Table 18. Materials Used in Medical Waste Emissions Tests

The following is a list of media, reagents, and organisms used for testing biological emissions from medical waste treatment facilities in June, 1993

Materials	Lot Number	Quality Control
Bacillus stearothermophilus (ATCC 12980)	23731	+controls quantify (field vials & filters)
Bacillus subtilis var. *niger* (ATCC 9372)	LG013C	+controls quantify (field vials & filters)
Trypticase Soy Agar (BBL 11043)	A6DBQ1	*BST / BSN* +controls (field vials & filters)
Nutrient Agar (BBL 11043)	C1DTGS	*BSN* +controls -controls
Tyrosine (used in agar, Baker X260-05)	F25728	*BSN* +controls -controls
Sodium thiosulfate (Fisher S-446)	795545	autoclaved
Phosphate buffer (AOAC method)		autoclaved
Polycarbonate filters (Nalge 135-4020)	TQC 851521 C2 201	sterile
Cellulose nitrate filters (Nalge 135-4020)	TQC 603880 A2 201	sterile

BST = *Bacillus stearothermophilus* ATCC 12980
BSN = *Bacillus subtilis* var. *niger* ATCC 9372

12.3 Reagents

Reagents were either purchased or prepared in the laboratory. Purchased reagents were inspected upon receipt, logged, dated, and stored as per manufacturer's direction. Preparation of reagent solutions involved analytical balance calibration and the careful weighing of ingredients with clean utensils to minimize the possibility of cross contamination. Prepared reagents were placed in appropriate and clean containers and labeled with date of preparation, name of reagent, expiration date if applicable, and the initials of the preparer. Reagents were then stored as appropriate (refrigerator, in the dark, flammable cabinet, etc.). Phosphate buffer dilution water (PBDW) for serial dilutions and organism suspensions was prepared according to the method described in the *Official Methods of Analysis* of the Association of Official Analytical Chemists (1984).

12.4 Equipment

In the laboratory, all incubators and refrigerators were equipped with thermometers calibrated against a reference thermometer, traceable to standardization against a National Institute of Standards and Technology thermometer. Correction factors had been previously assigned to each thermometer, acceptable ranges assigned to each piece of equipment, and temperatures, deviations, and corrective actions recorded on a daily basis as equipment is used. The digital pH meter was standardized prior to each use with standard buffers (4.0, 7.0). Balances were calibrated with standard NIST traceable balance weights.

During field sampling, all samplers were checked before use to insure that they were mechanically sound. Air flow through volumetric bioaerosol samplers was assured by continuous monitoring with vacuum pressure gauges and/or flow meters. Impactor samplers were decontaminated between samples by using 70% ethanol and allowing to air dry. Replicate samples were taken at each location. Field blanks for impactor plates and impinger fluids were included and accompanied all equipment to the sampling sites and back to RTI.

For sample plating, all micropipettors were checked for proper volumes by calibrating with water using an analytical balance, Fisher model A200DS.

12.5 Microbiological Testing and Sampling

All test organisms were transported to and from test sites in insulated containers to prevent exposure to temperature extremes. Additional samples of test organisms accompanied all test challenges to the testing sites and back to RTI. They were then processed for extent of viability as might be affected by storage and shipment. As agar plates and fluid tubes were processed and incubated, additional media of the same lot used, were inoculated with known organisms as positive growth and incubator control. As with organisms and media, all air and fluid samples were transported within 24 hours in insulated containers from test sites to the RTI Environmental Microbiology Laboratories.

12.6 Data Recording, Reduction, Validation, and Reporting

All data was recorded in an individual laboratory/field project notebook. Data reduction typically includes the use of means, medians, analyses of variance, and resultant standard deviations. Outliers are not dropped unless there is suggestive evidence that laboratory and/or field testing techniques were incorrect. Some data may be log transformed as necessary for analysis and interpretation. All data and calculations were checked a minimum of three times before being reported as final.

In this study, the potential for bioemissions from the medical waste treatment technologies evaluated were assessed on the basis of recovery of indicator spores from emission points during spiked waste processing. All sampling data from both spiked and non-spiked waste treatment were comparatively assessed.

13.0 OCCUPATIONAL HEALTH AND SAFETY

Recognized guidelines pertaining to safe laboratory and field experimentation were always followed. This included adherence to requirements contained in the RTI Safety Manual, all pertinent state and federal regulations, and the appropriate CDC/NIH guidelines.

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