WATER; PER-TRILLION LEVEL; DRINKING-WATER; BLADDER-CANCER; HUMAN BLOOD; PARTITION-COEFFICIENTS; CHLOROFORM EXPOSURE; GAS-CHROMATOGRAPHY

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Selection of a battery of rapid toxicity sensors for drinking water evaluation

Author(s): van der Schalie WH (van der Schalie, William H.), James RR (James, Ryan R.), Gargan TP (Gargan, Thomas P., II)

Source: BIOSENSORS & BIOELECTRONICS **Volume:** 22 **Issue:** 1 **Pages:** 18-27 **Published:** JUL 15 2006

Times Cited: 16 **References:** 25 **Citation Map**

Abstract: Comprehensive identification of chemical contaminants in Army field water supplies can be a lengthy process, but rapid analytical methods suitable for field use are limited. A complementary approach is to directly measure toxicity instead of individual chemical constituents. Ten toxicity sensors utilizing enzymes, bacteria, or vertebrate cells were tested to determine the minimum number of sensors that could rapidly identify toxicity in water samples containing one of 12 industrial chemicals. The ideal sensor would respond at a concentration just exceeding the Military Exposure Guideline (MEG) level for the chemical (an estimated threshold for adverse effects) but below the human lethal concentration. Chemical solutions were provided to testing laboratories as blind samples. No sensors responded to deionized water blanks; and only one sensor responded to a hard water blank. No single toxicity sensor responded to more than six chemicals in the desired response range, and one chemical (nicotine) was not detected by any sensor with the desired sensitivity. A combination of three sensors (Microtox, the Electric Cell Substrate Impedance Sensing (ECIS) test, and the Hepatocyte low density lipoprotein (LDL) uptake test) responded appropriately to nine of twelve chemicals. Adding a fourth sensor (neuronal microelectrode array) to the test battery allowed detection of two additional chemicals (aldicarb and methamidophos), but the neuronal microelectrode array was overly sensitive to paraquat. Evaluating sensor performance using a standard set of chemicals and a desired sensitivity range provides a basis both for selecting among available toxicity sensors and for evaluating emerging sensor technologies. Recommendations for future toxicity sensor evaluations are discussed. (c) 2005 Elsevier B.V. All rights reserved.

Document Type: Article

Language: English

Author Keywords: toxicity sensor; test battery; drinking water; military exposure guideline; MEG

KeyWords Plus: BIOASSAY; CELLS

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Neovascularization and angiogenic gene expression following chronic arsenic exposure in mice

Author(s): Soucy NV, Mayka D, Klei LR, Nemec AA, Bauer JA, Barchowsky A

Source: CARDIOVASCULAR TOXICOLOGY **Volume:** 5 **Issue:** 1 **Pages:** 29-41 **Published:** 2005

Times Cited: 16 **References:** 49 **Citation Map**

Abstract: Exposure to arsenic in drinking water increases incidence of cardiovascular diseases. However, the basic mechanisms and genetic changes that promote these diseases are unknown. This study investigated the effects of chronic arsenic exposure on vessel growth and expression of angiogenic and tissue remodeling genes in cardiac tissues. Male mice were exposed to low to moderately high levels of arsenite (AsIII) for 5, 10, or 20 wk in their drinking water. Vessel growth in Matrigel implants was tested during the last 2 wk of each exposure period. Implant vascularization increased in mice exposed to 5-500 ppb AsIII for 5 wk. Similar increases were seen following exposure to 50-250 ppb of AsIII over 20 wk, but the response to 500 ppb decreased with time. RT-PCR analysis of cardiac mRNA revealed differential expression of angiogenic or tissue remodeling genes, such as vascular endothelial cell growth factor (VEGF), VEGF receptors, plasminogen activator inhibitor-1, endothelin-1, and matrix metalloproteinase-9, which varied with time or amount of exposure. VEGF receptor mRNA and cardiac microvessel density were reduced by exposure to 500 ppb AsIII for 20 wk. These data demonstrate differential concentration and time-dependent effects of chronic arsenic exposure on cardiovascular phenotype and vascular remodeling that may explain the etiology for AsIII-induced disease.

Document Type: Article

Language: English

Author Keywords: arsenic; angiogenesis; neovascularization; Matrigel; vascular endothelial cell growth factor; matrix metalloproteinase-9; endothelin-1; plasminogen activator inhibitor-1

KeyWords Plus: ENDOTHELIAL GROWTH-FACTOR; ISCHEMIC-HEART-DISEASE; SMOOTH-MUSCLE-CELLS; VASCULAR-DISEASES; DRINKING-WATER; IN-VIVO; TRIOXIDE; MATRIX-METALLOPROTEINASE-9; HYPERTENSION; ATHEROGENESIS

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Use of drinking water treatment residuals as a potential best management practice to reduce phosphorus risk index scores

Author(s): Dayton EA, Basta NT

Source: JOURNAL OF ENVIRONMENTAL QUALITY **Volume:** 34 **Issue:** 6 **Pages:** 2112-2117 **Published:** NOV-DEC 2005

Times Cited: 15 **References:** 25 **Citation Map**

Abstract: The P risk index system has been developed to identify agricultural fields vulnerable to P loss as a step toward protecting surface water. Because of their high Langmuir phosphorus adsorption maxima (P-max), use of drinking water treatment residuals (WTRs) should be considered as a best management practice (BMP) to lower P risk index scores. This work discusses three WTR application methods that can be used to reduce P risk scores: (i) enhanced buffer strip, (ii) incorporation into a high soil test phosphorus (STP) soil, and (iii) co-blending with manure or biosolids. The relationship between WTR P-max and reduction in P extractability and runoff P was investigated. In a simulated rainfall experiment, using a buffer strip enhanced with 20 Mg WTR ha(-1), runoff P was reduced by from 66.8 to 86.2% and reductions were related to the WTR P-max. When 25 g kg(-1) WTR was incorporated into a high STP soil of 315 mg kg(-1) determined using Mehlich-3 extraction, 0.01 M calcium chloride-extractable phosphorus (CaCl2-P) reductions ranged from 60.9 to 96.0% and were strongly (P < 0.01) related to WTR P-max. At a 100 g kg(-1) WTR addition, Mehlich 3-extractable P reductions ranged from 41.1 to 86.7% and were strongly (P < 0.01) related to WTR P-max. Co-blending WTR at 250 g kg(-1) to manure or biosolids reduced CaCl2-P by > 75%. The WTR P-max. normalized across WTR application rates (P-max x WTR application) was significantly related to reductions in CaCl2-P or STP. Using WTR as a P risk index modifying factor will promote effective use of WTR as a BMP to reduce P loss from agricultural land.

Document Type: Proceedings Paper

Language: English

KeyWords Plus: SORPTION CAPACITY; SOILS; ALUMINUM; RUNOFF; BIOSOLIDS; QUALITY; LAND

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APPENDIX 10. MOST HIGHLY CITED DRINKING WATER PAPERS – WORLDWIDE

Arsenic removal from water/wastewater using adsorbents - A critical review

Author(s): Mohan D (Mohan, Dinesh), Pittman CU (Pittman, Charles U., Jr.)

Source: JOURNAL OF HAZARDOUS MATERIALS **Volume:** 142 **Issue:** 1-2 **Pages:** 1-53 **Published:** APR 2 2007

Times Cited: 188 **References:** 606 **Citation Map**

Abstract: Arsenic's history in science, medicine and technology has been overshadowed by its notoriety as a poison in homicides. Arsenic is viewed as being synonymous with toxicity. Dangerous arsenic concentrations in natural waters is now a worldwide problem and often referred to as a 20th-21st century calamity. High arsenic concentrations have been reported recently from the USA, China, Chile, Bangladesh, Taiwan, Mexico, Argentina, Poland, Canada, Hungary, Japan and India. Among 21 countries in different parts of the world affected by groundwater arsenic contamination, the largest population at risk is in Bangladesh followed by West Bengal in India. Existing overviews of arsenic removal include technologies that have traditionally been used (oxidation, precipitation/coagulation/membrane separation) with far less attention paid to adsorption. No previous review is available where readers can get an overview of the sorption capacities of both available and developed sorbents used for arsenic remediation together with the traditional remediation methods. We have incorporated most of the valuable available literature on arsenic rernediation by adsorption (similar to 600 references). Existing purification methods for drinking water; wastewater; industrial effluents, and technological solutions for arsenic have been listed. Arsenic sorption by commercially available carbons and other low-cost adsorbents are surveyed and critically reviewed and their sorption efficiencies are compared. Arsenic adsorption behavior in presence of other impurities has been discussed. Some commercially available adsorbents are also surveyed. An extensive table summarizes the sorption capacities of various adsorbents. Some low-cost adsorbents are superior including treated slags, carbons developed from agricultural waste (char carbons and coconut husk carbons), biosorbents (immobilized biomass, orange juice residue), goethite and some commercial adsorbents, which include resins, gels, silica, treated silica tested for arsenic removal come out to be superior. Immobilized biomass adsorbents offered outstanding performances. Desorption of arsenic followed by regeneration of sorbents has been discussed. Strong acids and bases seem to be the best desorbing agents to produce arsenic concentrates. Arsenic concentrate treatment and disposal obtained is briefly addressed. This issue is very important but much less discussed. (c) 2007 Elsevier B.V. All rights reserved.

Author Keywords: adsorption; arsenic; adsorbents; solid waste utilization; activated carbons; low-cost adsorbents; arsenic remediation; arsenic removal; arsenic adsorption

KeyWords Plus: ZERO-VALENT IRON; OXIDE-COATED SAND; MODIFIED CALCINED BAUXITE; NEUTRALIZED RED MUD; GRANULAR FERRIC HYDROXIDE; HYDROUS ZIRCONIUM-OXIDE; OF-USE TREATMENT; NANOCRYSTALLINE TITANIUM-DIOXIDE; ATOMIC-ABSORPTION SPECTROMETRY; IMPREGNATED ACTIVATED ALUMINA

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Hyperuricemia induces endothelial dysfunction

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Source: KIDNEY INTERNATIONAL **Volume:** 67 **Issue:** 5 **Pages:** 1739-1742 **Published:** MAY 2005

Times Cited: 164 **References:** 10 **Citation Map**

Abstract: Background. Hyperuricemia has been linked to cardiovascular and renal diseases, possibly through the generation of reactive oxygen species (ROS) and subsequent endothelial dysfunction. The enzymatic effect of xanthine oxidase is the production of ROS and uric acid. Studies have shown that inhibiting xanthine oxidase with allopurinol can reverse endothelial dysfunction. Furthermore, rat studies have shown that hyperuricemia-induced hypertension and vascular disease is at least partially reversed by the supplementation of the nitric oxide synthase (NOS) substrate, L-arginine. Therefore, we hypothesized that uric acid induces endothelial dysfunction by inhibiting nitric oxide production.

Methods. Hyperuricemia was induced in male Sprague-Dawley rats with an uricase inhibitor, oxonic acid, by gavage; control rats received vehicle. Allopurinol was placed in drinking water to block hyperuricemia. Rats were randomly divided into four groups: (1) control, (2) allopurinol only, (3) oxonic acid only, and (4) oxonic acid + allopurinol. Rats were sacrificed at 1 and 7 days, and their serum analyzed for serum uric acid and nitrites/nitrates concentrations. The effect of uric acid on nitric oxide production was also determined in bovine aortic endothelial cells.

Results. Oxonic acid induced mild hyperuricemia at both 1 and 7 days ($P < 0.05$). Allopurinol reversed the hyperuricemia at 7 days ($P <. 001$). Serum nitrites and nitrates (NOx) were reduced in hyperuricemic rats at both 1 and 7 days ($P <.001$). Allopurinol slightly reversed the decrease in NOx at 1 day and completely at 7 days ($P <.001$). There was a direct linear correlation between serum uric acid and NOx (R-2 = 0.56) and a trend toward higher systolic blood pressure in hyperuricemic rats (P = NS). Uric acid was also found to inhibit both basal and vascular endothelial growth factor (VEGF)-induced nitric oxide production in bovine aortic endothelial cells.

Conclusion. Hyperuricemic rats have a decrease in serum nitric oxide which is reversed by lowering uric acid levels. Soluble uric acid also impairs nitric oxide generation in cultured endothelial cells. Thus, hyperuricemia induces endothelial dysfunction; this may provide insight into a pathogenic mechanism by which uric acid may induce hypertension and vascular disease.

Document Type: Article

Language: English

Author Keywords: nitric oxide; uric acid; endothelial dysfunction

KeyWords Plus: CHRONIC HEART-FAILURE; URIC-ACID; NITRIC-OXIDE; ALLOPURINOL; HYPERTENSION; INHIBITION; DISEASE

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Cryptosporidium: a water-borne zoonotic parasite

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Source: VETERINARY PARASITOLOGY **Volume:** 126 **Issue:** 1-2 **Special Issue:** Sp. Iss. SI **Pages:** 37-56 **Published:** DEC 9 2004

Times Cited: 151 **References:** 94 **Citation Map**

Abstract: Of 155 species of mammals reported to be infected with Cryptosporidium parvum or C. parvum-like organisms most animals are found in the Orders Artiodactyla, Primates, and Rodentia. Because Cryptosporidium from most of these animals have been identified by oocyst morphology alone with little or no host specificity and/or molecular data to support identification it is not known how many of the reported isolates are actually C. parvum or other species. Cryptosporidiosis is a cause of morbidity and mortality in animals and humans, resulting primarily in diarrhea, and resulting in the most severe infections in immune-compromised individuals. Of 15 named species of Cryptosporidium infectious for nonhuman vertebrate hosts C. baileyi, C. canis, C. felis, C. hominis, C. meleagridis, C. muris, and C. parvum have been reported to also infect humans. Humans are the primary hosts for C. hominis, and except for C. parvum, which is widespread amongst nonhuman hosts and is the most frequently reported zoonotic species, the remaining species have been reported primarily in immunocompromised humans. The oocyst stage can remain infective under cool, moist conditions for many months, especially where water temperatures in rivers, lakes, and ponds remain low but above freezing. Surveys of surface water, groundwater, estuaries, and seawater have dispelled the assumption that Cryptosporidium oocysts are present infrequently and in geographically isolated locations. Numerous reports of outbreaks of cryptosporidiosis related to drinking water in North America, the UK, and Japan, where detection methods are in place, indicate that water is a major vehicle for transmission of cryptosporidiosis. (C) 2004 Elsevier B.V. All rights reserved.

Document Type: Review

Language: English

Author Keywords: cryptosporidiosis; taxonomy; epidemiology; zoonoses; water; marine

KeyWords Plus: N. SP APICOMPLEXA; PARVUM OOCYSTS; EXPERIMENTAL-INFECTION; CHESAPEAKE BAY; HUMAN FECES; LIFE-CYCLE; GIARDIA; IDENTIFICATION; GENOTYPE; SURVIVAL

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Science and technology for water purification in the coming decades

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Source: NATURE **Volume:** 452 **Issue:** 7185 **Pages:** 301-310 **Published:** MAR 20 2008

Times Cited: 150 **References:** 98 **Citation Map**

Abstract: One of the most pervasive problems afflicting people throughout the world is inadequate access to clean water and sanitation. Problems with water are expected to grow worse in the coming decades, with water scarcity occurring globally, even in regions currently considered water- rich. Addressing these problems calls out for a tremendous amount of research to be conducted to identify robust new methods of purifying water at lower cost and with less energy, while at the same time minimizing the use of chemicals and impact on the environment. Here we highlight some of the science and technology being developed to improve the disinfection and decontamination of water, as well as efforts to increase water supplies through the safe re- use of wastewater and efficient desalination of sea and brackish water.

Document Type: Review

Language: English

KeyWords Plus: OF-THE-ART; POLY(VINYLIDENE FLUORIDE) MEMBRANES; CARBON NANOTUBE MEMBRANES; GRANULAR ACTIVATED CARBON; ULTRAFILTRATION MEMBRANES; POLYMER MEMBRANES; DRINKING-WATER; NANOFILTRATION MEMBRANES; SURFACE SEGREGATION; WASTE-WATER

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Fate of endocrine-disruptor, pharmaceutical, and personal care product chemicals during simulated drinking water treatment processes

Author(s): Westerhoff P, Yoon Y, Snyder S, Wert E

Source: ENVIRONMENTAL SCIENCE & TECHNOLOGY **Volume:** 39 **Issue:** 17 **Pages:** 6649-6663 **Published:** SEP 1 2005

Times Cited: 148 **References:** 73 **Citation Map**

Document Type: Article

Language: English

KeyWords Plus: POWDERED ACTIVATED CARBON; NATURAL ORGANIC-MATTER; ADVANCED OXIDATION; HYDROXYL RADICALS; TREATMENT PLANTS; WASTE-WATER; BISPHENOL-A; 17-ALPHA-ETHYNYL ESTRADIOL; AQUEOUS CHLORINATION; ESTROGENIC ACTIVITY

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Oxidation of pharmaceuticals during ozonation of municipal wastewater effluents: A pilot study

Author(s): Huber MM, Gobel A, Joss A, Hermann N, Loffler D, Mcardell CS, Ried A, Siegrist H, Ternes TA, von Gunten U

Source: ENVIRONMENTAL SCIENCE & TECHNOLOGY **Volume:** 39 **Issue:** 11 **Pages:** 4290-4299 **Published:** JUN 1 2005

Times Cited: 147 **References:** 39 **Citation Map**

Abstract: To reduce the release of pharmaceuticals and endocrine disruptors into the aquatic environment or to remove them from wastewater intended for direct or indirect reuse, the application of advanced wastewater treatment may be required. In the present study, municipal wastewater effluents were treated with ozone (O-3) in a pilot-scale plant consisting of two bubble columns. The investigated effluents, which varied in suspended solids concentrations, comprised an effluent of conventional activated sludge treatment (CAS), the same effluent dosed with 15 mg of TSS L-1 of activated sludge (CAS + SS), and the effluent of a membrane bioreactor pilot plant (MBR). Selected classes of pharmaceuticals were spiked in the wastewater at realistic levels ranging from 0.5 to 5 mu g L-1. Samples taken at the inlet and the outlet of the pilot plant were analyzed with liquid chromatography (LC)-electrospray tandem mass spectrometry (MS). Macrolide and sulfonamide antibiotics, estrogens, and the acidic pharmaceuticals diclofenac, naproxen, and indomethacin were oxidized by more than 90-99% for O-3 doses >= 2 mg L-1 in all effluents. X-ray contrast media and a few acidic pharmaceuticals were only partly oxidized, but no significant differences were observed among the three effluents. These results show that many pharmaceuticals present in wastewater can be efficiently oxidized with O-3 and that suspended solids have only a minor influence on the oxidation efficiency of nonsorbing micropollutants.

