o-Toluidine and water

o-Toluidine is an industrial chemical primarily used in the production of dyes, herbicides, and rubber. *o*-Toluidine is a major metabolite of the widely used local anesthetic, prilocaine. Minnesotans are not likely to experience health effects from the levels of *o*-toluidine found in food and drinking water.

The Minnesota Department of Health (MDH) Risk Assessment Unit evaluates health risks for contaminants in drinking water and develops health-based guidance values for groundwater. The toxicological summary for *o*-toluidine can be found at the MDH Human Health-Based Water Guidance Table website.[1] MDH works in collaboration with the Minnesota Pollution Control Agency (MPCA) and the Minnesota Department of Agriculture (MDA) to understand the occurrence and environmental effects of these contaminants.

o-Toluidine in Minnesota waters

Between 2018 and 2020, *o*-toluidine was tested in over 100 drinking water systems across Minnesota, but it was not detected. It has been detected at least once in 24 other states.[2] *o*-Toluidine was also not detected in groundwater at one landfill site where it was tested.[3] In Minnesota surface water, *o*-toluidine has not been tested.

MDH guidance value

Based on available information, MDH developed a guidance value of 6 parts per billion (ppb) for *o*-toluidine in drinking water. MDH does not use guidance values to regulate water quality, but they may be useful for situations where federal regulations do not exist.

MDH develops guidance values to protect people who are most highly exposed and people who are most sensitive to the potentially harmful effects of a contaminant, including pregnant people, fetuses, infants, and children. A person drinking water with concentrations at or below the guidance value would be at little or no risk for harmful health effects from that contaminant.

Potential health effects

In animal studies, oral exposure to *o*-toluidine has effects on the kidney, liver, spleen, and male reproductive system. *o*-Toluidine is also associated with increased blood methemoglobin in animal and human epidemiology studies and an increased risk of cancer in animals with oral ingestion. No human-based data are available on the effects of *o*-toluidine following ingestion; however, occupational exposure has been linked to increased risk of bladder cancer. The U.S.

Environmental Protection Agency has classified *o*-toluidine as likely to be carcinogenic to humans.

Potential exposure to *o*-toluidine

Almost everyone experiences a low level of exposure to *o*-toluidine and it is commonly detected in urine. Scientists have determined that smoking (including second-hand smoke) is a major exposure source, but there may be other unknown sources as well.[4] *o*-Toluidine has been detected in the breast milk of both smokers and non-smokers at levels well below the MDH HBVs for drinking water. It may also be present in foods cured with smoke.[5] Drinking water is not likely to be a major source of exposure to *o*-toluidine.

o-Toluidine in the environment

o-Toluidine breaks down naturally in the environment over a timeframe of a few months. If it is ingested, *o*-toluidine is rapidly metabolized and excreted in urine. Absorption of *o*-toluidine through air or skin is not as well characterized.[5]

References

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4. World Health Organisation (2010). IARC Monographs on the evaluation of carcinogenic risks to humans. Volume 99, pp. 407-469. https://publications.iarc.who.int/download/mono99.pdf.
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