Acetophenone

98-86-2

Hazard Summary

Acetophenone is used for fragrance in soaps and perfumes, as a flavoring agent in foods, and as a solvent for plastics and resins. Acute (short-term) exposure to acetophenone vapor may produce skin irritation and transient corneal injury in humans. No information is available on the chronic (long-term), reproductive, developmental, or carcinogenic effects of acetophenone in humans. EPA has classified acetophenone as a Group D, not classifiable as to human carcinogenicity.

Please Note: The main sources of information for this fact sheet are EPA's Integrated Risk Information System (IRIS) (5), which contains information on oral chronic toxicity of acetophenone and the RfD, and EPA's Health and Environmental Effects Document for Acetophenone (2). Other secondary sources include the Hazardous Substances Data Bank (HSDB) (3), a database of summaries of peer-reviewed literature, and the Registry of Toxic Effects of Chemical Substances (RTECS) (4), a database of toxic effects that are not peer reviewed.

Uses

• Acetophenone is used in perfumery as a fragrance ingredient in soaps, detergents, creams, lotions, and perfumes; as a flavoring agent in foods, nonalcoholic beverages, and tobacco; as a specialty solvent for plastics and resins; as a catalyst for the polymerization of olefins; and in organic syntheses as a photosensitizer. (2,3,6)

Sources and Potential Exposure

- Occupational exposure to acetophenone may occur during its manufacture and use. (1)
- Acetophenone has been detected in ambient air and drinking water; exposure of the general public may occur through the inhalation of contaminated air or the consumption of contaminated water. (2)

Assessing Personal Exposure

• Hippuric acid may be monitored in the urine to determine whether or not exposure to acetophenone has occurred. (1)

Health Hazard Information

Acute Effects:

- Acute exposure of humans to acetophenone vapor may produce skin irritation and transient corneal injury. One study noted a decrease in light sensitivity in exposed humans. (2,3)
- Acute oral exposure has been observed to cause hypnotic or sedative effects, hematological effects, and a weakened pulse in humans. (1,3)
- Congestion of the lungs, kidneys, and liver were reported in rats acutely exposed to high levels of acetophenone via inhalation. (3)
- Tests involving acute exposure of rats, mice, and rabbits have demonstrated acetophenone to have moderateacute toxicity from oral or dermal exposure. (4)

Chronic Effects (Noncancer):

- No information is available on the chronic effects of acetophenone in humans.
- Degeneration of olfactory bulb cells was reported in rats chronically exposed via inhalation. In another study, chronic inhalation exposure of rats produced hematological effects and, at high doses, congestion of cardiac vessels and pronounced dystrophy of the liver. (2,3)
- In two studies, no effects were observed in rats chronically exposed to acetophenone in their diet. (2,3,5)
- EPA has not established a Reference Concentration (RfC) for acetophenone. (5)
- The Reference Dose (RfD) for acetophenone is 0.1 milligram per kilogram body weight per day (mg/kg/d) based on general toxicity in rats. The RfD is an estimate (with uncertainty spanning perhaps an order of magnitude) of a daily oral exposure to the human population (including sensitive subgroups) that is likely to be without appreciable risk of deleterious noncancer effects during a lifetime. It is not a direct estimator of risk but rather a reference point to gauge the potential effects. At exposures increasingly greater than the RfD, the potential for adverse health effects increases. Lifetime exposure above the RfD does not imply that an adverse health effect would necessarily occur. (5)
- EPA has low confidence in the study on which the RfD was based because, although the animals were tested by a relevant route of administration at three levels in a subchronic study and several endpoints were monitored, the sample size was inadequate and the range of doses tested did not define a lowestobserved-adverse-effect level (LOAEL); low confidence in the database because, although no-observedadverse-effect levels (NOAELs) were defined, supporting studies, carcinogenicity, teratogenicity, and reproductive studies, could not be located in the available literature; and, consequently, low confidence in the RfD. (5)

Reproductive/Developmental Effects:

- No information is available on the reproductive or developmental effects of acetophenone in humans.
- In one study of pregnant rats exposed dermally, no effects on reproduction or development were noted. (2,3)

Cancer Risk:

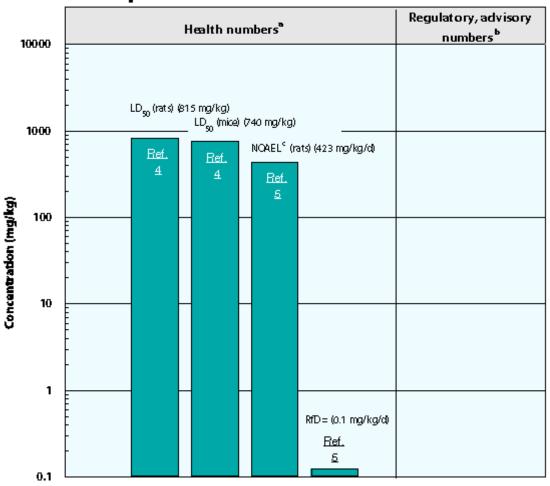
- No information is available on the carcinogenic effects of acetophenone in humans or animals.
- EPA has classified acetophenone as a Group D, not classifiable as to human carcinogenicity. (5)

Physical Properties

- The chemical formula for acetophenone is C₈H₈O, and its molecular weight is 120.15 g/mol. (2,6)
 Acetophenone occurs as a colorless liquid that is slightly soluble in water. (2,3,7)
- · Acetophenone has a sweet pungent odor of orange blossom or jasmine, with an odor threshold of about 0.83 milligrams per cubic meter (mg/m). (2,3,6)
- The vapor pressure for acetophenone is 0.372 mm Hg at 25 °C, and its log octanol/water partition coefficient (log K_{ow}) is 1.58. (2)

Conversion Factors:

To convert concentrations in air (at 25°C) from ppm to mg/m $\frac{3}{3}$: mg/m 3 = (ppm) × (molecular weight of the compound)/(24.45). For acetophenone: 1 ppm = 4.91 mg/m².



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 LD_{50} (Lethal Dose_{50})--A calculated dose of a chemical in water to which exposure for a specific length of time is expected to cause death in 50% of a defined experimental animal population.

The health values cited in this factsheet were obtained in December 1999.

^b Health numbers are toxicological numbers from animal testing or risk assessment values developed by EPA. Regulatory numbers are values that have been incorporated in Government regulations, while advisory numbers

are nonregulatory values provided by the Government or other groups as advice.

This NOAEL is from the critical study used as the basis for the EPA RfD.

References

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- 3. U.S. Department of Health and Human Services. Hazardous Substances Data Bank (HSDB, online database). National Toxicology Information Program, National Library of Medicine, Bethesda, MD. 1993.
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- 7. American Conference of Governmental Industrial Hygienists (ACGIH). 1999 TLV's and BEIs. Threshold Limit Values for Chemical Substances and Physical Agents, Biological Exposure Indices. Cincinnati, OH. 1999.

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