Document Type: Article

Language: English

KeyWords Plus: TANDEM MASS-SPECTROMETRY; SEWAGE-TREATMENT PLANTS; MUSK FRAGRANCES; DRINKING-WATER; OZONE; REMOVAL; 17-ALPHA-ETHINYLESTRADIOL; ENVIRONMENT; DICLOFENAC; PARAMETERS

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Liquid chromatography-tandem mass spectrometry for the analysis of pharmaceutical residues in environmental samples: a review

Author(s): Petrovic M, Hernando MD, Diaz-Cruz MS, Barcelo D

Source: JOURNAL OF CHROMATOGRAPHY A **Volume:** 1067 **Issue:** 1-2 **Pages:** 1-14 **Published:** MAR 4 2005

Times Cited: 145 **References:** 51 **Citation Map**

Abstract: Pharmaceutical residues are environmental contaminants of recent concern and the requirements for analytical methods are mainly dictated by low concentrations found in aqueous and solid environmental samples. In the current article, a review of the liquid chromatography-tandem mass spectrometry (LC-MS/MS) based methods published so far for the determination of pharmaceuticals in the environment is presented. Pharmaceuticals included in this review are antibiotics, non-steroidal anti-inflammatory drugs, beta-blockers, lipid regulating agents and psychiatric drugs. Advanced aspects of current LC-MS/MS methodology, including sample preparation and matrix effects, are discussed. (c) 2004 Elsevier B.V. All rights reserved.

Document Type: Review

Language: English

Author Keywords: liquid chromatography-tandem mass spectrometry; non-steroidal anti-inflammatory drugs; beta-blockers; antibiotica; lipid regulating agents

KeyWords Plus: SOLID-PHASE EXTRACTION; SEWAGE-TREATMENT PLANTS; FLUOROQUINOLONE ANTIBACTERIAL AGENTS; NONSTEROIDAL ANTIINFLAMMATORY DRUGS; PERSONAL CARE PRODUCTS; TIME-OF-FLIGHT; WASTE-WATER; AQUATIC ENVIRONMENT; TRIPLE-QUADRUPOLE; DRINKING-WATER

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Cyanobacterial toxins: risk management for health protection

Author(s): Codd GA, Morrison LF, Metcalf JS

Source: TOXICOLOGY AND APPLIED PHARMACOLOGY **Volume:** 203 **Issue:** 3 **Pages:** 264-272 **Published:** MAR 15 2005

Times Cited: 145 **References:** 56 **Citation Map**

Abstract: This paper reviews the occurrence and properties of cyanobacterial toxins, with reference to the recognition and management of the human health risks which they may present. Mass populations of toxin-producing cyanobacteria in natural and controlled waterbodies include blooms and scums of planktonic species, and mats and biofilms of benthic species. Toxic cyanobacterial populations have been reported in freshwaters in over 45 countries, and in numerous brackish, coastal, and marine environments. The principal toxigenic genera are listed. Known sources of the families of cyanobacterial toxins (hepato-, neuro-, and cytotoxins, irritants, and gastrointestinal toxins) are briefly discussed. Key procedures in the risk management of cyanobacterial toxins and cells are reviewed, including derivations (where sufficient data are available) of tolerable daily intakes (TDIs) and guideline values (GVs) with reference to the toxins in drinking water, and guideline levels for toxigenic cyanobacteria in bathing waters. Uncertainties and some gaps in knowledge are also discussed, including the importance of exposure media (animal and plant foods), in addition to potable and recreational waters. Finally, we present an outline of steps to develop and implement risk management strategies for cyanobacterial cells and toxins in waterbodies, with recent applications and the integration of Hazard Assessment Critical Control Point (HACCP) principles. (c) 2004 Elsevier Inc. All rights reserved.

Document Type: Article

Language: English

Author Keywords: cyanobacteria; algae; microcystin; anatoxin; cylindrospermopsin

KeyWords Plus: MICROCYSTIS-AERUGINOSA; DRINKING-WATER; TOXICITY; EXPOSURE; CYLINDROSPERMOPSIN; IDENTIFICATION; ROUTES; LEVEL; ALGAE; BLOOM

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Variation in arsenic speciation and concentration in paddy rice related to dietary exposure

Author(s): Williams PN, Price AH, Raab A, Hossain SA, Feldmann J, Meharg AA

Source: ENVIRONMENTAL SCIENCE & TECHNOLOGY **Volume:** 39 **Issue:** 15 **Pages:** 5531-5540 **Published:** AUG 1 2005

Times Cited: 139 **References:** 42 **Citation Map**

Abstract: Ingestion of drinking water is not the only elevated source of arsenic to the diet in the Bengal Delta. Even at background levels, the arsenic in rice contributes considerably to arsenic ingestion in subsistence rice diets. We set out to survey As speciation in different rice varieties from different parts of the globe to understand the contribution of rice to arsenic exposure. Pot experiments were utilized to ascertain whether growing rice on As contaminated soil affected speciation and whether genetic variation accounted for uptake and speciation. USA long grain rice had the highest mean arsenic level in the grain at 0.26 mu g As g(-1) (n = 7), and the highest grain arsenic value of the survey at 0.40,mu g As g-1. The mean arsenic level of Bangladeshi rice was 0.13 mu g As g(-1) (n = 15). The main As species detected in the rice extract were Aslll, DMA(v), and As-v. In European, Bangladeshi, and Indian rice 64 +/- 1 % (n = 7), 80 +/- 3 % (n = 11), and 81 +/- 4% (n = 15), respectively, of the recovered arsenic was found to be inorganic. In contrast, DMAv was the predominant species in rice from the USA, with only 42 +/- 5% (n = 12) of the arsenic being inorganic. Pot experiments show that the proportions of DMAv in the grain are significantly dependent on rice cultivar (p = 0.026) and that plant nutrient status is effected by arsenic exposure.

Document Type: Article

Language: English

KeyWords Plus: ELEMENTAL CONTENT; DRINKING-WATER; UNITED-STATES; ORYZA-SATIVA; WEST-BENGAL; BANGLADESH; FOOD; CONTAMINATION; TOXICITY; SOILS

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Electrohydraulic discharge and nonthermal plasma for water treatment

Author(s): Locke BR, Sato M, Sunka P, Hoffmann MR, Chang JS

Source: INDUSTRIAL & ENGINEERING CHEMISTRY RESEARCH **Volume:** 45 **Issue:** 3 **Pages:** 882-905 **Published:** FEB 1 2006

Times Cited: 134 **References:** 408 **Citation Map**

Abstract: The application of strong electric fields in water and organic liquids has been studied for several years, because of its importance in electrical transmission processes and its practical applications in biology, chemistry, and electrochemistry. More recently, liquid-phase electrical discharge reactors have been investigated, and are being developed, for many environmental applications, including drinking water and wastewater treatment, as well as, potentially, for environmentally benign chemical processes. This paper reviews the current status of research on the application of high-voltage electrical discharges for promoting chemical reactions in the aqueous phase, with particular emphasis on applications to water cleaning.

Document Type: Review

Language: English

KeyWords Plus: PULSED ELECTRIC-FIELDS; ADVANCED OXIDATION PROCESSES; PHOTO-FENTON REACTION; VOLATILE ORGANIC-COMPOUNDS; STREAMER CORONA DISCHARGE; HIGH-VOLTAGE DISCHARGE; ACTIVATED CARBON PARTICLES; CATALYTIC WET OXIDATION; GLIDING ARC DISCHARGES; SHOCK-WAVE LITHOTRIPSY

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APPENDIX 11. MOST HIGHLY CITED WASTE WATER PAPERS–CINCINNATI

The urban stream syndrome: current knowledge and the search for a cure

Author(s): Walsh CJ, Roy AH, Feminella JW, Cottingham PD, Groffman PM, Morgan RP

Source: JOURNAL OF THE NORTH AMERICAN BENTHOLOGICAL SOCIETY **Volume:** 24 **Issue:** 3 **Pages:** 706-723 **Published:** SEP 2005

Times Cited: 163 **References:** 76 **Citation Map**

Abstract: The term "urban stream syndrome" describes the consistently observed ecological degradation of streams draining urban land. This paper reviews recent literature to describe symptoms of the syndrome, explores mechanisms driving the syndrome, and identifies appropriate goals and methods for ecological restoration of urban streams. Symptoms of the urban stream syndrome include a flashier hydrograph, elevated concentrations of nutrients and contaminants, altered channel morphology, and reduced biotic richness, with increased dominance of tolerant species. More research is needed before generalizations can be made about urban effects on stream ecosystem processes, but reduced nutrient uptake has been consistently reported. The mechanisms driving the syndrome are complex and interactive, but most impacts can be ascribed to a few major large-scale sources, primarily urban stormwater runoff delivered to streams by hydraulically efficient drainage systems. Other stressors, such as combined or sanitary sewer overflows, wastewater treatment plant effluents, and legacy pollutants (long-lived pollutants from earlier land uses) can obscure the effects of stormwater runoff. Most research on urban impacts to streams has concentrated on correlations between instream ecological metrics and total catchment imperviousness. Recent research shows that some of the variance in such relationships can be explained by the distance between the stream reach and urban land, or by the hydraulic efficiency of stormwater drainage The mechanisms behind such patterns require experimentation at the catchment scale to identify the best management approaches to conservation and restoration of streams in urban catchments. Remediation of stormwater impacts is most likely to be achieved through widespread application of innovative approaches to drainage design. Because humans dominate urban ecosystems, research on urban stream ecology will require a broadening of stream ecological research to integrate with social, behavioral, and economic research.

Document Type: Proceedings Paper

Language: English

Author Keywords: urbanization; streams; stormwater management; water quality; hydrology; ecosystem processes; imperviousness; restoration; urban ecology

KeyWords Plus: LAND-USE; MACROINVERTEBRATE COMMUNITIES; CATCHMENT URBANIZATION; DIATOM COMMUNITIES; MELBOURNE REGION; BIOTIC INTEGRITY; RIPARIAN ZONES; NITROGEN-CYCLE; MANAGEMENT; IMPACTS

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Collapse of a fish population after exposure to a synthetic estrogen

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Source: PROCEEDINGS OF THE NATIONAL ACADEMY OF SCIENCES OF THE UNITED STATES OF AMERICA **Volume:** 104 **Issue:** 21 **Pages:** 8897-8901 **Published:** MAY 22 2007

Times Cited: 141 **References:** 30 **Citation Map**

Abstract: Municipal wastewaters are a complex mixture containing estrogens and estrogen mimics that are known to affect the reproductive health of wild fishes. Male fishes downstream of some wastewater out falls produce vitellogenin (VTG) (a protein normally synthesized by females during oocyte maturation) and early-stage eggs in their testes, and this feminization has been attributed to the presence of estrogenic substances such as natural estrogens [estrone or 17 beta-estradiol (E2)], the synthetic estrogen used in birth-control pills [17 alpha-ethynylestradiol (EE2)], or weaker estrogen mimics such as nonylphenol in the water. Despite widespread evidence that male fishes are being feminized, it is not known whether these low-level, chronic exposures adversely impact the sustainability of wild populations. We conducted a 7-year, wholelake experiment at the Experimental Lakes Area (ELA) in northwestern Ontario, Canada, and showed that chronic exposure of fathead minnow (Pimephalespromelas) to low concentrations (5-6 ng-L-1) of the potent 17 alpha-ethynylestradiol led to feminization of males through the production of vitellogenin mRNA and protein, impacts on gonadal development as evidenced by intersex in males and altered oogenesis in females, and, ultimately, a near extinction of this species from the lake. Our observations demonstrate that the concentrations of estrogens and their mimics observed in freshwaters can impact the sustainability of wild fish populations.

Document Type: Article

Language: English

Author Keywords: endocrine disrupters; fathead minnow; municipal wastewaters; population-level effects; whole-lake experiment

KeyWords Plus: MINNOW PIMEPHALES-PROMELAS; EXPERIMENTAL ACIDIFICATION; WASTE-WATER; FATHEAD MINNOWS; LIFE-CYCLE; WILD; LAKE; ETHINYLESTRADIOL; ETHYNYLESTRADIOL; IDENTIFICATION

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Transport of chemical and microbial compounds from known wastewater discharges: Potential for use as indicators of human fecal contamination

Author(s): Glassmeyer ST, Furlong ET, Kolpin DW, Cahill JD, Zaugg SD, Werner SL, Meyer MT, Kryak DD

Source: ENVIRONMENTAL SCIENCE & TECHNOLOGY **Volume:** 39 **Issue:** 14 **Pages:** 5157-5169 **Published:** JUL 15 2005

Times Cited: 118 **References:** 75 **Citation Map**

Abstract: The quality of drinking and recreational water is currently (2005) determined using indicator bacteria. However, the culture tests used to analyze for these bacteria require a long time to complete and do not discriminate between human and animal fecal material sources. One complementary approach is to use chemicals found in human wastewater, which would have the advantages of (1) potentially shorter analysis times than the bacterial culture tests and (2) being selected for human-source specificity. At 10 locations, water samples were collected upstream and at two successive points downstream from a wastewaster treatment plant (WWTP); a treated effluent sample was also collected at each WWTP. This sampling plan was used to determine the persistence of a chemically diverse suite of emerging contaminants in streams. Samples were also collected at two reference locations assumed to have minimal human impacts. Of the 110 chemical analytes investigated in this project, 78 were detected at least once. The number of compounds in a given sample ranged from 3 at a reference location to 50 in a WWTP effluent sample. The total analyte load at each location varied from 0.018 mu g/L at the reference location to 97.7 mu g/L in a separate WWTP effluent sample. Although most of the compound concentrations were in the range of 0.01-1.0 mu g/L, in some samples, individual concentrations were in the range of 5-38 mu g/L. The concentrations of the majority of the chemicals present in the samples generally followed the expected trend: they were either nonexistent or at trace levels in the upstream samples, had their maximum concentrations in the WWTP effluent samples, and then declined in the two downstream samples. This research suggests that selected chemicals are useful as tracers of human wastewater discharge.

Document Type: Article

Language: English

KeyWords Plus: SOLID-PHASE EXTRACTION; PERFORMANCE LIQUID-CHROMATOGRAPHY; FLUORESCENT WHITENING AGENTS; PERSONAL CARE PRODUCTS; SEWAGE-TREATMENT PLANTS; SURFACE WATERS; AQUATIC ENVIRONMENT; PHARMACEUTICAL COMPOUNDS; ENDOCRINE DISRUPTORS; ANTHROPOGENIC MARKER

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Sources of pathogenic microorganisms and their fate during land application of wastes

Author(s): Gerba CP, Smith JE

Source: JOURNAL OF ENVIRONMENTAL QUALITY **Volume:** 34 **Issue:** 1 **Pages:** 42-48 **Published:** JAN-FEB 2005

Times Cited: 62 **References:** 49 **Citation Map**

Abstract: The hazards associated with pathogens in land-applied animal and human wastes have long been recognized. Management of these risks requires an understanding of sources, concentrations, and removal by processes that may be used to treat the wastes; survival in the environment; and exposure to sensitive populations. The major sources are animal feeding operations, municipal wastewater treatment plant effluents, biosolids, and on-site treatment systems. More than 150 known enteric pathogens may be present in the untreated wastes, and one new enteric pathogen has been discovered every year over the past decade. There has been increasing demand that risks associated with the land treatment and application be better defined. For risks to be quantified, more data are needed on the concentrations of pathogens in wastes, the effectiveness of treatment processes, standardization of detection methodology, and better quantification of exposure.

Document Type: Proceedings Paper

Language: English

KeyWords Plus: RISK-ASSESSMENT; DRINKING-WATER; SEWAGE-SLUDGE; HEPATITIS-E; INACTIVATION; GUIDELINES; TRANSPORT; BIOSOLIDS; VIRUSES; HEALTH

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Nanocrystalline TiO2 photocatalytic membranes with a hierarchical mesoporous multilayer structure: Synthesis, characterization, and multifunction

Author(s): Choi H, Sofranko AC, Dionysiou DD

Source: ADVANCED FUNCTIONAL MATERIALS **Volume:** 16 **Issue:** 8 **Pages:** 1067-1074 **Published:** MAY 19 2006

Times Cited: 53 **References:** 40 **Citation Map**

Abstract: A novel sol-gel dip-coating process to fabricate nanocrystalline TiO2 photocatalytic membranes with a robust hierarchical mesoporous multilayer and improved performance has been studied. Various titania sols containing poly(oxyethylenesorbitan monooleate) (Tween 80) surfactant as a pore-directing agent to tailor-design the porous structure of TiO2 materials at different molar ratios of' Tween 80/isopropyl alcohol/acetic acid/titanium tetraisopropoxide = R:45:6:1 have been synthesized. The sols are dip-coated on top of a homemade porous alumina substrate to fabricate TiO2/Al2O3 composite membranes, dried, and calcined, and this procedure is repeated with varying sols in succession. The resulting asymmetric mesoporous TiO2 membrane with a thickness of .0.9 mu m exhibits a hierarchical change in pore diameter from 2-6, through 3-8, to 5-11 nm from the top to the bottom layer. Moreover, the corresponding porosity is incremented from 46.2, through 56.7, to 69.3 %. Compared to a repeated-coating process using a single sol, the hierarchical multilayer process improves water permeability significantly without sacrificing the organic retention and photocatalytic activity of the TiO2 membranes. The prepared TiO2 photocatalytic membrane has great potential in developing highly efficient water treatment and reuse systems, for example, decomposition of organic pollutants, inactivation of pathogenic microorganisms, physical separation of contaminants, and self-antifouling action because of its multifunctional capability.

Document Type: Article

Language: English

KeyWords Plus: WASTE-WATER TREATMENT; ANATASE THIN-FILMS; SILICA MEMBRANES; NANOPOROUS SILICAS; TITANIUM-DIOXIDE; GAS SEPARATION; IONIC LIQUID; TEMPERATURE; PERFORMANCE; SUSPENSION

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Excretion and ecotoxicity of pharmaceutical and personal care products in the environment

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Source: ECOTOXICOLOGY AND ENVIRONMENTAL SAFETY **Volume:** 63 **Issue:** 1 **Pages:** 113-130 **Published:** JAN 2006

Times Cited: 50 **References:** 128 **Citation Map**

Abstract: The presence and fate of pharmaceutical and personal care products (PPCPs) in the environment is undergoing increasing Scrutiny. The existing clinical pharmacokinetics and pharmacodynamics data for 81 common compounds were examined for cues of ecotoxicity. Of these the proportions excreted were available for 60 compounds (i.e., 74%). The compounds had a low (<= 0.5%,), a moderately low (6-39%), a relatively high (40-69%), or a high (>= 70%) proportion of the parent compound excreted. More than half of the compounds evaluated have low or moderately low proportions of the parent compound excreted. However, the proportions excreted were negatively but moderately correlated (r = -0.50; n = 13; P = 0.08) with the concentrations of the compounds in the aquatic environment, suggesting that the compounds that have low proportions excreted may also have inherently low degradability in the environment. Solubility, log K-ow, and pK(a), work well in predicting the behavior of PPCPs under clinical conditions and have been used in the environmental assessment of PPCPs prior to approval. However, these parameters did not correlate with the proportion of PPCPs excreted in the environment or their concentration ill the environment, underscoring the need for research into the behavior of PPCPs in the environment. PPCPs occur in low concentrations in the environment and are unlikely to elicit acute toxicity. An ecotoxicity potential that is based oil chronic toxicity, bioavailability, and duration of exposure to nontarget organisms is described Lis a guide in assessing the potency of these compounds in the environment. (c) 2005 Elsevier Inc. All rights reserved.

