

Xylene

What is xylene?

- Xylene is a clear, colorless, flammable liquid with a sweet smell that evaporates quickly.
- Xylene occurs naturally in petroleum, coal and wood tars and is formed, to a small extent, during forest fires.
- Chemical industries produce xylene from petroleum.
- There are three possible chemical structures of xylene called ortho- (o-), meta- (m-), and para- (p-), xylene. Xylene is usually manufactured and marketed as a mixture of these chemical structures.

What are the uses of xylene?

- Xylene is used in medical technology, dentistry and industry as a solvent.
- Xylene is used in laboratories during the preparation of slides and in dentistry during root canal treatment.
- Xylene is used in the printing, rubber and leather industries.
- Xylene is used as a solvent in paints, inks, varnishes, shellac, rust preventives and adhesives, and as a component in some detergents and gasoline.
- Xylene is used in the manufacture of pesticides and pharmaceutical products.
- Xylene may be a component of solutions injected underground to aid in the recovery of natural gas.

Is xylene in the environment?

- Xylene can enter the environment at refineries during the production, transport and processing of petroleum.
- Xylene can enter the environment from automobile exhaust gases, during the use of certain solvents, and from hazardous waste landfills.
- Xylene can enter the environment after an accidental spill or a leak during storage or burial at a waste site.
- Most xylene released into the environment evaporates into air.

- In air, xylene breaks down rapidly to less harmful chemicals within a couple of days.
- Typical concentrations of xylene in outdoor air range from 1 to 30 parts per billion (ppb).
- Xylene in soil or surface water evaporates or is slowly broken down by environmental bacteria.
- Xylene is not commonly found in drinking water. When it is, the levels of xylene are typically below 2 ppb.
- Very small amounts of xylene are present in cigarette smoke.
- Small amounts of xylene are also commonly found in indoor air. Xylene has been reported in indoor air at concentrations ranging from 1 to 10 ppb.
- Xylene has been found in a variety of foods (meat, fruit, dairy, fish, vegetables, grains) at concentrations ranging from 1 to 100 ppb.

How are people exposed to xylene?

- Inhalation is the major route of exposure to xylene.
- Exposure to xylene in indoor air may occur from breathing vapors from household products and gasoline.
- Automobile garage workers, metal workers and furniture refinishers may be exposed to high levels of xylene from workplace solvents.
- Exposure to xylene may occur through skin contact with the substance during the use of household or workplace products.
- Exposure to xylene outdoors occurs primarily by breathing contaminated air.
- Exposure to xylene can occur by inhaling cigarette smoke or by eating foods contaminated with it.

How does xylene enter and leave the body?

- Xylene rapidly enters the body through the gut and the lungs when ingested or inhaled.
- Xylene liquid enters the body through intact skin.
- Xylene crosses the placenta to the fetus and is excreted in breast milk. Xylene in breast milk can be passed to the infant.
- Most of the xylene in the body is rapidly broken down in the liver to non-toxic compounds. The major non-toxic breakdown product is methylhippuric acid, which is excreted in the urine.

- Xylene does not accumulate in the body. Elimination is slower in individuals with a large amount of body fat.
- Most inhaled or ingested xylene is eliminated in urine within 18 hours.
- Drinking alcohol or taking aspirin may prolong the length of time xylene remains in the body.

How harmful is exposure to xylene?

- Xylene is toxic when ingested or inhaled.
- Symptoms of xylene poisoning include headache, dizziness, nausea, vomiting, drowsiness, excitement, tremor, irregular heart rhythm, inflammation and fluid in the lungs, loss of muscle coordination, liver and kidney damage, and coma.
- Breathing xylene for even short periods of time at concentrations as low as 50 parts per million (ppm) can cause irritation to mucous membranes and skin, affect breathing, and cause headaches and dizziness.
- Breathing xylene for longer periods at concentrations as low as 14 ppm can cause eye irritation, sore throat, anxiety, forgetfulness, inability to concentrate and a sensation of intoxication.
- Feelings of intoxication can occur with exposure to 100 ppm of xylene.
- Xylene vapors are mildly irritating to the skin. Repeated or prolonged contact with xylene can cause skin to crack and peel.
- If liquid xylene remains on the skin, it may cause burning pain.
- Concurrent use of alcohol or aspirin increases the risk of adverse effects from xylene exposure.

Can exposure to xylene cause cancer?

- The Department of Health and Human Services (DHHS), the International Agency for Research on Cancer (IARC) and the U.S. Environmental Protection Agency (EPA) have not determined whether exposure to elevated levels of xylene causes cancer.

Is there a medical test to show whether I've been exposed to xylene?

- Xylene can be measured in blood, and one of its breakdown products, methylhippuric acid, can be measured in urine if the dose is high. However, the levels will not correlate well with the degree of exposure or to symptoms and, therefore, have little clinical relevance.
- Measurement of blood levels of xylene may also be limited by its rapid breakdown in the body.

What is the treatment for xylene poisoning?

- There is no antidote for xylene poisoning.
- Treatment consists of support of respiratory and cardiovascular functions.

Are there recommendations to protect public health?

- The Occupational Safety Health Association's (OSHA) Permissible Exposure Limit (PEL) for xylene in air is 100 ppm averaged over an eight-hour workshift.
- OSHA's short-term exposure limit (STEL) for xylene in air is 150 ppm (15-minute exposure).
- EPA has set an enforceable limit, the maximum contaminant level (MCL) of 10 ppm (10,000 ppb) for xylene in drinking water.
- The National Institute for Occupational Safety and Health (NIOSH) recommended exposure limits for xylene at 100 ppm as a TWA for up to a 10-hour work shift and a 40-hour work week and 200 ppm for 10 minutes as a short-term limit.
- NIOSH IDLH (immediately dangerous to life or health) = 900 ppm

What can I do to reduce or prevent exposure to xylene?

- Use xylene-containing products in well ventilated areas.
- When not in use, xylene-containing products should be tightly sealed to prevent evaporation into the air.
- Sometimes children sniff household products in an attempt to get high. Talk to your children about the dangers of sniffing products containing xylene.

What should I do if I believe I am ill as a result of exposure to xylene?

- Terminate exposure and seek rapid emergency medical treatment in a hospital setting if your condition or history suggests xylene poisoning.

Where can I get more information?

For more information, contact:

The Pennsylvania Department of Health, Division of Environmental Health Epidemiology, P.O. Box 90, Harrisburg, Pennsylvania, 17108. Telephone number: 717-787-1708.

The U.S. Department of Health and Human Services, Agency for Toxic Substances and Disease Registry, Atlanta, Georgia. Telephone number: 800-CDC-INFO (800-232-4636).

References

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- (6) World Health Organization (WHO), Xylenes in Drinking-water, Background document for development of WHO Guidelines for Drinking-water Quality, 2003.
- (7) British Journal of Industrial Medicine 1988;45: 127-132, Interactions of m-xylene and aspirin metabolism in man, Campbell, Wilson, et. al.; searched online on March 20, 2012 @ <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC1007957/pdf/brjindmed00142-0055.pdf>.
- (8) U.S. Department of Health and Human Services, Public Health Service, Agency for Toxic Substances and Disease Registry (ATSDR). Managing Hazardous Materials Incidents, searched March 28, 2012 @ <http://www.atsdr.cdc.gov/MHMI/mmq71.pdf>.