Document Type: Review

Language: English

Author Keywords: bioavailability; drug excretion; ecotoxicity; environmental assessment; pharmaceuticals; pharmacodynamics; risk assessment; sorption

KeyWords Plus: SEWAGE-TREATMENT PLANTS; CENTRAL-NERVOUS-SYSTEM; THERAPEUTIC-USE; CLINICAL PHARMACOKINETICS; ACTIVATED-SLUDGE; MUNICIPAL SEWAGE; WASTE-WATER; ABSOLUTE BIOAVAILABILITY; AQUATIC ENVIRONMENT; HEALTHY-VOLUNTEERS

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Equilibrium and kinetic adsorption study of a cationic dye by a natural adsorbent - Silkworm pupa

Author(s): Noroozi B (Noroozi, B.), Sorial GA (Sorial, G. A.), Bahrami H (Bahrami, H.), Arami M (Arami, M.)

Source: JOURNAL OF HAZARDOUS MATERIALS **Volume:** 139 **Issue:** 1 **Pages:** 167-174 **Published:** JAN 2 2007

Times Cited: 37 **References:** 45 **Citation Map**

Abstract: In this work the use of silkworm pupa, which is the waste of silk spinning industries has been investigated as an adsorbent for the removal of C.I. Basic Blue 41. The amino acid nature of the pupa provided a reasonable capability for dye removal. Equilibrium adsorption isotherms and kinetics were investigated. The adsorption equilibrium data were analyzed by using various adsorption isotherm models and the results have shown that adsorption behavior of the dye could be described reasonably well by either Langmuir or Freundlich models. The characteristic parameters for each isotherm have been determined. The monolayer adsorption capacity was determined to be 555 mg/g. Kinetic studies indicated that the adsorption follows pseudo-second-order kinetics with a rate constant of 0.0434 and 0.0572 g/min mg for initial dye concentration of 200 mg/l at 20 and 40 degrees C, respectively. Kinetic studies showed that film diffusion and intra-particle diffusion were simultaneously operating during the adsorption process. The rate constant for intra-particle diffusion was estimated to be 1.985 mg/g min(0.5).
(c) 2006 Elsevier B.V. All rights reserved.

Document Type: Article

Language: English

Author Keywords: adsorption isotherm; adsorption kinetics; basic blue 41; silkworm pupa

KeyWords Plus: AQUEOUS-SOLUTION; ACTIVATED CARBON; WASTE-WATER; TEXTILE DYES; ACID VIOLET; REMOVAL; SORPTION; PEAT; RED; BIOSORPTION

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Urban contributions of glyphosate and its degradate AMPA to streams in the United States

Author(s): Kolpin DW, Thurman EM, Lee EA, Meyer MT, Furlong ET, Glassmeyer ST

Source: SCIENCE OF THE TOTAL ENVIRONMENT **Volume:** 354 **Issue:** 2-3 **Pages:** 191-197 **Published:** FEB 1 2006

Times Cited: 34 **References:** 37 **Citation Map**

Abstract: Glyphosate is the most widely used herbicide in the world, being routinely applied to control weeds in both agricultural and urban settings. Microbial degradation of glyphosate produces aminomethyl phosphonic acid (AMPA). The high polarity and water-solubility of glyphosate and AMPA has, until recently, made their analysis in water samples problematic. Thus, compared to other herbicides (e.g. atrazine) there are relatively few studies on the environmental occurrence of glyphosate and AMPA. In 2002, treated effluent samples were collected from 10 wastewater treatment plants (WWTPs) to study the occurrence of glyphosate and AMPA. Stream samples were collected upstream and downstream of the 10 WWTPs. Two reference streams were also sampled. The results document the apparent contribution of WWTP effluent to stream concentrations of glyphosate and AMPA, with roughly a two-fold increase in their frequencies of detection between stream samples collected upstream and those collected downstream of the WWTPs. Thus, urban use of glyphosate contributes to glyphosate and AMPA concentrations in streams in the United States. Overall, AMPA was detected much more frequently (67.5%) compared to glyphosate (17.5%). (c) 2005 Elsevier B.V. All rights reserved.

Document Type: Article

Language: English

Author Keywords: glyphosate; streams; United States

KeyWords Plus: WASTE-WATER CONTAMINANTS; TOXICITY; HERBICIDES; FORMULATIONS; SOIL; PHARMACEUTICALS; PESTICIDES; SEDIMENT; FISH

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Use of 16S rRNA gene terminal restriction fragment analysis to assess the impact of solids retention time on the bacterial diversity of activated sludge

Author(s): Saikaly PE, Stroot PG, Oerther DB

Source: APPLIED AND ENVIRONMENTAL MICROBIOLOGY **Volume:** 71 **Issue:** 10 **Pages:** 5814-5822 **Published:** OCT 2005

Times Cited: 33 **References:** 43 **Citation Map**

Abstract: Terminal restriction fragment length polymorphism (T-RFLP) analysis of 16S rRNA genes was used to investigate the reproducibility and stability in the bacteria] community structure of laboratory- scale sequencing batch bioreactors (SBR) and to assess the impact of solids retention time (SRT) on bacterial diversity. Two experiments were performed. In each experiment two sets of replicate SBRs were operated for a periods of three times the SRT. One set was operated at an SRT of 2 days and another set was operated at an SRT of 8 days. Samples for T-RFLP analysis were collected from the two sets of replicate reactors. HhaI, MspI, and RsaI T-RFLP profiles were analyzed using cluster analysis and diversity statistics. Cluster analysis with Ward's method using Jaccard distance and Hellinger distance showed that the bacterial community structure in both sets of reactors from both experimental runs was dynamic and that replicate reactors were clustered together and evolved similarly from startup. Richness (S), evenness (E), the Shannon-Weaver index (H), and the reciprocal of Simpson's index (1/D) were calculated, and the values were compared between the two sets of reactors. Evenness values were higher for reactors operated at an SRT of 2 days. Statistically significant differences in diversity (H and D) between the two sets of reactors were tested using a randomization procedure, and the results showed that reactors from both experimental runs that were operated at an SRT of 2 days had higher diversity (H and D) at the 5% level. T-RFLP analysis with diversity indices proved to be a powerful tool to analyze changes in the bacterial community diversity in response to changes in the operational parameters of activated- sludge systems.

Document Type: Article

Language: English

KeyWords Plus: GRADIENT GEL-ELECTROPHORESIS; MICROBIAL COMMUNITY STRUCTURE; POLYMORPHISM T-RFLP; PROKARYOTIC DIVERSITY; WASTE-WATER; PCR-DGGE; BIODIVERSITY; ECOLOGY; OSCILLATIONS; DYNAMICS

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Effect of permeate flux and tangential flow on membrane fouling for wastewater treatment

Author(s): Choi H, Zhang K, Dionysiou DD, Oerther DB, Sorial GA

Source: SEPARATION AND PURIFICATION TECHNOLOGY **Volume:** 45 **Issue:** 1 **Pages:** 68-78 **Published:** SEP 2005

Times Cited: 33 **References:** 33 **Citation Map**

Abstract: Well-controlled membrane filtration experiments were performed to systematically investigate the effect of permeate flux and tangential flow (crossflow) on membrane fouling. Results were analyzed by the resistance-in-series model where the reason for flux decline was subdivided into adsorption, concentration polarization, and reversible and irreversible fouling. A synthesized paper mill wastewater with mainly lignin and 2-chlorophenol, biological suspension (activated sludge), and their mixture were used as feed solutions for ultrafiltration (30 000 Da) and microfiltration (0.3 mu m) at different concentrations. The filtration experiments demonstrated that permeate flux declined faster with increasing feed concentration and membrane pore size and with decreasing tangential flow. The biological suspension rather than wastewater quality was a major cause for permeate flux decline in membrane bioreactors. In the absence of permeate flux, filtration resistance by foulants adsorption was negligible, as compared to total filtration resistance in the presence of permeate flux. It was also shown that tangential flow had almost no effect on the decline rate of permeate flux at pseudo steady state. Membrane cleaning results revealed that, in the absence of tangential flow, permeate flux decline was dominantly caused by reversible fouling. On the other hand, tangential flow caused slightly higher irreversible fouling due to higher permeation drag, as compared to the case of absence of tangential flow. Autopsy of fouled membranes suggested that the irreversible fouling layer was initially formed by pore blocking of small particles followed by strong interaction of fouling layer with mainly dissolved materials and by fouling layer compaction due to permeation drag. (C) 2005 Elsevier B.V. All rights reserved.

Document Type: Article

Language: English

Author Keywords: fouling; permeate flux; tangential flow; filtration resistance; resistance-in-series model; membrane bioreactor; autopsy

KeyWords Plus: CONCENTRATION POLARIZATION; ULTRAFILTRATION MEMBRANES; ANAEROBIC BIOREACTOR; PARTICLE DEPOSITION; SURFACE PROPERTIES; ACTIVATED-SLUDGE; REVERSE-OSMOSIS; MICROFILTRATION; FILTRATION; PERFORMANCE

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APPENDIX 12. MOST HIGHLY CITED WASTE WATER PAPERS–INDIANAPOLIS

Waste-Indicator and Pharmaceutical Compounds in Landfill-Leachate-Affected Ground Water near Elkhart, Indiana, 2000-2002

Author(s): Buszka PM (Buszka, P. M.)[1], Yeskis DJ (Yeskis, D. J.)[2], Kolpin DW (Kolpin, D. W.)[3], Furlong ET (Furlong, E. T.)[4], Zaugg SD (Zaugg, S. D.)[4], Meyer MT (Meyer, M. T.)[5]

Source: BULLETIN OF ENVIRONMENTAL CONTAMINATION AND TOXICOLOGY **Volume:** 82 **Issue:** 6 **Pages:** 653-659 **Published:** JUN 2009

Times Cited: 0 **References:** 15 **Citation Map**

Abstract: Four wells downgradient from a landfill near Elkhart, Indiana were sampled during 2000-2002 to evaluate the presence of waste-indicator and pharmaceutical compounds in landfill-leachate-affected ground water. Compounds detected in leachate-affected ground water included detergent metabolites (p-nonylphenol, nonylphenol monoethoxylate, nonylphenol diethoxylate, and octylphenol monoethoxylate), plasticizers (ethanol-2-butoxy-phosphate and diethylphthalate), a plastic monomer (bisphenol A), disinfectants (1,4-dichlorobenzene and triclosan), an antioxidant (5-methyl-1H-benzotriazole), three fire-retardant compounds (tributylphosphate and tri(2-chloroethyl)phosphate, and tri(dichlorisopropyl)phosphate), and several pharmaceuticals and metabolites (acetaminophen, caffeine, cotinine, 1,7-dimethylxanthine, fluoxetine, and ibuprofen). Acetaminophen, caffeine, and cotinine detections confirm prior indications of pharmaceutical and nicotinate disposal in the landfill.

Document Type: Article

Language: English

Author Keywords: Landfill leachate; Ground water; Wastewater; Pharmaceuticals; Indiana

KeyWords Plus: MUNICIPAL LANDFILL; ORGANIC-COMPOUNDS; NATIONAL RECONNAISSANCE; CONTAMINANTS; DOWNGRADIENT; PLUME

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Effects of human pharmaceuticals on aquatic life: Next steps

Author(s): Cunningham VL, Buzby M, Hutchinson T, Mastrocco F, Parke N, Roden N

Source: ENVIRONMENTAL SCIENCE & TECHNOLOGY **Volume:** 40 **Issue:** 11 **Pages:** 3456-3462 **Published:** JUN 1 2006

Times Cited: 26 **References:** 25 **Citation Map**

Document Type: Editorial Material

Language: English

KeyWords Plus: WASTE-WATER CONTAMINANTS; US SURFACE WATERS; TREATMENT PLANTS; GREATER; MODEL; FATE; ENVIRONMENT; CHEMICALS; RIVERS; FISH

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Human pharmaceuticals in US surface waters: A human health risk assessment

Author(s): Schwab BW, Hayes EP, Fiori JM, Mastrocco FJ, Roden NM, Cragin D, Meyerhoff RD, D'Aco VJ, Anderson PD

Source: REGULATORY TOXICOLOGY AND PHARMACOLOGY **Volume:** 42 **Issue:** 3 **Pages:** 296-312 **Published:** AUG 2005

Times Cited: 59 **References:** 104 **Citation Map**

Abstract: The detection of low levels of pharmaceuticals in rivers and streams, drinking water, and groundwater has raised questions as to whether these levels may affect human health. This report presents human health risk assessments for 26 active pharmaceutical ingredients (APIs) and/or their metabolites, representing 14 different drug classes, for which environmental monitoring data are available for the United States. Acceptable daily intakes (ADIs) are derived using the considerable data that are available for APIs. The resulting ADIs are designed to protect potentially exposed populations, including sensitive sub-populations. The ADIs are then used to estimate predicted no effect concentrations (PNECs) for two sources of potential human exposure: drinking water and fish ingestion. The PNECs are compared to measured environmental concentrations (MECs) from the published literature and to maximum predicted environmental concentrations (PECs) generated using the PhATE model. The PhATE model predictions are made under conservative assumptions of low river flow and no depletion (i.e., no metabolism, no removal during wastewater or drinking water treatment, and no instream depletion). Ratios of MECs to PNECs are typically very low and consistent with PEC to PNEC ratios. For all 26 compounds, these low ratios indicate that no appreciable human health risk exists from the presence of trace concentrations of these APIs in surface water and drinking water. (C) 2005 Elsevier Inc. All rights reserved.

Document Type: Review

Language: English

Author Keywords: risk assessment; PhATE; pharmaceutical; medicine; human health; environment; drinking water; fish consumption

KeyWords Plus: SOLID-PHASE EXTRACTION; TANDEM MASS-SPECTROMETRY; PERSONAL CARE PRODUCTS; SEWAGE-TREATMENT PLANTS; WASTE-WATER; AQUATIC ENVIRONMENT; DRINKING-WATER; NATIONAL RECONNAISSANCE; THERAPEUTIC DRUGS; CLOFIBRIC ACID

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APPENDIX 13. MOST HIGHLY CITED WASTE WATER PAPERS–COLUMBUS

Cathodic limitations in microbial fuel cells: An overview

Author(s): Rismani-Yazdi H (Rismani-Yazdi, Hamid)[1], Carver SM (Carver, Sarah M.)[2], Christy AD (Christy, Ann D.)[1], Tuovinen IH (Tuovinen, I. H.)[2,3]

Source: JOURNAL OF POWER SOURCES **Volume:** 180 **Issue:** 2 **Pages:** 683-694 **Published:** JUN 1 2008

Times Cited: 41 **References:** 72 **Citation Map**

Abstract: Microbial fuel cells (MFCs) are a promising technology for sustainable production of alternative energy and waste treatment. The performance of microbial fuel cells is severely affected by limitations on irreversible reactions and processes in the anode and the cathode compartments. The purpose of this paper is to review the cathodic limitations MFCs and provide an overview on cathodic activation, ohmic and mass transport losses and substrate crossover. Recent studies that have addressed these limitations and explored approaches for improvement are also discussed. MFCs still face many challenges but with consistent advances, especially with respect to the cathode, performance can continue to improve. (C) 2008 Elsevier B.V. All rights reserved.

Document Type: Review

Language: English

Author Keywords: microbial fuel cell; cathodic limitation; activation losses; ohmic losses; mass transport losses; substrate crossover

KeyWords Plus: PROTON-EXCHANGE MEMBRANE; WASTE-WATER TREATMENT; SHEWANELLA-ONEIDENSIS DSP10; ELECTRICITY-GENERATION; OXYGEN REDUCTION; POWER-GENERATION; MEDIATOR-LESS; ANAEROBIC RESPIRATION; INTERNAL RESISTANCE; ELECTRON-TRANSFER

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Willows beyond wetlands: Uses of Salix L. species for environmental projects

Author(s): Kuzovkina YA, Quigley MF

Source: WATER AIR AND SOIL POLLUTION **Volume:** 162 **Issue:** 1-4 **Pages:** 183-204 **Published:** MAR 2005

Times Cited: 26 **References:** 130 **Citation Map**

Abstract: Species of Salix characterized by particular physiological adaptations and ecological resilience are predisposed to use in conservation and environmental projects in many climatic zones and adverse microsite conditions. The economic importance of Salix is currently increasing and emerging in a wide array of practical applications to restore damaged ecosystems. Here we describe the ecology, physiological characteristics and agricultural requirements of Salix and present an integrated picture based on literature review, of current uses for willows well beyond wetland and riparian situations. These uses include ecosystem restoration, phytoremediation (phytoextraction, phytodegradation, rhizofiltration and phytostabilization), bioengineering (water and wind erosion, and protective structures), and biomass production for both fuel and fiber.

Document Type: Review

Language: English

Author Keywords: biofiltration; biological engineering; ecological restoration; erosion control; phytoremediation; Salix; willow

KeyWords Plus: SHORT-ROTATION COPPICE; MUNICIPAL WASTE-WATER; BIOMASS PRODUCTION; VEGETATION FILTERS; ENERGY FORESTRY; WOODY-PLANTS; PHYTOREMEDIATION; SOIL; CADMIUM; CLONES

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Tropical treatment wetlands dominated by free-floating macrophytes for water quality improvement in Costa Rica

Author(s): Nahlik AM (Nahlik, Amanda M.), Mitsch WJ (Mitsch, William J.)

Source: ECOLOGICAL ENGINEERING **Volume:** 28 **Issue:** 3 **Special Issue:** Sp. Iss. SI **Pages:** 246-257 **Published:** DEC 1 2006

Times Cited: 24 **References:** 51 **Citation Map**

Abstract: Five tropical treatment wetlands dominated by floating aquatic plants and constructed to deal with a variety of wastewaters were compared for their effectiveness in treating organic matter and nutrients in the Parismina River Basin in eastern Costa Rica. Wastewaters were from a dairy farm, a dairy processing plant, a banana paper plant, and a landfill. Four of the five wetland systems were effective in reducing nutrient levels of effluents before water was discharged into rivers. Ammonia levels in water entering most wetlands were considerably higher than ambient (i.e., riverine) levels; concentrations were reduced by as much as 92% in the wetlands and retained at a maximum rate of 166 g N m(-2) year(-1). Nitrate nitrogen removal was variable, but occurred in low concentrations in the inflows (less than 1 mg N L-1). Phosphate phosphorus was present in high levels but was effectively reduced through the wetlands (92 and 45% reductions through dairy farm wetlands, 83% reduction through banana paper wetlands, and 80% reduction through dairy processing wetlands). Retention of phosphate phosphorus ranged from 0.1 to 10.7 g P m(-2) year(-1) in the treatment wetlands. Dissolved oxygen in the wetland outflows were <= 2 mg L-1 in three of the sampled wetlands, most likely a result of the abundant free-floating macrophytes that sheltered the water from diffusion and shaded aquatic productivity. The efficacy of these created wetlands to treat effluents from different sources varied, and modified wetland designs or active management may be necessary to improve water quality even further. Recommendations on tropical wetland design and management are presented, as are suggestions for implementing this ecological engineering approach with farmers in Central America. (C) 2006 Elsevier B.V. All rights reserved.

Document Type: Proceedings Paper

Language: English

Author Keywords: tropical wetlands; wastewater treatment; nutrient reduction; free-floating macrophytes; treatment wetlands; Parismina river; Eichhornia crassipes; Pistia stratiotes

KeyWords Plus: EXPERIMENTAL CONSTRUCTED WETLANDS; WASTE-WATER; AQUATIC MACROPHYTES; ARTIFICIAL WETLANDS; SOUTHERN CALIFORNIA; PHOSPHORUS REMOVAL; TREATMENT SYSTEMS; NUTRIENT REMOVAL; NITRATE REMOVAL; NITROGEN

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Sustainable land application: An overview

Author(s): O'Connor GA, Elliott HA, Basta NT, Bastian RK, Pierzynski GM, Sims RC, Smith JE

Source: JOURNAL OF ENVIRONMENTAL QUALITY **Volume:** 34 **Issue:** 1 **Pages:** 7-17 **Published:** JAN-FEB 2005

Times Cited: 20 **References:** 90 **Citation Map**

Abstract: Man has land-applied societal nonhazardous wastes for centuries as a means of disposal and to improve the soil via the recycling of nutrients and the addition of organic matter. Nonhazardous wastes include a vast array of materials, including manures, biosolids, composts, wastewater effluents, food-processing wastes, industrial by-products; these are collectively referred to herein as residuals. Because of economic restraints and environmental concerns about land-filling and incineration, interest in land application continues to grow. A major lesson that has been learned, however, is that the traditional definition of land application that emphasizes applying residuals to land in a manner that protects human and animal health, safeguards soil and water resources, and maintains long-term ecosystem quality is incomplete unless the earning of public trust in the practices is included. This overview provides an introduction to a subset of papers and posters presented at the conference, "Sustainable Land Application," held in Orlando, FL, in January 2004. The USEPA, USDA, and multiple national and state organizations with interest in, and/or responsibilities for, ensuring the sustainability of the practice sponsored the conference. The overriding conference objectives were to highlight significant developments in land treatment theory and practice, and to identify future research needs to address critical gaps in the knowledge base that must be addressed to ensure sustainable land application of residuals.

Document Type: Proceedings Paper

Language: English

KeyWords Plus: IRON-DEFICIENT SOIL; SEWAGE-SLUDGE; ORGANIC CONTAMINANTS; RISK-ASSESSMENT; PHOSPHORUS; BIOSOLIDS; MUNICIPAL; MANURE; WATER; COMPOST

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Fabrication of microelectrode arrays for in situ sensing of oxidation reduction potentials

Author(s): Lee JH, Jang A, Bhadri PR, Myers RR, Timmons W, Beyette FR, Bishop PL, Papautsky I

Source: SENSORS AND ACTUATORS B-CHEMICAL **Volume:** 115 **Issue:** 1 **Pages:** 220-226 **Published:** MAY 23 2006

Times Cited: 18 **References:** 17 **Citation Map**

Abstract: There is a clear need for in situ monitoring of oxidation-reduction potential (ORP) in many environmental applications, particularly those involving water quality monitoring and wastewater treatment. This paper describes fabrication of microelectrode sensor arrays for measurements of ORP in situ in the environment, such as at Superfund sites. The four-probe microelectrode arrays were fabricated from glass using a two-step, HF-based meniscus etching process. The tip size of individual microelectrodes was approximately 200 nm. The electrochemical performance of these ORP electrodes was fully characterized by measuring redox potentials of standard and reference solutions. When compared with commercial milli-electrodes, the microelectrode arrays exhibited very fast response time (from a few milliseconds to 30 s) and proved to be extraordinarily stable (variability on the order of 2 mV over a 4-day test period). This successful development of microelectrode arrays for ORP measurements will enable in situ measurement of redox potentials in the environment, such as contaminated soils, biofilm or sediments at Superfund sites. (c) 2005 Elsevier B.V. All rights reserved.

Document Type: Article

Language: English

Author Keywords: microelectrodes; micromachining; microelectrode arrays; oxidation-reduction potential; in situ monitoring

KeyWords Plus: BIOFILMS

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Evaluations of different hypervariable regions of archaeal 16S rRNA genes in profiling of methanogens denaturing by Archaea-specific PCR and gradient gel electrophoresis

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Source: APPLIED AND ENVIRONMENTAL MICROBIOLOGY **Volume:** 74 **Issue:** 3 **Pages:** 889-893 **Published:** FEB 2008

Times Cited: 15 **References:** 42 **Citation Map**

Abstract: Different hypervariable (V) regions of the archaeal 16S rRNA gene (rrs) were compared systematically to establish a preferred V region(s) for use in Archaea-specific PCR-denaturing gradient gel electrophoresis (DGGE). The PCR products of the V3 region produced the most informative DGGE profiles and permitted identification of common methanogens from rumen samples from sheep. This study also showed that different methanogens might be detected when different V regions are targeted by PCR-DGGE. Dietary fat appeared to transiently stimulate Methanosphaera stadtmanae but inhibit Methanobrevibacter sp. strain AbM4 in rumen samples.

Document Type: Article

Language: English

KeyWords Plus: MICROBIAL COMMUNITY; WASTE-WATER; DIVERSITY; RUMEN; BACTERIAL; SHEEP; POPULATIONS; IDENTIFICATION; FERMENTATION; ASSEMBLAGES

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Influence of hydrologic pulses, flooding frequency, and vegetation on nitrous oxide emissions from created riparian marshes

Author(s): Hernandez ME (Hernandez, Maria E.), Mitsch WJ (Mitsch, William J.)

Source: WETLANDS **Volume:** 26 **Issue:** 3 **Pages:** 862-877 **Published:** SEP 2006

Times Cited: 14 **References:** 48 **Citation Map**

Abstract: The effects of hydrologic conditions, water quality gradients, and vegetation on nitrous oxide gaseous emissions were investigated in two identical 1-ha surface-flow created riverine wetlands in Columbus, Ohio, USA. For two years, both wetlands experienced seasonal (winter-spring) controlled hydrologic flood pulses followed by one year in which they received a steady flow rate of water. Nitrous oxide fluxes were quantified in a transverse gradient at different elevations (edge plots and high marsh plots with alternate wet and dry conditions, and low marsh plots and open water plots that were permanently flooded). The highest average of N2O fluxes was observed in high marsh plots (21.8 2.5 mu g-N m(-2) h(-1)), followed by edge plots (12.6 +/- 2.5 mu g-N m(-2) h(-1)), open water plots (9.9 +/- 2.1 mu g-N m(-2) h(-1)), and low marsh plots (7.0 +/- 4.8 mu g-N m(-2) h(-1)). Highest nitrous oxide fluxes were consistently observed in high marsh plots during summer when soil temperatures were >= 20 degrees C. In permanently flooded plots without vegetation, nitrous oxide fluxes were low, regardless of flood-pulse conditions. In high marsh plots, water table remained near the soil surface one week after flooding, causing an increase in N2O fluxes (25.9 +/- 13.9 mu g-N m(-2) h(-1)) compared with fluxes before (2.4 +/- 6.4 2.2 mu g-N m(-2) h(-1)) and during (6.9 +/- 2.2 mu g-N m(-2) h(-1)) flooding. In edge plots, nitrous oxide emissions increased during and after the flooding (11.3 +/- 3.2 and 7.3 +/- 3.3 mu g-N m(-2) h(-1)) compared with fluxes before the flood pulse (4.1 +/- 1.8 mu g-N m(-2) h(-1)). In low marsh and edge zones, no significant (P > 0.05) differences were observed in the seasonal N2O fluxes in the pulsing year versus steady-flow year. Spring N2O fluxes from high marsh plots were significantly (P=0.04) higher under steady-flow conditions (26.2 +/- 5.5 mu g-N m(-2) h(-1)) than under pulsing conditions (9.6 +/- 3.6 mu g-N m(-2) h(-1)), probably due to the water table near the surface that prevailed in those plots under steady flow condition. N2O fluxes were higher in plots with vegetation (39.6 +/- 13.7 mu g-N m(-2) h(-1)) than in plots without vegetation (-3.6 +/- 13.7 mu g-N m(-2) h(-1)) when plots were inundated; however, when no surface water was present, N2O fluxes were similar in plots with and without vegetation. Implications for large-scale wetland creation and restoration in the Mississippi River Basin and elsewhere for controlling nitrogen are discussed.

Document Type: Article

Language: English

Author Keywords: nitrogen; denitrification; nitrous oxide; hydrologic pulses; created marshes; greenhouse gases; riparian marshes; Olentangy River Wetland Research Park

KeyWords Plus: MISSISSIPPI RIVER-BASIN; BUFFER ZONES; WASTE-WATER; SOIL; DENITRIFICATION; WETLANDS; N2O; NITRIFICATION; ATMOSPHERE; FLOODPLAIN

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Ultrasonic destruction of surfactants: Application to industrial wastewaters

Author(s): Weavers LK, Pee GY, Frim JA, Yang L, Rathman JF

Source: WATER ENVIRONMENT RESEARCH **Volume:** 77 **Issue:** 3 **Pages:** 259-265 **Published:** MAY-JUN 2005

Times Cited: 12 **References:** 33 **Citation Map**

Abstract: This research focused on the use of sonication to destroy surfactants and surface tension properties in industrial wastewaters that affect traditional water treatment processes. We have investigated the sonochemical destruction of surfactants and a chelating agent to understand the release of metals from surfactants during sonication. In addition, the effects of physical properties of surfactants and the effect of ultrasonic frequency were investigated to gain an understanding of the factors affecting degradation. Sonochemical degradation of surfactants was observed to be more effective than nonsurfactant compounds. In addition, as the concentration is increased, the degradation rate constant does not decrease as significantly as with nonsurfactant compounds in the near-field acoustical processor reactor. The degradation of metal complexes is not as effective as in the absence of the metal. However, this is likely an artifact of the model complexing agent used. Surfactant metal complexes are expected to be faster, as they will accumulate at the hot bubble interface, significantly increasing ligand exchange kinetics and thus degradation of the complex.

Document Type: Article

Language: English

Author Keywords: surfactants; sonication; degradation; industrial wastewater; ethylenediaminetetraacetic acid

KeyWords Plus: AQUEOUS-SOLUTION; SONOCHEMICAL DESTRUCTION; SONOLYTIC DEGRADATION; WATER; MECHANISM; KINETICS; PENTACHLOROPHENOL; IRRADIATION; ETHOXYLATE; SEDIMENTS

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Soil science and the carbon civilization

Author(s): Lal R (Lal, Rattan)

Source: SOIL SCIENCE SOCIETY OF AMERICA JOURNAL **Volume:** 71 **Issue:** 5 **Pages:** 1425-1437 **Published:** SEP-OCT 2007

Times Cited: 11 **References:** 191 **Citation Map**

Abstract: Soil science must play a crucial role in meeting present and emerging societal needs of the 21st century and beyond for a population expected to stabilize around 10 billion and having increased aspirations for a healthy diet and a rise in the standards of living. In addition to advancing food security by eliminating hunger and malnutrition, soil resources must be managed regarding numerous other global needs through interdisciplinary collaborations. Some of which are to mitigate global warming; to improve quantity and quality of freshwater resources; to enhance biodiversity; to minimize desertification; serve as a repository of Waste; air archive of human and planetary history; meet growing energy demands; develop strategies of sustainable management of urban ecosystems; alleviate poverty of agricultural communities as an engine of economic development; and fulfill aspirations of rapidly urbanizing and industrializing societies. In addition to food and ecosystem services, bio-industries (e.g., plastics, solvents, paints, adhesives, pharmaceuticals and chemicals) through plant-based compounds (carbohydrates, proteins, and oils) and energy plantations (bioethanol and biodiesel) can revolutionize agriculture. These diverse and complex demands on soil resources necessitate a shift in strategic thinking and conceptualizing sustainable management of soil resources in agroecosystems to provide A ecosystem services while also meeting the needs for food, feed, fiber, and fuel by developing multifunctional production systems. There is a strong need to broaden the scope of soil science to effectively address ever changing societal needs. To do this, soil scientists must rally with allied sciences including hydrology, climatology, geology, ecology, biology, physical sciences (chemistry, physics), and engineering. Use of nanotechnology, biotechnology, and information technology can play an important role in addressing emerging global issues. Pursuit of sustainability, being a moral/ethical and political challenge, must be addressed in cooperation with economists and political scientists. Soil scientists must work in cooperation with industrial ecologists and urban planners toward sustainable development and management of soils in urban and industrial ecosystems. More than half of the world's population (3.3 billion) live in towns and cities, and the number of urban dwellers is expected to increase to 5 billion by 2030. Thus, the study of urban soils for industrial use, human habitation, recreation, infrastructure forestry, and urban agriculture is a high priority. Soil scientists Must nurture symbiotic/synergistic relations with numerous stake holders including land managers, energy companies and carbon traders, urban planners, waste disposal organizations, and conservators of natural resources. Trading of C credits in a trillion-dollar market by 2020 must be made accessible to land managers, especially the resource-poor farmers in developing countries. Soil science curricula, at undergraduate and graduate levels, Must be revisited to provide the needed background in all basic and applied sciences with focus on globalization. We must raise the profile of soil science profession and position Students in the competitive world of ever flattening Earth.

Document Type: Review

Language: English

KeyWords Plus: NO-TILL CORN; CLIMATE-CHANGE IMPACTS; WASTE-WATER DISPOSAL; FOOD SECURITY; UNITED-STATES; ORGANIC-MATTER; STOVER REMOVAL; SLOW-RELEASE; URBAN SOILS; GLOBAL FOOD

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Use of an ecological treatment system (ETS) for removal of nutrients from dairy wastewater

Author(s): Lansing SL (Lansing, Stephanie L.), Martin JF (Martin, Jay F.)

Source: ECOLOGICAL ENGINEERING **Volume:** 28 **Issue:** 3 **Special Issue:** Sp. Iss. SI **Pages:** 235-245 **Published:** DEC 1 2006

Times Cited: 11 **References:** 43 **Citation Map**

Abstract: Ecological Treatment Systems (ETS) are composed of a series of anaerobic and aerobic reactors, clarifiers, and wetlands, and have been used for the removal of nutrients from municipal and industrial wastewaters. The design of ETS enhances nutrient removal by providing both aerobic and anaerobic environments and steep gradients between the two environments. The ability of an ETS to treat wastewater from a dairy farm was investigated with a 20-week study in Columbus, OH, USA.

The Waterman Ecological Treatment System (WETS) had four replicate treatment lines. Together, the four lines treated 1310 L/day of diluted wastewater from a dairy facility with over 99% removal of ammonium-nitrogen (NH4-N) and carbonaceous biochemical oxygen demand (CBOD), and 79% removal of orthophosphate (PO4-P). The average influent/effluent concentrations of NH4-N, CBOD, and PO4-P were 52.1/0.07 mg/L, 517/5.2 mg O-2/L, and 21.0/4.4 mg/L, respectively Nitrate + nitrite (NOx-N) was produced and removed within the system, and had an average effluent concentration of 0.53 mg/L. The multiple anaerobic-aerobic interfaces in the WETS design enhanced biological removal of nitrogen and phosphorus. NH4-N, CBOD, and NOx-N were consistently removed throughout the 20-week study, but PO4-P removal efficiency decreased over time in one of the four treatment lines.
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Document Type: Proceedings Paper

Language: English

Author Keywords: living machine; nitrogen; nitrification; denitrification; phosphorus; constructed wetlands

KeyWords Plus: FLOW CONSTRUCTED WETLAND; PHOSPHORUS REMOVAL; DENITRIFICATION; NITRIFICATION; WASTEWATERS; CULTURES; NITRATE; DESIGN

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APPENDIX 14. MOST HIGHLY CITED WASTE WATER PAPERS–WORLDWIDE

Photoinduced reactivity of titanium dioxide

Author(s): Carp O, Huisman CL, Reller A

Source: PROGRESS IN SOLID STATE CHEMISTRY **Volume:** 32 **Issue:** 1-2 **Pages:** 33-177 **Published:** 2004

Times Cited: 738 **References:** 1,295 **Citation Map**

Abstract: The utilization of solar irradiation to supply energy or to initiate chemical reactions is already an established idea. If a wide-band gap semiconductor like titanium dioxide (TiO2) is irradiated with light, excited electron-hole pairs result that can be applied in solar cells to generate electricity or in chemical processes to create or degrade specific compounds. Recently, a new process used on the surface of TiO2 films, namely, photoinduced super-hydrophilicity, is described. All three appearances of the photoreactivity of TiO2 are discussed in detail in this review, but the main focus is on the photocatalytic activity towards environmentally hazardous compounds (organic, inorganic, and biological materials), which are found in wastewater or in air. Besides information on the mechanistical aspects and applications of these kinds of reactions, a description of the attempts and possibilities to improve the reactivity is also provided. This paper would like to assist the reader in getting an overview of this exciting, but also complicated, field.
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Document Type: Review

Language: English

Author Keywords: titanium dioxide; photocatalysis; photoinduced processes; surface properties; environmental remediation

KeyWords Plus: HETEROGENEOUS PHOTOCATALYTIC OXIDATION; TIO2 THIN-FILMS; CHEMICAL-VAPOR-DEPOSITION; VISIBLE-LIGHT IRRADIATION; GAS-PHASE PHOTOOXIDATION; SOL-GEL METHOD; ANATASE-RUTILE TRANSITION; VOLATILE ORGANIC-COMPOUNDS; IRON-DOPED TITANIA; TEXTILE AZO-DYE

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Microbial fuel cells: Methodology and technology

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Source: ENVIRONMENTAL SCIENCE & TECHNOLOGY **Volume:** 40 **Issue:** 17 **Pages:** 5181-5192 **Published:** SEP 1 2006

Times Cited: 384 **References:** 77 **Citation Map**

Abstract: Microbial fuel cell (MFC) research is a rapidly evolving field that lacks established terminology and methods for the analysis of system performance. This makes it difficult for researchers to compare devices on an equivalent basis. The construction and analysis of MFCs requires knowledge of different scientific and engineering fields, ranging from microbiology and electrochemistry to materials and environmental engineering. Describing MFC systems therefore involves an understanding of these different scientific and engineering principles. In this paper, we provide a review of the different materials and methods used to construct MFCs, techniques used to analyze system performance, and recommendations on what information to include in MFC studies and the most useful ways to present results.

Document Type: Review

Language: English

KeyWords Plus: CONTINUOUS ELECTRICITY-GENERATION; SEDIMENT-WATER INTERFACE; PROTON-EXCHANGE MEMBRANE; REDUCED NEUTRAL RED; BIOFUEL CELLS; ELECTRON-TRANSFER; POWER-GENERATION; WASTE-WATER; ENERGY-CONSERVATION; HARVESTING ENERGY

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Non-conventional low-cost adsorbents for dye removal: A review

Author(s): Crini G

Source: BIORESOURCE TECHNOLOGY **Volume:** 97 **Issue:** 9 **Pages:** 1061-1085 **Published:** JUN 2006

Times Cited: 351 **References:** 227 **Citation Map**

Abstract: Adsorption techniques are widely used to remove certain classes of pollutants from waters, especially those that are not easily biodegradable. Dyes represent one of the problematic groups. Currently, a combination of biological treatment and adsorption on activated carbon is becoming more common for removal of dyes from wastewater. Although commercial activated carbon is a preferred sorbent for color removal, its widespread use is restricted due to high cost. As such, alternative non-conventional sorbents have been investigated. It is well-known that natural materials, waste materials from industry and agriculture and biosorbents can be obtained and employed as inexpensive sorbents. In this review, an extensive list of sorbent literature has been compiled. The review (i) presents a critical analysis of these materials; (ii) describes their characteristics, advantages and limitations, and (iii) discusses various mechanisms involved. It is evident from a literature survey of about 210 recent papers that low-cost sorbents have demonstrated outstanding removal capabilities for certain dyes. In particular, chitosan might be a promising adsorbent for environmental and purification purposes. (c) 2005 Elsevier Ltd. All rights reserved.

Document Type: Review

Language: English

Author Keywords: dyes; adsorption; low-cost adsorbents; wastewater treatment

KeyWords Plus: LIQUID-PHASE ADSORPTION; METAL HYDROXIDE SLUDGE; LINKED CHITOSAN BEADS; WASTE-WATER TREATMENT; AZO-REACTIVE DYES; FUNGUS ASPERGILLUS-NIGER; METHYLENE-BLUE REMOVAL; FIXED-BED SYSTEMS; WHITE-ROT FUNGI; AQUEOUS-SOLUTION

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Ecotoxicology of human pharmaceuticals

Author(s): Fent K, Weston AA, Caminada D

Source: AQUATIC TOXICOLOGY **Volume:** 76 **Issue:** 2 **Pages:** 122-159 **Published:** FEB 10 2006

Times Cited: 311 **References:** 224 **Citation Map**

Abstract: Low levels of human medicines (pharmaceuticals) have been detected in many countries in sewage treatment plant (STP) effluents, surface waters, seawaters, groundwater and some drinking waters. For some pharmaceuticals effects on aquatic organisms have been investigated in acute toxicity assays. The chronic toxicity and potential subtle effects are only marginally known, however. Here, we critically review the current knowledge about human pharmaceuticals in the environment and address several key questions. What kind of pharmaceuticals and what concentrations occur in the aquatic environment? What is the fate in surface water and in STP? What are the modes of action of these compounds in humans and are there similar targets in lower animals? What acute and chronic ecotoxicological effects may be elicited by pharmaceuticals and by mixtures? What are the effect concentrations and how do they relate to environmental levels? Our review shows that only very little is known about long-term effects of pharmaceuticals to aquatic organisms, in particular with respect to biological targets. For most human medicines analyzed, acute effects to aquatic organisms are unlikely, except for spills. For investigated pharmaceuticals chronic lowest observed effect concentrations (LOEC) in standard laboratory organisms are about two orders of magnitude higher than maximal concentrations in STP effluents. For diclofenac, the LOEC for fish toxicity was in the range of wastewater concentrations, whereas the LOEC of propranolol and fluoxetine for zooplankton and benthic organisms were near to maximal measured STP effluent concentrations. In surface water, concentrations are lower and so are the environmental risks. However, targeted ecotoxicological studies are lacking almost entirely and such investigations are needed focusing on subtle environmental effects. This will allow better and comprehensive risk assessments of pharmaceuticals in the future. (c) 2005 Elsevier B.V. All rights reserved.

Document Type: Review

Language: English

Author Keywords: pharmaceuticals; ecotoxicological effects; environmental toxicity; chronic effects; environmental risk assessment

KeyWords Plus: SEWAGE-TREATMENT PLANTS; PROLIFERATOR-ACTIVATED RECEPTORS; MINNOW PIMEPHALES-PROMELAS; TROUT ONCORHYNCHUS-MYKISS; PERSONAL CARE PRODUCTS; SEROTONIN REUPTAKE INHIBITORS; ENVIRONMENTAL RISK-ASSESSMENT; TANDEM MASS-SPECTROMETRY; WASTE-WATER CONTAMINANTS; MEDAKA ORYZIAS-LATIPES

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Application of biosorption for the removal of organic pollutants: A review

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Source: PROCESS BIOCHEMISTRY **Volume:** 40 **Issue:** 3-4 **Pages:** 997-1026 **Published:** MAR 2005

Times Cited: 290 **References:** 127 **Citation Map**

Abstract: In modern society, an increasing number of hazardous organic compounds are being discharged into the environment. Most are degraded or detoxificated by physical. chemical and biological treatments before released into the environment. Although the biological treatments are a removal process for some organic compounds, their products of biodegradation may also be hazardous. Moreover, some nondegradable compounds discharged into the environment along with the treated compounds can cause problems because they usually come back to humanbeings through the several channels such as bioaccumulation. As a result, organic molecules that are not biodegradable, can still be removed from the wastewater by the microbial biomass via the process of biosorption. Biosorption is also becoming a promising alternative to replace or supplement the present removal processes of organic pollutants from wastewaters. Among these pollutants, dyes, phenolics and pesticides have recently been of great concern because of the extreme toxicity and/or persistency in the environment. Biosorption of these type of hazardous organics by selected live and dead microoganisms has been investigated by various workers. This review examines a wide variety of microorganisms (fungi, yeasts, bacteria, etc.), which are capable of uptake of organic pollutants, discusses various mechanisms involved in biosorption, discusses the effects of various parameters such as pH, temperature, concentrations of organic pollutant, other ions, and biomass in solution. pretreatment method, etc. on biosorption, reports some elution and regeneration methods for biomass; summarizes the equilibrium and kinetic models used in batch and continuous biosorption systems which are important to determine the biosorption capacity of microorganism and to design of treatment processes. (C) 2004 Elsevier Ltd. All rights reserved.

Document Type: Review

Language: English

Author Keywords: biosorption; organic pollutant; microorganism; batch system; continuous system; equilibrium; kinetics

KeyWords Plus: WHITE-ROT FUNGI; KLUYVEROMYCES-MARXIANUS IMB3; ANAEROBIC GRANULAR SLUDGE; RHIZOPUS-ARRHIZUS BIOMASS; HEAVY-METAL BIOSORPTION; REACTIVE TEXTILE DYES; REMAZOL-BLACK-B; BAGASSE FLY-ASH; AQUEOUS-SOLUTION; ACTIVATED-SLUDGE

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Microbial fuel cells: novel biotechnology for energy generation

Author(s): Rabaey K, Verstraete W

Source: TRENDS IN BIOTECHNOLOGY **Volume:** 23 **Issue:** 6 **Pages:** 291-298 **Published:** JUN 2005

Times Cited: 253 **References:** 64 **Citation Map**

Abstract: Microbial fuel cells (MFCs) provide new opportunities for the sustainable production of energy from biodegradable, reduced compounds. MFCs function on different carbohydrates but also on complex substrates present in wastewaters. As yet there is limited information available about the energy metabolism and nature of the bacteria using the anode as electron acceptor; few electron transfer mechanisms have been established unequivocally. To optimize and develop energy production by MFCs fully this knowledge is essential. Depending on the operational parameters of the MFC, different metabolic pathways are used by the bacteria. This determines the selection and performance of specific organisms. Here we discuss how bacteria use an anode as an electron acceptor and to what extent they generate electrical output. The MFC technology is evaluated relative to current alternatives for energy generation.

Document Type: Review

Language: English

KeyWords Plus: METAL-REDUCING BACTERIUM; ELECTRICITY-GENERATION; ELECTRON-TRANSFER; SHEWANELLA-PUTREFACIENS; NEUTRAL RED; FE(III)-REDUCING BACTERIUM; MEDIATOR-LESS; WASTE-WATER; BIOFUEL CELL; REDUCTION

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Recent developments in polysaccharide-based materials used as adsorbents in wastewater treatment

Author(s): Crini G

Source: PROGRESS IN POLYMER SCIENCE **Volume:** 30 **Issue:** 1 **Pages:** 38-70 **Published:** JAN 2005

Times Cited: 228 **References:** 202 **Citation Map**

Abstract: The chemical contamination of water from a wide range of toxic derivatives, in particular heavy metals, aromatic molecules and dyes, is a serious environmental problem owing to their potential human toxicity. Therefore, there is a need to develop technologies that can remove toxic pollutants found in wastewaters. Among all the treatments proposed, adsorption is one of the more popular methods for the removal of pollutants from the wastewater. Adsorption is a procedure of choice for treating industrial effluents, and a useful tool for protecting the environment. In particular, adsorption on natural polymers and their derivatives are known to remove pollutants from water. The increasing number of publications on adsorption of toxic compounds by modified polysaccharides shows that there is a recent increasing interest in the synthesis of new low-cost adsorbents used in wastewater treatment. The present review shows the recent developments in the synthesis of adsorbents containing polysaccharides, in particular modified biopolymers derived from chitin, chitosan, starch and cyclodextrin. New polysaccharide based-materials are described and their advantages for the removal of pollutants from the wastewater discussed. The main objective of this review is to provide recent information about the most important features of these polymeric materials and,to show the advantages gained from the use of adsorbents containing modified biopolymers in waste water treatment. (C) 2005 Elsevier Ltd. All rights reserved.

Document Type: Review

Language: English

Author Keywords: polysaccharides; biopolymers; chitin; chitosan; starch; cyclodextrin; networks; crosslinking; grafting; hybrid materials; adsorption; adsorbents; pollutants

KeyWords Plus: CROSS-LINKED CHITOSAN; BETA-CYCLODEXTRIN POLYMER; SOLID-PHASE EXTRACTION; METAL HYDROXIDE SLUDGE; NONPOROUS GLASS-BEADS; AZO REACTIVE DYES; AQUEOUS-SOLUTION; ACTIVATED CARBON; HEAVY-METALS; ADSORPTION PROPERTIES

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Advanced oxidation processes for organic contaminant destruction based on the Fenton reaction and related chemistry

Author(s): Pignatello JJ, Oliveros E, MacKay A

Source: CRITICAL REVIEWS IN ENVIRONMENTAL SCIENCE AND TECHNOLOGY **Volume:** 36 **Issue:** 1 **Pages:** 1-84 **Published:** 2006

Times Cited: 214 **References:** 314 **Citation Map**

Abstract: Fenton chemistry encompasses reactions of hydrogen peroxide in the presence of iron to generate highly reactive species such as the hydroxyl radical and possibly others. In this review, the complex mechanisms of Fenton and Fenton-like reactions and the important factors influencing these reactions, from both a fundamental and practical perspective, in applications to water and soil treatment, are discussed. The review covers modified versions including the photoassisted Fenton reaction, use of chelated iron, electro-Fenton reactions, and Fenton reactions using heterogeneous catalysts. Sections are devoted to nonclassical pathways, by-products, kinetics and process modeling, experimental design methodology, soil and aquifer treatment, use of Fenton in combination with other advanced oxidation processes or biodegradation, economic comparison with other advanced oxidation processes, and case studies.

Document Type: Review

Language: English

Author Keywords: advanced oxidation technologies; aquifier remediation; electro-Fenton; photo-Fenton; soil remediation; waste treatment; water treatment

KeyWords Plus: WASTE-WATER-TREATMENT; CATALYZED HYDROGEN-PEROXIDE; HYDROXYL RADICAL GENERATION; CHROMATOGRAPHY-MASS-SPECTROMETRY; POLYCYCLIC AROMATIC-HYDROCARBONS; ION-PROMOTED PHOTODECOMPOSITION; HOMOGENEOUS AQUEOUS-SOLUTION; OPTIMAL EXPERIMENTAL-DESIGN; IRON-INDUCED ACTIVATION; LARGE-SCALE DEVELOPMENT

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Fouling in membrane bioreactors used in wastewater treatment

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Source: JOURNAL OF MEMBRANE SCIENCE **Volume:** 284 **Issue:** 1-2 **Pages:** 17-53 **Published:** NOV 1 2006

Times Cited: 212 **References:** 304 **Citation Map**

Abstract: The membrane bioreactor (MBR) can no longer be considered as a novel process. This reliable and efficient technology has become a legitimate alternative to conventional activated sludge processes and an option of choice for many domestic and industrial applications. However, membrane fouling and its consequences in terms of plant maintenance and operating costs limit the widespread application of MBRS. To provide a better understanding of the complex fouling mechanisms and propensities occurring in MBR processes, this review compiles and analyses more than 300 publications. This paper also proposes updated definitions of key parameters such as critical and sustainable flux, along with standard methods to determine and measure the different fractions of the biomass. Although there is no clear consensus on the exact phenomena occurring on the membrane interface during activated sludge filtration, many publications indicate that the extracellular polymeric substances (EPS) play a major role during fouling formation. More precisely, the carbohydrate fraction from the soluble microbial product (also called soluble EPS or biomass supernatant) has been often cited as the main factor affecting MBR fouling, although the role of the protein compounds in the fouling formation is still to be clarified. Strategies to limit fouling include manipulating bioreactor conditions, adjusting hydrodynamics and flux and optimizing module design. (c) 2006 Elsevier B.V. All rights reserved.

Document Type: Review

Language: English

Author Keywords: membrane bioreactors; fouling; activated sludge; operating conditions; cleaning

KeyWords Plus: SUBMERGED HOLLOW-FIBER; CROSS-FLOW FILTRATION; EXTRACELLULAR POLYMERIC SUBSTANCES; ACTIVATED-SLUDGE SYSTEM; DEAD-END MICROFILTRATION; PERFORMANCE COMPACT REACTOR; SOLUBLE MICROBIAL PRODUCTS; VAR. MARXIANUS NRRLY2415; CRITICAL FLUX CONCEPT; MODEL EPS SOLUTIONS

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Levels and trends of brominated flame retardants in the European environment

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Source: CHEMOSPHERE **Volume:** 64 **Issue:** 2 **Pages:** 187-208 **Published:** JUN 2006

Times Cited: 204 **References:** 114 **Citation Map**

Language: English

Author Keywords: brominated flame retardants; polybrominated diphenyl ethers; hexabromocyclododecane; tetrabromobisphenol-A; Europe; atmosphere; sediment; soil; sewage sludge; biota

KeyWords Plus: POLYBROMINATED DIPHENYL ETHERS; PERSISTENT ORGANIC POLLUTANTS; PRESSURIZED LIQUID EXTRACTION; SEALS HALICHOERUS-GRYPUS; MUSSELS MYTILUS-EDULIS; CARP CYPRINUS-CARPIO; SALMON SALMO-SALAR; BELGIAN NORTH-SEA; DECABROMODIPHENYL ETHER; BALTIC SEA

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APPENDIX 15. MOST HIGHLY CITED STORM WATER PAPERS– CINCINNATI

The urban stream syndrome: current knowledge and the search for a cure

Author(s): Walsh CJ, Roy AH, Feminella JW, Cottingham PD, Groffman PM, Morgan RP

Source: JOURNAL OF THE NORTH AMERICAN BENTHOLOGICAL SOCIETY **Volume:** 24 **Issue:** 3 **Pages:** 706-723 **Published:** SEP 2005

Times Cited: 163 **References:** 76 **Citation Map**

Abstract: The term "urban stream syndrome" describes the consistently observed ecological degradation of streams draining urban land. This paper reviews recent literature to describe symptoms of the syndrome, explores mechanisms driving the syndrome, and identifies appropriate goals and methods for ecological restoration of urban streams. Symptoms of the urban stream syndrome include a flashier hydrograph, elevated concentrations of nutrients and contaminants, altered channel morphology, and reduced biotic richness, with increased dominance of tolerant species. More research is needed before generalizations can be made about urban effects on stream ecosystem processes, but reduced nutrient uptake has been consistently reported. The mechanisms driving the syndrome are complex and interactive, but most impacts can be ascribed to a few major large-scale sources, primarily urban stormwater runoff delivered to streams by hydraulically efficient drainage systems. Other stressors, such as combined or sanitary sewer overflows, wastewater treatment plant effluents, and legacy pollutants (long-lived pollutants from earlier land uses) can obscure the effects of stormwater runoff. Most research on urban impacts to streams has concentrated on correlations between instream ecological metrics and total catchment imperviousness. Recent research shows that some of the variance in such relationships can be explained by the distance between the stream reach and urban land, or by the hydraulic efficiency of stormwater drainage The mechanisms behind such patterns require experimentation at the catchment scale to identify the best management approaches to conservation and restoration of streams in urban catchments. Remediation of stormwater impacts is most likely to be achieved through widespread application of innovative approaches to drainage design. Because humans dominate urban ecosystems, research on urban stream ecology will require a broadening of stream ecological research to integrate with social, behavioral, and economic research.

Document Type: Proceedings Paper

Language: English

Author Keywords: urbanization; streams; stormwater management; water quality; hydrology; ecosystem processes; imperviousness; restoration; urban ecology

KeyWords Plus: LAND-USE; MACROINVERTEBRATE COMMUNITIES; CATCHMENT URBANIZATION; DIATOM COMMUNITIES; MELBOURNE REGION; BIOTIC INTEGRITY; RIPARIAN ZONES; NITROGEN-CYCLE; MANAGEMENT; IMPACTS

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Investigating hydrologic alteration as a mechanism of fish assemblage shifts in urbanizing streams

Author(s): Roy AH, Freeman MC, Freeman BJ, Wenger SJ, Ensign WE, Meyer JL

Source: JOURNAL OF THE NORTH AMERICAN BENTHOLOGICAL SOCIETY **Volume:** 24 **Issue:** 3 **Pages:** 656-678 **Published:** SEP 2005

Times Cited: 42 **References:** 61 **Citation Map**

Abstract: Stream biota in urban and suburban settings are thought to be impaired by altered hydrology, however, it is unknown what aspects of the hydrograph alter fish assemblage structure and which fishes are most vulnerable to hydrologic alterations in small streams. We quantified hydrologic variables and fish assemblages in 30 small streams and their subcatchments (area 8-20 km(2)) in the Etowah River Catchment (Georgia, USA). We stratified streams and their subcatchments into 3 landcover categories based on imperviousness (< 10%, 10-20%, > 20% of subcatchment), and then estimated the degree of hydrologic alteration based on synoptic measurements of baseflow yield. We derived hydrologic variables from stage gauges at each study site for 1 y (January 2003-2004). Increased imperviousness was positively correlated with the frequency of storm events and rates of the rising and falling limb of the hydrograph (i.e., storm "flashiness") during most seasons. Increased duration of low flows associated with imperviousness only occurred during the autumn low-flow period, and this measure corresponded with increased richness of lentic tolerant species. Altered storm flows in summer and autumn were related to decreased richness of endemic, cosmopolitan, and sensitive fish species, and decreased abundance of lentic tolerant species. Species predicted to be sensitive to urbanization, based on specific life-history or habitat requirements, also were related to stormflow variables and % fine bed sediment in riffles. Overall, hydrologic variables explained 22 to 66% of the variation in fish assemblage richness and abundance. Linkages between hydrologic alteration and fish assemblages were potentially complicated by contrasting effects of elevated flows on sediment delivery and scour and mediating effects of high stream gradient on sediment delivery from elevated flows. However, stormwater management practices promoting natural hydrologic regimes are likely to reduce the impacts of catchment imperviousness on stream fish assemblages.

Document Type: Proceedings Paper

Language: English

Author Keywords: fishes; impervious surface cover; urbanization; hydrology; stormflow; baseflow; sediment; stormwater management

KeyWords Plus: ALTERED FLOW REGIMES; RIVER-BASIN; AQUATIC BIODIVERSITY; IMPERVIOUS SURFACES; WATER-QUALITY; URBANIZATION; AREA; MITIGATION; USA; HOMOGENIZATION

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Importance of riparian forests in urban catchments contingent on sediment and hydrologic regimes

Author(s): Roy AH, Freeman MC, Freeman BJ, Wenger SJ, Meyer JL, Ensign WE

Source: ENVIRONMENTAL MANAGEMENT **Volume:** 37 **Issue:** 4 **Pages:** 523-539 **Published:** APR 2006

Times Cited: 12 **References:** 48 **Citation Map**

Abstract: Forested riparian corridors are thought to minimize impacts of landscape disturbance on stream ecosystems; yet, the effectiveness of streamside forests in mitigating disturbance in urbanizing catchments is unknown. We expected that riparian forests would provide minimal benefits for fish assemblages in streams that are highly impaired by sediment or hydrologic alteration. We tested this hypothesis in 30 small streams along a gradient of urban disturbance (1-65% urban land cover). Species expected to be sensitive to disturbance (i.e., fluvial specialists and "sensitive" species that respond negatively to urbanization) were best predicted by models including percent forest cover in the riparian corridor and a principal components axis describing sediment disturbance. Only sites with coarse bed sediment and low bed mobility (vs. sites with high amounts of fine sediment) had increased richness and abundances of sensitive species with higher percent riparian forests, supporting our hypothesis that response to riparian forests is contingent on the sediment regime. Abundances of Etheostoma scotti, the federally threatened Cherokee darter, were best predicted by models with single variables representing stormflow (r(2) = 0.34) and sediment (r(2) = 0.23) conditions. Lentic-tolerant species richness and abundance responded only to a variable representing prolonged duration of low-flow conditions. For these species, hydrologic alteration overwhelmed any influence of riparian forests on stream biota. These results suggest that, at a minimum, catchment management strategies must simultaneously address hydrologic, sediment, and riparian disturbance in order to protect all aspects of fish assemblage integrity.

Document Type: Article

Language: English

Author Keywords: fish assemblage; urbanization; sedimentation; hydrologic alteration; riparian buffers; watershed management

KeyWords Plus: STREAM BIOTIC INTEGRITY; MULTIPLE SPATIAL SCALES; STORMWATER MANAGEMENT; FISH ASSEMBLAGES; HABITAT STRUCTURE; RIVER-BASIN; LAND-USE; URBANIZATION; IMPACTS; ECOLOGY

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Application of market mechanisms and incentives to reduce stormwater runoff - An integrated hydrologic, economic and legal approach

Author(s): Parikh P, Taylor MA, Hoagland T, Thurston H, Shuster W

Source: ENVIRONMENTAL SCIENCE & POLICY **Volume:** 8 **Issue:** 2 **Pages:** 133-144 **Published:** 2005

Times Cited: 9 **References:** 33 **Citation Map**

Abstract: Increased stormwater flows are a direct result of urbanization and the consequent increase in the proportion of land area under impervious surface. Due to its contribution to abnormally high stream flows and its role as a carrier of pollutants that degrade water quality, excess stormwater runoff has negative impacts on both terrestrial and aquatic ecosystems. In response to the increased magnitude and frequency of stormwater runoff events, municipalities and local governments seek cost-effective strategies to manage the risks associated with these stormwater flows. The goal of a proposed interdisciplinary approach involves providing incentives for the construction of small-scale best management practices throughout a small urban watershed, leading to a cost-effective means to control stormwater runoff, and partially restoring a more natural hydrologic regime to a watershed area. Market mechanisms and other incentives have been suggested as plausible approaches to the reduction of stormwater runoff. Development and implementation of market mechanisms and incentives to reduce stormwater runoff, however, involves interdisciplinary considerations and issues. This paper develops an interdisciplinary view of the stormwater runoff issue, beginning with a brief description of stormwater runoff management from a hydrologic perspective. We then present a background on types of market instruments and their related incentives as possible approaches to reducing the risks associated with both the magnitude and frequency of recurrence for excess stormwater runoff flows. This is followed by an analysis of how the federal Clean Water Act and state water laws have dealt with stormwater issues. These perspectives and methods are synthesized to develop several stormwater management scenarios that include stormwater user fees, stormwater runoff charges, allowance markets, and voluntary offset programs. Each of these programs would likely incorporate stormwater best management practices at the watershed level, yet in different ways, and we discuss the opportunities and limitations borne out of our analysis of the legal, economic, and hydrologic considerations. (c) 2005 Elsevier Ltd. All rights reserved.

Document Type: Article

Language: English

Author Keywords: stormwater runoff; market mechanisms; local government; water quantity

KeyWords Plus: LAND-USE; URBANIZATION; URBAN

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Impediments and solutions to sustainable, watershed-scale urban stormwater management: Lessons from Australia and the United States

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Source: ENVIRONMENTAL MANAGEMENT **Volume:** 42 **Issue:** 2 **Pages:** 344-359 **Published:** AUG 2008

Times Cited: 8 **References:** 74 **Citation Map**

Abstract: In urban and suburban areas, stormwater runoff is a primary stressor on surface waters. Conventional urban stormwater drainage systems often route runoff directly to streams and rivers, thus exacerbating pollutant inputs and hydrologic disturbance, and resulting in the degradation of ecosystem structure and function. Decentralized stormwater management tools, such as low impact development (LID) or water sensitive urban design (WSUD), may offer a more sustainable solution to stormwater management if implemented at a watershed scale. These tools are designed to pond, infiltrate, and harvest water at the source, encouraging evaporation, evapotranspiration, groundwater recharge, and re-use of stormwater. While there are numerous demonstrations of WSUD practices, there are few examples of widespread implementation at a watershed scale with the explicit objective of protecting or restoring a receiving stream. This article identifies seven major impediments to sustainable urban stormwater management: (1) uncertainties in performance and cost, (2) insufficient engineering standards and guidelines, (3) fragmented responsibilities, (4) lack of institutional capacity, (5) lack of legislative mandate, (6) lack of funding and effective market incentives, and (7) resistance to change. By comparing experiences from Australia and the United States, two developed countries with existing conventional stormwater infrastructure and escalating stream ecosystem degradation, we highlight challenges facing sustainable urban stormwater management and offer several examples of successful, regional WSUD implementation. We conclude by identifying solutions to each of the seven impediments that, when employed separately or in combination, should encourage widespread implementation of WSUD with watershed-based goals to protect human health and safety, and stream ecosystems.

Document Type: Article

Language: English

Author Keywords: stormwater runoff; water resource management; watershed protection; policy; restoration; sustainability

KeyWords Plus: RUNOFF; STREAM; CATCHMENT; IMPACTS; SYSTEMS; DESIGN; REDUCE

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Opportunity costs of residential best management practices for stormwater runoff control

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Source: JOURNAL OF WATER RESOURCES PLANNING AND MANAGEMENT-ASCE **Volume:** 132 **Issue:** 2 **Pages:** 89-96 **Published:** MAR-APR 2006

Times Cited: 6 **References:** 24 **Citation Map**

Abstract: Excess stormwater runoff is a serious problem in a large number of urban areas, causing flooding, water pollution, ground-water recharge deficits, and ecological damage to urban streams. Solutions currently proposed to deal with this problem often involve large centralized infrastructure and high expense. Phase II of the Environmental Protection Agency's stormwater regulation is now requiring smaller Communities nationwide to make important decisions about the potentially expensive management of excess stormwater runoff. This paper builds on research investigating the use of economic incentives to promote dispersed placement of smaller-scale best management practices (BMPs) for water detention to control excess runoff. We estimate a hedonic price function for houses in the area of a pilot project, and include the estimated part worth of yard area as our lower bound for opportunity cost in the cost function of the residential BMPs. We then show the effects of the inclusion of opportunity cost on two potentially useful incentive-based policy instruments available to communities.

Document Type: Article

Language: English

KeyWords Plus: LAND

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Risk management of sediment stress: A framework for sediment risk management research

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Source: ENVIRONMENTAL MANAGEMENT **Volume:** 36 **Issue:** 2 **Pages:** 175-194 **Published:** AUG 2005

Times Cited: 6 **References:** 152 **Citation Map**

Abstract: Research related to the ecological risk management of sediment stress in watersheds is placed under a common conceptual framework in order to help promote the timely advance of decision support methods for aquatic resource managers and watershed-level planning. The proposed risk management research program relies heavily on model development and verification, and should be applied under an adaptive management approach. The framework is centered on using best management practices (BMPs), including eco-restoration. It is designed to encourage the development of numerical representations of the performance of these management options, the integration of this information into sediment transport simulation models that account for uncertainty in both input and output, and would use strategic environmental monitoring to guide sediment-related risk management decisions for mixed land use watersheds. The goal of this project was to provide a sound scientific framework based on recent state of the practice in sediment-related risk assessment and management for research and regulatory activities, As a result, shortcomings in the extant data and measurement and modeling tools were identified that can help determine future research direction. The compilation of information is beneficial to the coordination of related work being conducted within and across entities responsible for managing watershed-scale risks to aquatic ecosystems.

Document Type: Review

Language: English

Author Keywords: sediment stress; risk management; best management practices; models; water quality protection; sediment transport; erosion

KeyWords Plus: SUSPENDED-SEDIMENT; STORMWATER MANAGEMENT; RECURRENCE INTERVAL; RUNOFF DETENTION; TRANSPORT RATES; WATER-QUALITY; SOIL-EROSION; MODEL; WETLAND; RIVER

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Prospects for enhanced groundwater recharge via infiltration of urban storm water runoff: A case study

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Source: JOURNAL OF SOIL AND WATER CONSERVATION **Volume:** 62 **Issue:** 3 **Pages:** 129-137 **Published:** MAY-JUN 2007

Times Cited: 4 **References:** 22 **Citation Map**

Abstract: The rain garden is an urban storm water best management practice that is used to infiltrate runoff close to its source, thereby disconnecting impervious area while providing an avenue for groundwater recharge. Groundwater recharge may provide additional benefits to aquatic ecosystems via enhancement of stream base flow.Yet, soil conditions can impact on certain aspects of rain garden performance and its provision of ecosystem services. In the context of a watershed-level study to determine the effectiveness of decentralized storm water management, we performed an order 1 soil survey of the Shepherd Creek watershed (Cincinnati, Ohio) to delineate soils and identify and describe representative soil pedons, and then we assessed subsoil saturated hydraulic conductivity (K-sat) in each of the three dominant subsoils with qualitative estimation methods and directly with constant-head permeametry. We next simulated the effect of subsoil hydrology of a hypothetical implementation of a parcel-level rain garden on groundwater recharge in this watershed. Measured subsoil K-sat were overall very low with a mean of 0.01 cm hr(-1) (4 x 10(-3) in hr(-1)) for Eden soil and a mean of 0.2 cm hr(-1) (0.08 in hr(-1)) for both the fine-silty family and Switzerland soils. Compared with the measured values, qualitative measures overestimated K-sat and depth of recharge for Eden and fine-silty, and underestimated the same for Switzerland. Based on median parcel features and 2004 warm-season storm records, rain gardens in the fine-silty family and Switzerland subsoils would be expected to contribute about 6 cm (2.4 in) of recharge as compared to the 2 cm (0.8 in) expected in Eden soils. Our results also suggest the highest potential for abatement of storm water quantity abatement in Eden soils, with some partitioning of this water to recharge as an added benefit. Our approach and results form the basis for a comprehensive understanding of how storm water management decentralized at the watershed level may positively impact ecosystem services.

Document Type: Article

Language: English

Author Keywords: base flow; best management practices; ecosystem services; groundwater recharge; rain garden; runoff; storm water

KeyWords Plus: MANAGEMENT; SYSTEMS

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ASSESSING IMPERVIOUS SURFACE CONNECTIVITY AND APPLICATIONS FOR WATERSHED MANAGEMENT

Author(s): Roy AH (Roy, Allison H.)[1], Shuster WD (Shuster, William D.)[1]

Source: JOURNAL OF THE AMERICAN WATER RESOURCES ASSOCIATION **Volume:** 45 **Issue:** 1 **Pages:** 198-209 **Published:** FEB 2009

Times Cited: 3 **References:** 32 **Citation Map**

Abstract: Although total impervious area (TIA) is often used as an indicator of urban disturbance, recent studies suggest that the subset of impervious surfaces that route stormwater runoff directly to streams via stormwater pipes, called directly connected impervious area (DCIA), may be a better predictor of stream ecosystem alteration. We evaluated the differences between TIA and DCIA in the Shepherd Creek catchment, a small (1.85-km(2)), suburban basin in Cincinnati, Ohio. Imperviousness determinations were calculated based on publicly available geographic information system (GIS) data and parcel-scale field assessments, and these direct assessments were compared to DCIA calculated from published, empirical relationships. Impervious and semi-impervious area comprised 13.1% of the catchment area, with 56.3% of the impervious area connected. When summarized by subcatchments (0.26-1.85 km(2)), TIA measured in the field (11-23%) was considerably higher than that calculated from the National Land Cover Data Imperviousness Layer (7-18%). In contrast, TIA calculated based on aerial photos was similar to TIA calculated from field assessments, thus indicating that photo interpretation may be adequate for catchment-scale (>25 ha) TIA determinations. While these GIS data sources can be used to calculate TIA, on-site assessments were necessary to accurately determine DCIA within residential parcels. There was a wide variation in percent connectivity across parcels, and, subsequently, DCIA was not accurately predicted from empirical relationships with TIA. We discuss applications of DCIA data that highlight the importance of parcel-scale field assessments for managing suburban watersheds.

Document Type: Article

Language: English

Author Keywords: impervious surfaces; directly connected impervious area; disconnected impervious area; effective impervious area; stormwater management; watershed management; rivers/streams; urban areas

KeyWords Plus: STREAM; URBANIZATION; CATCHMENT; IMPACTS; SYSTEMS; RUNOFF; MECHANISMS; AREA; FISH

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Urban wet-weather flows

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Source: WATER ENVIRONMENT RESEARCH **Volume:** 79 **Issue:** 10 **Pages:** 1166-1227 **Published:** 2007

Times Cited: 2 **References:** 466 **Citation Map**

Document Type: Review

Language: English

KeyWords Plus: POLYCYCLIC AROMATIC-HYDROCARBONS; RAINFALL-RUNOFF MODELS; PERVIOUS CONCRETE PAVEMENT; ARTIFICIAL NEURAL-NETWORKS; FECAL INDICATOR BACTERIA; COMBINED SEWER OVERFLOW; INDUCED COPPER RUNOFF; STORM-WATER RUNOFF; LAND-USE CHANGE; A-S RELATION

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APPENDIX 16. MOST HIGHLY CITED STORM WATER PAPERS–INDIANAPOLIS

Comparative study of transport processes of nitrogen, phosphorus, and herbicides to streams in five agricultural basins, USA

Author(s): Domagalski JL (Domagalski, Joseph L.)[1], Ator S (Ator, Scott)[2], Coupe R (Coupe, Richard)[3], McCarthy K (McCarthy, Kathleen)[4], Lampe D (Lampe, David)[5], Sandstrom M (Sandstrom, Mark)[6], Baker N (Baker, Nancy)[5]

Source: JOURNAL OF ENVIRONMENTAL QUALITY **Volume:** 37 **Issue:** 3 **Pages:** 1158-1169 **Published:** MAY-JUN 2008

Times Cited: 8 **References:** 43 **Citation Map**

Abstract: Agricultural chemical transport to surface water and the linkage to other hydrological compartments, principally ground water, was investigated at five watersheds in semiarid to humid climatic settings. Chemical transport was affected by storm water runoff, soil drainage, irrigation, and how streams were linked to shallow ground water systems. Irrigation practices and timing of chemical use greatly affected nutrient and pesticide transport in the semiarid basins. Irrigation with imported water tended to increase ground water and chemical transport, whereas the use of locally pumped irrigation water may eliminate connections between streams and ground water, resulting in lower annual loads. Drainage pathways in humid environments are important because the loads may be transported in tile drains, or through varying combinations of ground water discharge, and overland flow. In most cases, overland flow contributed the greatest loads, but a significant portion of the annual load of nitrate and some pesticide degradates can be transported under base-flow conditions. The highest basin yields for nitrate were measured in a semiarid irrigated system that used imported water and in a stream dominated by tile drainage in a humid environment. Pesticide loads, as a percent of actual use (LAPU), showed the effects of climate and geohydrologic conditions. The LAPU values in the semiarid study basin in Washington were generally low because most of the load was transported in ground water discharge to the stream. When herbicides are applied during the rainy season in a semiarid setting, such as simazine in the California basin, LAPU values are similar to those in the Midwest basins.

Document Type: Article

Language: English

KeyWords Plus: SAN-JOAQUIN RIVER; MISSISSIPPI RIVER; SURFACE WATERS; GROUNDWATER; NITRATE; PESTICIDES; CALIFORNIA; ILLINOIS; BEHAVIOR; EXPORT

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Beyond the urban gradient: barriers and opportunities for timely studies of urbanization effects on aquatic ecosystems

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Source: JOURNAL OF THE NORTH AMERICAN BENTHOLOGICAL SOCIETY **Volume:** 28 **Issue:** 4 **Pages:** 1038-1050 **Published:** DEC 2009

Times Cited: 3 **References:** 83 **Citation Map**

Abstract: Many studies have shown that streams degrade in response to urbanization in the watershed. These studies often are based on use of biotic and abiotic variables to measure stream health across a gradient of land cover/land use. The results of these studies can be applied to other urban systems, but often fail to provide a mechanistic understanding of the urban impact, in part, because of the nature of the experimental design. We analyzed the advantages and disadvantages of using environmental gradient studies to further understanding of urban stream systems. We also evaluated alternative experimental design approaches, including best management practice monitoring, long-term watershed studies, paired-watershed studies, and before-after control-impact studies, which could be used to complement the gradient approach. We illustrate these theoretical discussions with an urban paired-watershed case study in the Etowah watershed in northern Georgia. Our goal is to move experimental designs in a direction that will further our mechanistic understanding of the effects of existing urbanization on aquatic ecosystems and will provide opportunities to evaluate stream responses to environmentally sensitive urban land cover.

Document Type: Proceedings Paper

Language: English

Author Keywords: urbanization; experimental design; paired watershed; environmental gradient; urban stream; development; impacts

KeyWords Plus: MULTIPLE SPATIAL SCALES; LAND-USE; MANAGEMENT-PRACTICES; WATER-QUALITY; CATCHMENT URBANIZATION; STORMWATER MANAGEMENT; STREAM TEMPERATURE; BIOTIC INTEGRITY; IMPACTS; HABITAT

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APPENDIX 17. MOST HIGHLY CITED STORM WATER PAPERS– COLUMBUS

Uncertainty in measured sediment and nutrient flux in runoff from small agricultural watersheds

Author(s): Harmel RD, King KW

Source: TRANSACTIONS OF THE ASAE **Volume:** 48 **Issue:** 5 **Pages:** 1713-1721 **Published:** SEP-OCT 2005

Times Cited: 15 **References:** 27 **Citation Map**

Abstract: Storm water quality sampling techniques vary considerably in the resources required for sample collection and analysis, and potentially in the resulting constituent flux estimates. However quantitative information on sampling error is rarely available for use in selecting appropriate sampling techniques and for evaluating the effects of various techniques on measured results. In an effort to quantify, uncertainty in constituent flux measurement for flow-interval sampling techniques,water quality data were collected from two small watersheds in central Texas. Each watershed was instrumented with two automated samplers. One sampler was programmed to take high-frequency composite samples to determine the actual load for each runoff event. The other sampler collected discrete samples, from which 15 strategies with 1.32 to 5.28 mm, volumetric depth sampling intervals with discrete and composite sampling were produced. Absolute errors were consistently larger for suspended sediment than for NO3-N and PO4-P for both individual event and cumulative loads, which is attributed to differences in the variability of within-event constituent concentrations. The mean event-specific coefficient of variation (CV) ranged from 0.53 to 0.69 for sediment, from 0.38 to 0.39 for NO3-N, and from 0.18 to 0.21 for PO4-P. Event-specific CV values were correlated with the magnitude of absolute errors for individual event loads, with mean r values of 0.52 and 0.57 for the two sites. Cumulative errors were less than +/- 10% for all sampling strategies evaluated. Significant differences in load estimate error resulted from changes in sampling interval, but increasing the number of composited samples had no effect; therefore, composite sampling is recommended if necessary to manage the number of samples collected.

Document Type: Article

Language: English

Author Keywords: nitrogen; nonpoint-source pollution; phosphorus; sampling error; water quality sampling

KeyWords Plus: SAMPLING STRATEGIES; ACCURACY; LOADS; GRAB

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Modelling hydrological processes in created freshwater wetlands: an integrated system approach

Author(s): Zhang L, Mitsch WJ

Source: ENVIRONMENTAL MODELLING & SOFTWARE **Volume:** 20 **Issue:** 7 **Pages:** 935-946 **Published:** JUL 2005

Times Cited: 14 **References:** 48 **Citation Map**

Abstract: This study investigates hydrologic processes of four different flow-through created freshwater wetlands in Ohio, USA, by use of several versions of a simple daily mass-balance water budget model. The model includes surface inflows and outflows, precipitation, evapotranspiration, and groundwater seepage. We calibrated the daily water budget for two experimental wetlands that had pumped inflow during 1999 and validated it during 2000-2002 on the same basins. The coefficient of prediction efficiency is 0.70 and the modelled hydroperiod followed observed water depths during the calibration period well. The average retention time in the calibration year 1999 was 4.4-4.6 days. The model was applied to a 3-ha created riparian wetland that receives river flooding. Results illustrated that this wetland has developed a hydroperiod with more than sufficient flooding to ensure that it will meet the hydrologic criteria of a formal jurisdictional wetland definition in the USA. Water budget predictions for a stormwater wetland provided useful design information for hydroperiod and hydrologic dynamics prior to the construction of that system. The model was simulated for average, dry, and wet years. An integrated systems approach was developed using a STELLA 7.0 with its capabilities of dynamic interface level control (e.g. buttons and switches) features. (c) 2004 Elsevier Ltd. All rights reserved.

Document Type: Article

Language: English

Author Keywords: wetland hydrology; flow-through wetlands; wetland creation and restoration; mitigation wetland; stormwater wetland; wetland hydrologic modelling; wetland hydroperiod; STELLA; Olentangy River Wetland Research Park

KeyWords Plus: CONSTRUCTED WETLANDS; PERSPECTIVE; PHOSPHORUS; MANAGEMENT; RETENTION; BALANCE; DESIGN

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Effects of wetland depth and flow rate on residence time distribution characteristics

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Source: ECOLOGICAL ENGINEERING **Volume:** 23 **Issue:** 3 **Pages:** 189-203 **Published:** NOV 1 2004

Times Cited: 11 **References:** 26 **Citation Map**

Abstract: The residence time distribution (RTD) representing the hydraulics of a wetland is an important tool for modeling and designing treatment wetlands for optimal constituent removal. To correctly use RTD results, it is necessary to understand the conditions under which this distribution remains stable. Dye tracer experiments were conducted on a stormwater treatment wetland to investigate hydrologic factors affecting RTD characteristics. Dye was introduced into the inflow under normal flow conditions and during simulated storm flows, providing a range of flow rates and water levels. Dye distribution in the outlet was measured using an in situ fluorometer. Results indicate that flow rates did not have a significant effect on RTD characteristics. The RTDs normalized for volume and flow demonstrated a greater amount of short-circuiting and a larger mixing scale when water depth increased, demonstrating that water level can have a direct impact on the RTD of a wetland. This effect suggests that more than one RTD may be necessary for analyzing a wetland subject to changing water levels. For the wetland in this study, increasing the water depth elicited a decrease in hydraulic efficiency. Understanding such factors that affect hydraulic efficiency will aid in the design and management of wetlands. (C) 2004 Elsevier B.V. All rights reserved.

Document Type: Article

Language: English

Author Keywords: hydraulic efficiency; rhodamine WT; nonideal flow; moment analysis; hydrology; dye tracer

KeyWords Plus: EMERGENT VEGETATION; CONSTRUCTED WETLANDS; PONDS; DIFFUSION; TRACER

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Practical guidance for discharge and water quality data collection on small watersheds

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Source: TRANSACTIONS OF THE ASABE **Volume:** 49 **Issue:** 4 **Pages:** 937-948 **Published:** JUL-AUG 2006

Times Cited: 10 **References:** 85 **Citation Map**

Abstract: Many sampling projects have been initiated or modified in recent years to quantify the effects of water quality protection and enhancement programs. Although comprehensive references on the theory and procedures related to discharge data collection have been published, similar guides to water quality sampling are not available. Several sources provide general guidance on sampling project design and on manual sampling procedures, but only recently has detailed information on automated storm water quality sampling been developed. As a result, a compilation of available information on the design of water quality sampling projects is needed to support sound decision-making regarding data collection resources and procedural alternatives. Thus, the objective of this article is to compile and present practical guidance for collection of discharge and water quality constituent data at the field and small watershed scale. The guidelines included are meant to increase the likelihood of project success, specifically accurate characterization of water quality within project resource constraints. Although many considerations are involved in establishing a successful sampling project, the following recommendations are generally applicable to field and small watershed studies: (1) consider wet-weather access, travel time, equipment costs, and sample collection method in the selection of sampling site numbers and locations; (2) commit adequate resources for equipment maintenance and repair; (3) assemble a well-trained, on-call field staff able to make frequent site visits; (4) establish reliable stage-discharge relationships for accurate discharge measurement; (5) use periodic manual grab sample collection with adequate frequency to characterize baseflow water quality; (6) use flow-interval or time-interval storm sampling with adequate frequency to characterize storm water quality; and (7) use composite sampling to manage sample numbers without substantial increases in uncertainty.

Document Type: Article

Language: English

Author Keywords: agricultural runoff; water quality sampling; nonpoint-source pollution; urban storm water

KeyWords Plus: DROP-BOX WEIR; SAMPLING STRATEGIES; SUSPENDED-SEDIMENT; AGRICULTURAL WATERSHEDS; SMALL STREAMS; FLOW; PHOSPHORUS; RUNOFF; LOADS; UNCERTAINTY

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Nutrient load generated by storm event runoff from a golf course watershed

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Source: JOURNAL OF ENVIRONMENTAL QUALITY **Volume:** 36 **Issue:** 4 **Pages:** 1021-1030 **Published:** JUL-AUG 2007

Times Cited: 9 **References:** 67 **Citation Map**

Abstract: Turf, including home lawns, roadsides, golf courses, parks, etc., is often the most intensively managed land use in the urban landscape. Substantial inputs of fertilizers and water to maintain turf systems have led to a perception that turf systems are a major contributor to nonpoint source water pollution. The primary objective of this study was to quantify nutrient (NO3-N, NH4-N, and PO4-P) transport in storm-generated surface runoff from a golf course. Storm event samples were collected for 5 yr (1 Apr. 1998-31 Mar. 2003) from the Morris Williams Municipal Golf Course in Austin, TX. Inflow and outflow samples were collected from a stream that transected the golf course. One hundred fifteen runoff-producing precipitation events were measured. Median NO3-N and PO4-P concentrations at the outflow location were significantly ($p < 0.05$) greater than like concentrations measured at the inflow location; however, median outflow NH4-N concentration was significantly less than the median inflow concentration. Storm water runoff transported 1.2 kg NO3-N ha(-1) yr(-1), 0.23 kg NH4-N ha(-1) yr(-1), and 0.51 kg PO4-P ha(-1) yr(-1) from the course. These amounts represent approximately 3.3% of applied N and 6.2% of applied P over the contributing area for the same period. NO3-N transport in storm water runoff from this course does not pose a substantial environmental risk; however, the median PO4-P concentration exiting the course exceeded the USEPA recommendation of 0.1 mg L-1 for streams not discharging into lakes. The PO4-P load measured in this study was comparable to soluble P rates measured from agricultural lands. The findings of this study emphasize the need to balance golf course fertility management with environmental risks, especially with respect to phosphorus.

Document Type: Article

Language: English

KeyWords Plus: QUALITY IMPACTS; NITROGEN LOSSES; PHOSPHORUS LOSS; TURFGRASS; SEDIMENT; FERTILIZATION; PESTICIDE; TRANSPORT; MOVEMENT; REMOVAL

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Urban Battery Litter

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Source: JOURNAL OF ENVIRONMENTAL ENGINEERING-ASCE **Volume:** 135 **Issue:** 1 **Pages:** 46-57 **Published:** JAN 2009

Times Cited: 4 **References:** 25 **Citation Map**

Abstract: Consumer batteries littered in urban environments are generally littered on pavements. These batteries rapidly deteriorate by several physical and chemical mechanisms that breach their structural integrity and release a host of environmentally significant pollutants (Ag, Ba, Cd, Cr, Cu, Hg, Li, Mn, Ni, Pb, Ti, Zn) to storm-water runoff. Research on urban battery litter began at Case Western Reserve University in the summer of 2001. This paper presents much of what is currently known about the occurrence of urban battery litter. Data are presented on the number, type, and condition of over 6,100 littered batteries collected in field surveys conducted in urban areas around Cleveland. Methods are presented for estimating battery litter rates and for characterizing the size, structure, internal chemistry, deterioration status, life expectancy, and contaminant release potential of urban battery litter. Results from field study sites demonstrate that at "hot spot" locations, battery litter can be a significant source of contamination. Annual litter rates as high as 215 batteries/ha (nearly 90/acre) of parking lot pavement and 0.4 batteries/m of street curb (one battery for every 8 ft. of curb) have been measured. At some locations the Zn mass loading from batteries approaches 1 kg/ha and could be the most significant source of pavement-related Zn released to urban storm-water runoff.

Document Type: Article

Language: English

KeyWords Plus: HIGHWAY RUNOFF; ZINC

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Nutrient flux in storm water runoff and baseflow from managed turf

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Source: ENVIRONMENTAL POLLUTION **Volume:** 150 **Issue:** 3 **Pages:** 321-328 **Published:** DEC 2007

Times Cited: 4 **References:** 49 **Citation Map**

Abstract: The urban landscape is comprised of many land uses, none more intensively managed than turfgrass; however, quantification of nutrient losses from specific land uses within urban watersheds, specifically golf courses is limited. Nitrate (NO3-N) and dissolved reactive phosphorus (DRP) were measured on a golf course in Austin, TX,: USA from April 1, 1998 to March 31, 2003. NO3-N and DRP concentrations measured in storm flow were significantly greater exiting the course compared to those entering the course. Significant differences were also measured in baseflow NO3-N concentrations. The measured loading from the course was 4.0 kg NO3-N ha(-1) yr(-1) (11% of applied) and 0.66 kg DRP ha(-1) yr(-1) (8% of applied). The resulting concentrations contributed by the course were 1.2 mg L-1 NO3-N and 0.2 mg L-1 DRP. At these levels, NO3-N poses minimal environmental risk. However, the DRP concentration is twice the recommended level to guard against eutrophication. (C) 2007 Elsevier Ltd. All rights reserved.

Document Type: Article

Language: English

Author Keywords: nitrate; dissolved reactive phosphorus; urban; water quality; golf; watershed

KeyWords Plus: GOLF-COURSES; PRECAMBRIAN SHIELD; NITRATE-NITROGEN; PHOSPHORUS LOSS; SURFACE-WATER; LAND USES; TURFGRASS; QUALITY; URBAN; PESTICIDE

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Prospects for enhanced groundwater recharge via infiltration of urban storm water runoff: A case study

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Source: JOURNAL OF SOIL AND WATER CONSERVATION **Volume:** 62 **Issue:** 3 **Pages:** 129-137 **Published:** MAY-JUN 2007

Times Cited: 4 **References:** 22 **Citation Map**

Abstract: The rain garden is an urban storm water best management practice that is used to infiltrate runoff close to its source, thereby disconnecting impervious area while providing an avenue for groundwater recharge. Groundwater recharge may provide additional benefits to aquatic ecosystems via enhancement of stream base flow.Yet, soil conditions can impact on certain aspects of rain garden performance and its provision of ecosystem services. In the context of a watershed-level study to determine the effectiveness of decentralized storm water management, we performed an order 1 soil survey of the Shepherd Creek watershed (Cincinnati, Ohio) to delineate soils and identify and describe representative soil pedons, and then we assessed subsoil saturated hydraulic conductivity (K-sat) in each of the three dominant subsoils with qualitative estimation methods and directly with constant-head permeametry. We next simulated the effect of subsoil hydrology of a hypothetical implementation of a parcel-level rain garden on groundwater recharge in this watershed. Measured subsoil K-sat were overall very low with a mean of 0.01 cm hr(-1) (4 x 10(-3) in hr(-1)) for Eden soil and a mean of 0.2 cm hr(-1) (0.08 in hr(-1)) for both the fine-silty family and Switzerland soils. Compared with the measured values, qualitative measures overestimated K-sat and depth of recharge for Eden and fine-silty, and underestimated the same for Switzerland. Based on median parcel features and 2004 warm-season storm records, rain gardens in the fine-silty family and Switzerland subsoils would be expected to contribute about 6 cm (2.4 in) of recharge as compared to the 2 cm (0.8 in) expected in Eden soils. Our results also suggest the highest potential for abatement of storm water quantity abatement in Eden soils, with some partitioning of this water to recharge as an added benefit. Our approach and results form the basis for a comprehensive understanding of how storm water management decentralized at the watershed level may positively impact ecosystem services.

Document Type: Article

Language: English

Author Keywords: base flow; best management practices; ecosystem services; groundwater recharge; rain garden; runoff; storm water

KeyWords Plus: MANAGEMENT; SYSTEMS

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Analysis and modeling of suspended solids from high-frequency monitoring in a stormwater treatment wetland

Author(s): Holland JF, Martin JF, Granata T, Bouchard V, Quigley M, Brown L

Source: ECOLOGICAL ENGINEERING **Volume:** 24 **Issue:** 3 **Pages:** 159-176 **Published:** FEB 20 2005

Times Cited: 4 **References:** 30 **Citation Map**

Abstract: Tools for modeling pulsed flows and constituent fluxes in wetlands, although well developed in theory, have not been well tested in practice. High-frequency monitoring of suspended solids and flows in a stormwater treatment wetland enabled application and analysis of these tools. A dynamic flow- and volume-weighted time variable, analogous to the retention time in steady-flow systems, is one important tool tested in this study. Cross-correlations with time lags demonstrated that the dynamic time variable was a better predictive variable of pulsed events than was the standard, static time variable. Although plug-flow models are typically used for steady-flow wetlands, residence time distribution (RTD) models are indispensable for describing pulsed flows and constituent fluxes in wetlands. This study demonstrated that RTD modeling with reaction kinetics of suspended solids during storm events produces a better explanation of outflow data than possible with steady, plug-flow models. Using only input and output data, an RTD model explained sedimentation rates with less unexplained variance than the standard, plug-flow model. The results of this study underscore the importance and utility of RTD modeling for complex flows. (c) 2004 Elsevier B.V. All rights reserved.

Document Type: Article

Language: English

Author Keywords: pulsed flow; sedimentation; turbidity; first-order reaction rate; chemical engineering; convolution integral

KeyWords Plus: NONPOINT-SOURCE POLLUTION; CONSTRUCTED WETLANDS; PHOSPHORUS RETENTION; DISTRIBUTIONS; REMOVAL; RUNOFF; PONDS

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A hierarchical optimization approach to watershed land use planning

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Source: WATER RESOURCES RESEARCH **Volume:** 43 **Issue:** 11 **Article Number:** W11416 **Published:** NOV 21 2007

Times Cited: 2 **References:** 49 **Citation Map**

Abstract: A hierarchical optimization framework is developed to analyze spatially complex watersheds and to support spatial decision making for land management practices. A watershed is subdivided into smaller spatial units according to its hierarchy, and a three-level optimization approach determines optimal land allocations at the subarea, catchment, and 30 m cell levels. A storm water runoff simulation model is used to generate peak discharge pseudo data, under different land use patterns. The results are inputs to regression analyses, and the functional relationships between peak discharges and land use variables are estimated as quadratic functions (r(2) > 0.90). These functions are used in the optimization models to allocate future land uses to minimize peak discharges at the watershed and subarea outlets. The integrated hydrological land use optimization (IHLUO) model is next used to allocate land uses at the cell level. The results are promising, with a 46% reduction of the peak discharge rate as compared to the rate generated by the current land use pattern. The results provide site-specific guidelines for land use management and practices at a high spatial resolution (30 m). The proposed methodology is applied to the Old Woman Creek watershed, located in the southwestern basin of Lake Erie (Ohio).

Document Type: Article

Language: English

KeyWords Plus: MANAGEMENT-PRACTICES; LAKE ERIE; CONSEQUENCES; METHODOLOGY; DISCHARGES; POLLUTION; DYNAMICS; QUALITY; MODEL; SCALE

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APPENDIX 18. MOST HIGHLY CITED STORM WATER PAPERS– WORLDWIDE

The urban stream syndrome: current knowledge and the search for a cure

Author(s): Walsh CJ, Roy AH, Feminella JW, Cottingham PD, Groffman PM, Morgan RP

Source: JOURNAL OF THE NORTH AMERICAN BENTHOLOGICAL SOCIETY **Volume:** 24 **Issue:** 3 **Pages:** 706-723 **Published:** SEP 2005

Times Cited: 163 **References:** 76 **Citation Map**

Abstract: The term "urban stream syndrome" describes the consistently observed ecological degradation of streams draining urban land. This paper reviews recent literature to describe symptoms of the syndrome, explores mechanisms driving the syndrome, and identifies appropriate goals and methods for ecological restoration of urban streams. Symptoms of the urban stream syndrome include a flashier hydrograph, elevated concentrations of nutrients and contaminants, altered channel morphology, and reduced biotic richness, with increased dominance of tolerant species. More research is needed before generalizations can be made about urban effects on stream ecosystem processes, but reduced nutrient uptake has been consistently reported. The mechanisms driving the syndrome are complex and interactive, but most impacts can be ascribed to a few major large-scale sources, primarily urban stormwater runoff delivered to streams by hydraulically efficient drainage systems. Other stressors, such as combined or sanitary sewer overflows, wastewater treatment plant effluents, and legacy pollutants (long-lived pollutants from earlier land uses) can obscure the effects of stormwater runoff. Most research on urban impacts to streams has concentrated on correlations between instream ecological metrics and total catchment imperviousness. Recent research shows that some of the variance in such relationships can be explained by the distance between the stream reach and urban land, or by the hydraulic efficiency of stormwater drainage The mechanisms behind such patterns require experimentation at the catchment scale to identify the best management approaches to conservation and restoration of streams in urban catchments. Remediation of stormwater impacts is most likely to be achieved through widespread application of innovative approaches to drainage design. Because humans dominate urban ecosystems, research on urban stream ecology will require a broadening of stream ecological research to integrate with social, behavioral, and economic research.

Author Keywords: urbanization; streams; stormwater management; water quality; hydrology; ecosystem processes; imperviousness; restoration; urban ecology

KeyWords Plus: LAND-USE; MACROINVERTEBRATE COMMUNITIES; CATCHMENT URBANIZATION; DIATOM COMMUNITIES; MELBOURNE REGION; BIOTIC INTEGRITY; RIPARIAN ZONES; NITROGEN-CYCLE; MANAGEMENT; IMPACTS

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Stream restoration in urban catchments through redesigning stormwater systems: looking to the catchment to save the stream

Author(s): Walsh CJ, Fletcher TD, Ladson AR

Source: JOURNAL OF THE NORTH AMERICAN BENTHOLOGICAL SOCIETY **Volume:** 24 **Issue:** 3 **Pages:** 690-705 **Published:** SEP 2005

Times Cited: 77 **References:** 44 **Citation Map**

Abstract: Restoration of streams degraded by urbanization has usually been attempted by enhancement of instream habitat or riparian zones. Such restoration approaches are unlikely to substantially improve instrearn ecological condition because they do not match the scale of the degrading process. Recent studies of urban impacts on streams in Melbourne, Australia, on water chemistry, algal biomass and assemblage composition of diatoms and invertebrates, suggested that the primary degrading process to streams in many urban areas is effective imperviousness (EI), the proportion of a catchment covered by impervious surfaces directly connected to the stream by stormwater drainage pipes. The direct connection of impervious surfaces to streams means that even small rainfall events can produce sufficient surface runoff to cause frequent disturbance through regular delivery of water and pollutants; where impervious surfaces are not directly connected to streams, small rainfall events are intercepted and infiltrated. We, therefore, identified use of alternative drainage methods, which maintain a near-natural frequency of surface runoff from the catchment, as the best approach to stream restoration in urban catchments and then used models of relationships between 14 ecological indicators and EI to determine restoration objectives. Ecological condition, as indicated by concentrations of water-quality variables, algal biomass, and several measures of diatom and macroinvertebrate assemblage composition, declined with increasing El until a threshold was reached (EI = 0.01-0.14), beyond which no further degradation was observed. We showed, in a sample catchment, that it is possible to redesign the drainage system to reduce El to a level at which the models predict detectable improvement in most ecological indicators. Distributed, low-impact design measures are required that intercept rainfall from small events and then facilitate its infiltration, evaporation, transpiration, or storage for later in-house use.

Document Type: Proceedings Paper

Language: English

Author Keywords: ecological restoration; urban; watershed; stormwater; impervious area; drainage connection; low-impact design; water-sensitive urban design; retrofit

KeyWords Plus: ECOLOGY; CONSERVATION; HABITAT; URBANIZATION; MANAGEMENT; CALIFORNIA; FRAMEWORK; RIPARIAN; IMPACTS; LOADS

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Distribution of Cryptosporidium genotypes in storm event water samples from three watersheds in New York

Author(s): Jiang JL, Alderisio KA, Xiao LH

Source: APPLIED AND ENVIRONMENTAL MICROBIOLOGY **Volume:** 71 **Issue:** 8 **Pages:** 4446-4454 **Published:** AUG 2005

Times Cited: 48 **References:** 38 **Citation Map**

Abstract: To assess the source and public health significance of Cryptosporidium oocyst contamination in storm runoff, a PCR-restriction fragment length polymorphism technique based on the small-subunit rRNA gene was used in the analysis of 94 storm water samples collected from the Malcolm Brook and N5 stream basins in New York over a 3-year period. The distribution of Cryptosporidium in this study was compared with the data obtained from 27 storm water samples from the Ashokan Brook in a previous study. These three watersheds represented different levels of human activity. Among the total of 121 samples analyzed from the three watersheds, 107 were PCR positive, 101 of which (94.4%) were linked to animal sources. In addition, C. hominis (W14) was detected in six samples collected from the Malcolm Brook over a 2-week period. Altogether, 22 Cryptosporidium species or genotypes were found in storm water samples from these three watersheds, only 11 of which could be attributed to known species/groups of animals. Several Cryptosporidium spp. were commonly found in these three watersheds, including the W1 genotype from an unknown animal source, the W4 genotype from deer, and the W7 genotype from muskrats. Some genotypes were found only in a particular watershed. Aliquots of 113 samples were also analyzed by the Environmental Protection Agency (EPA) Method 1623; 63 samples (55.7%) were positive for Cryptosporidium by microscopy, and 39 (78%) of the 50 microscopy-negative samples were positive by PCR. Results of this study demonstrate that molecular techniques can complement traditional detection methods by providing information on the source of contamination and the human-infective potential of Cryptosporidium oocysts found in water.

Document Type: Article

Language: English

KeyWords Plus: POLYMERASE-CHAIN-REACTION; PARVUM OOCYSTS; PUBLIC-HEALTH; RIVER WATER; PARASITES; GIARDIA; IDENTIFICATION; CONTAMINATION; TRANSMISSION; TAXONOMY

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Chemical and microbiological parameters in New Orleans floodwater following Hurricane Katrina

Author(s): Pardue JH, Moe WM, McInnis D, Thibodeaux LJ, Valsaraj KT, Maciasz E, van Heerden I, Korevec N, Yuan QZ

Source: ENVIRONMENTAL SCIENCE & TECHNOLOGY **Volume:** 39 **Issue:** 22 **Pages:** 8591-8599 **Published:** NOV 15 2005

Times Cited: 47 **References:** 15 **Citation Map**

Abstract: Hurricane Katrina, rated as a Category 4 hurricane on the Saffir-Simpson scale, made landfall on the U. S. Gulf Coast near New Orleans, Louisiana on Monday, August 29, 2005. The storm brought heavy winds and rain to the city, and several levees intended to protect New Orleans from the water of Lake Pontchartrain were breached. Consequently, up to 80% of the city was flooded with water reaching depths in excess of three meters in some locations. Research described in this paper was conducted to provide an initial assessment of contaminants present in floodwaters shortly after the storm and to characterize water pumped out of the city into Lake Pontchartrain once dewatering operations began several days after the storm. Data are presented which demonstrate that during the weeks following the storm, floodwater was brackish and well-buffered with very low concentrations of volatile and semivolatile organic pollutants. Dissolved oxygen was depleted in surface floodwater, averaging 1.6 mg/L in the Lakeview district and 4.8 mg/L in the Mid City district. Dissolved oxygen was absent (<0.02 mg/L) at the bottom of the floodwater column in the Mid-City district 9 days after the storm. Chemical oxygen demand (Mid City average 79.9 mg/L) and fecal coliform bacteria (Mid City average 1.4 x 10(5) MPN/100 mL) were elevated in surface floodwater but typical of stormwater runoff in the region. Lead, arsenic, and in some cases, chromium, exceeded drinking water standards but with the exception of some elevated Pb concentrations generally were typical of stormwater. Data suggest that what distinguishes Hurricane Katrina floodwater is the large volume and the human exposure to these pollutants that accompanied the flood, rather than very elevated concentrations of toxic pollutants.

Document Type: Article

Language: English

KeyWords Plus: STORM WATER

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Experimental evidence for the effects of additional water, nutrients and physical disturbance on invasive plants in low fertility Hawkesbury Sandstone soils, Sydney, Australia

Author(s): Leishman MR, Thomson VP

Source: JOURNAL OF ECOLOGY **Volume:** 93 **Issue:** 1 **Pages:** 38-49 **Published:** FEB 2005

Times Cited: 45 **References:** 50 **Citation Map**

Document Type: Article

Language: English

Author Keywords: disturbance; exotic; growth responses; infertile soils; invisibility; specific leaf area; stormwater; survival

KeyWords Plus: OPEN FOREST ECOTONES; LANTANA-CAMARA L.; EXOTIC PLANTS; SPECIES RICHNESS; URBAN BUSHLAND; NATIVE PLANTS; GROWTH; INVASIBILITY; COMMUNITIES; PHOSPHORUS

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Evaluation and optimization of bioretention media for treatment of urban storm water runoff

Author(s): Hsieh CH, Davis AP

Source: JOURNAL OF ENVIRONMENTAL ENGINEERING-ASCE **Volume:** 131 **Issue:** 11 **Pages:** 1521-1531 **Published:** NOV 2005

Times Cited: 43 **References:** 26 **Citation Map**

Abstract: Bioretention is a relatively new urban storm water best management practice. The objective of this study is to provide insight on media characteristics that control bioretention water management behavior. Eighteen bioretention columns and six existing bioretention facilities were evaluated employing synthetic runoff. In columns, the runoff infiltration rate through different media mixtures ranged from 0.28 to 8.15 cm/min at a fixed 15 cur head. For pollutant removals, the results showed excellent removal for oil/grease (> 96%). Total lead removal (from 66 to > 98%) decreased when the total suspended solids level in the effluent increased (removed from 29 to > 96%). The removal efficiency of total phosphor-us ranged widely (4-99%), apparently due to preferential flow patterns, and both nitrate and ammonium were moderate to poorly removed, with removals ranging from 1 to 43% and from 2 to 49%, respectively. Two more on-site experiments were conducted during a rainfall event to compare with laboratory investigation. For bioretention design, two media design profiles are proposed; > 96% TSS, > 96% O/G, > 98% lead, > 70% TP, > 9% nitrate, and > 20% ammonium removals are expected with these designs.

Document Type: Article

Language: English

Author Keywords: retention; stormwater management; runoff; urban areas; infiltration rate; pollutants; optimization

KeyWords Plus: PHOSPHORUS; SOIL; REMOVAL; ADSORPTION; TRANSPORT; SORPTION; COPPER; ZINC; FLOW; LEAD

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Investigating hydrologic alteration as a mechanism of fish assemblage shifts in urbanizing streams

Author(s): Roy AH, Freeman MC, Freeman BJ, Wenger SJ, Ensign WE, Meyer JL

Source: JOURNAL OF THE NORTH AMERICAN BENTHOLOGICAL SOCIETY **Volume:** 24 **Issue:** 3 **Pages:** 656-678 **Published:** SEP 2005

Times Cited: 42 **References:** 61 **Citation Map**

Abstract: Stream biota in urban and suburban settings are thought to be impaired by altered hydrology, however, it is unknown what aspects of the hydrograph alter fish assemblage structure and which fishes are most vulnerable to hydrologic alterations in small streams. We quantified hydrologic variables and fish assemblages in 30 small streams and their subcatchments (area 8-20 km(2)) in the Etowah River Catchment (Georgia, USA). We stratified streams and their subcatchments into 3 landcover categories based on imperviousness (< 10%, 10-20%, > 20% of subcatchment), and then estimated the degree of hydrologic alteration based on synoptic measurements of baseflow yield. We derived hydrologic variables from stage gauges at each study site for 1 y (January 2003-2004). Increased imperviousness was positively correlated with the frequency of storm events and rates of the rising and falling limb of the hydrograph (i.e., storm "flashiness") during most seasons. Increased duration of low flows associated with imperviousness only occurred during the autumn low-flow period, and this measure corresponded with increased richness of lentic tolerant species. Altered storm flows in summer and autumn were related to decreased richness of endemic, cosmopolitan, and sensitive fish species, and decreased abundance of lentic tolerant species. Species predicted to be sensitive to urbanization, based on specific life-history or habitat requirements, also were related to stormflow variables and % fine bed sediment in riffles. Overall, hydrologic variables explained 22 to 66% of the variation in fish assemblage richness and abundance. Linkages between hydrologic alteration and fish assemblages were potentially complicated by contrasting effects of elevated flows on sediment delivery and scour and mediating effects of high stream gradient on sediment delivery from elevated flows. However, stormwater management practices promoting natural hydrologic regimes are likely to reduce the impacts of catchment imperviousness on stream fish assemblages.

Document Type: Proceedings Paper

Language: English

Author Keywords: fishes; impervious surface cover; urbanization; hydrology; stormflow; baseflow; sediment; stormwater management

KeyWords Plus: ALTERED FLOW REGIMES; RIVER-BASIN; AQUATIC BIODIVERSITY; IMPERVIOUS SURFACES; WATER-QUALITY; URBANIZATION; AREA; MITIGATION; USA; HOMOGENIZATION

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Detection of human-derived fecal pollution in environmental waters by use of a PCR-based human polyomavirus assay

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Source: APPLIED AND ENVIRONMENTAL MICROBIOLOGY **Volume:** 72 **Issue:** 12 **Pages:** 7567-7574 **Published:** DEC 2006

Times Cited: 38 **References:** 64 **Citation Map**

Abstract: Regulatory agencies mandate the use of fecal coliforms, Escherichia coli or Enterococcus spp., as microbial indicators of recreational water quality. These indicators of fecal pollution do not identify the specific sources of pollution and at times underestimate health risks associated with recreational water use. This study proposes the use of human polyomaviruses (HPyVs), which are widespread among human populations, as indicators of human fecal pollution. A method was developed to concentrate and extract HPyV DNA from environmental water samples and then to amplify it by nested PCR. HPyVs were detected in as little as 1 mu l of sewage and were not amplified from dairy cow or pig wastes. Environmental water samples were screened for the presence of HPyVs and two additional markers of human fecal pollution: the Enterococcus faecium esp gene and the 16S rRNA gene of human-associated Bacteroides. The presence of human-specific indicators of fecal pollution was compared to fecal coliform and Enterococcus concentrations. HPyVs were detected in 19 of 20 (95%) samples containing the E. faecium esp gene and Bacteroides human markers. Weak or no correlation was observed between the presence/absence of human-associated indicators and counts of indicator bacteria. The sensitivity, specificity, and correlation with other human-associated markers suggest that the HPyV assay could be a useful predictor of human fecal pollution in environmental waters and an important component of the microbial-source-tracking "toolbox."

Document Type: Article

Language: English

KeyWords Plus: MICROBIAL SOURCE TRACKING; POLYMERASE-CHAIN-REACTION; JC-VIRUS; BK-VIRUS; ESCHERICHIA-COLI; INDICATOR BACTERIA; ENTERIC VIRUSES; ENTEROCOCCUS-FAECIUM; STORMWATER RUNOFF; LAKE-MICHIGAN

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Sources of heavy metals and polycyclic aromatic hydrocarbons in urban stormwater runoff

Author(s): Brown JN, Peake BM

Source: SCIENCE OF THE TOTAL ENVIRONMENT **Volume:** 359 **Issue:** 1-3 **Pages:** 145-155 **Published:** APR 15 2006

Times Cited: 38 **References:** 29 **Citation Map**

Abstract: Polycyclic aromatic hydrocarbons (PAHs) and heavy metals were measured in road debris collecting in urban areas and in the suspended sediment (SS) component of runoff from two stormwater catchments in Dunedin, New Zealand. Levels in the road debris ranged from 119-527 mu g/g for lead, 50-464 mu g/g for copper, 241-1 325 mu g/g for zinc and 1.20-11.6 mu g/g for Sigma 16PAH. The SS from the largely rural catchment (20% urban) had similar concentrations to the road debris, indicating that this urban material was the main source of the contaminants measured in the stormwater. Similar PAH fingerprint profiles and isomer ratios indicative of dominant pyrogenic (combustion) sources were also found in these two groups of materials. The SS from the 100% urban catchment contained 2- to 6-fold higher concentrations of metals and 10-fold greater levels of Sigma 16PAH. The higher levels of lead and copper were probably a result of industrial land uses in this catchment, while the additional zinc was linked to an abundance of zinc-galvanised roofing iron in the catchment's residential suburbs. The PAH profiles and isomer ratios were different for this urban catchment and suggested that a disused gasworks was contributing PAHs to the stormwater runoff. (C) 2005 Elsevier B.V. All rights reserved.

Document Type: Article

Language: English

Author Keywords: stormwater; PAHs; metals; fingerprint; street dust; gasworks

KeyWords Plus: SURFICIAL SEDIMENTS; PAHS; PARIS; CATCHMENT; POLLUTION; WATERS; FRANCE; ORIGIN; RIVER

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Coastal water quality impact of stormwater runoff from an urban watershed in southern California

Author(s): Ahn JH, Grant SB, Surbeck CQ, Digiacomo PM, Nezlin NP, Jiang S

Source: ENVIRONMENTAL SCIENCE & TECHNOLOGY **Volume:** 39 **Issue:** 16 **Pages:** 5940-5953 **Published:** AUG 15 2005

Times Cited: 37 **References:** 43 **Citation Map**

Abstract: Field studies were conducted to assess the coastal water quality impact of stormwater runoff from the Santa Ana River, which drains a large urban watershed located in southern California. Stormwater runoff from the river leads to very poor surf zone water quality, with fecal indicator bacteria concentrations exceeding California ocean bathing water standards by up to 500%. However, cross-shore currents (e.g., rip cells) dilute contaminated surf zone water with cleaner water from offshore, such that surf zone contamination is generally confined to < 5 km around the river outlet. Offshore of the surf zone, stormwater runoff ejected from the mouth of the river spreads out over a very large area, in some cases exceeding 100 km(2) on the basis of satellite observations. Fecal indicator bacteria concentrations in these large stormwater plumes generally do not exceed California ocean bathing water standards, even in cases where offshore samples test positive for human pathogenic viruses (human adenoviruses and enteroviruses) and fecal indicator viruses (F+ coliphage). Multiple lines of evidence indicate that bacteria and viruses in the offshore stormwater plumes are either associated with relatively small particles (< 53 mu m) or not particle-associated. Collectively, these results demonstrate that stormwater runoff from the Santa Ana River negatively impacts coastal water quality, both in the surf zone and offshore. However, the extent of this impact, and its human health significance, is influenced by numerous factors, including prevailing ocean currents, within-plume processing of particles and pathogens, and the timing, magnitude, and nature of runoff discharged from river outlets over the course of a storm.

Document Type: Article

Language: English

KeyWords Plus: FECAL INDICATOR BACTERIA; SANTA-MONICA BAY; POLYMERASE-CHAIN-REACTION; SURF ZONE; HUNTINGTON-BEACH; FIELD-MEASUREMENTS; ORANGE-COUNTY; POLLUTION; VARIABILITY; TRANSPORT

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