Minnesota Department of Health

CONTAMINANTS OF EMERGING CONCERN PROGRAM

Diphenhydramine Screening Profile

Diphenhydramine is a contaminant that has been detected in Minnesota waters. The information in this profile was collected for the screening process of the Minnesota Department of Health's Contaminants of Emerging Concern (CEC) program in June 2015. The chemicals nominated to the CEC program are screened and ranked based on their toxicity and presence in Minnesota waters. Based on these rankings, some chemicals are selected for a full review. CEC program staff have not selected diphenhydramine for a full review.

Diphenhydramine Uses

Diphenhydramine is an over-the-counter antihistamine used to treat allergy symptoms, the common cold, insomnia, and motion sickness. It is commonly known by the brand names Benadryl® and Unisom®.

Diphenhydramine in the Environment

Diphenhydramine enters the environment through human excretion and through the disposal of unused medications into toilets, sinks, and landfills.

One way to reduce diphenhydramine in the environment is to dispose of unused medication properly. Follow the recommendations from the Minnesota Pollution Control Agency for disposing of unwanted medications.[1]

Diphenhydramine was detected in Minnesota waters at maximum concentrations of:

- 0.436 parts per billion (ppb) in wastewater,[2]
- 0.158 ppb in water not used for drinking water,[2]
- 0.016 ppb in groundwater.[3]

Diphenhydramine is unlikely to build up in the tissues of fish or other wildlife.[4]

Exposure to Diphenhydramine

Exposure to diphenhydramine can occur through taking medication containing diphenhydramine and drinking contaminated water or breastmilk.

Diphenhydramine may be present in the breastmilk of women taking medications containing diphenhydramine. Women exposed to high doses of diphenhydramine over an extended period can experience decreased lactation.[5] Nursing mothers should talk to their doctor about any medications they are taking.

Potential Health Effects

Although side effects of this drug at therapeutic doses are known, there is little information available about the health effects of diphenhydramine at the lower levels found in the environment.

In laboratory studies, developmental effects have been seen in animals exposed to high levels of diphenhydramine.[6]

A full review of diphenhydramine may be possible; however, it is ranked lower than other nominated CEC chemicals at this time.

References

1. Minnesota Pollution Control Agency. Disposal of Household Hazardous Waste. 2015. http://www.pca.state.mn.us/index.php/living-green/living-green-citizen/household-hazardous-waste/disposing-of-unwanted-medications.html
2. Lee K, et al. Chemicals of emerging concern in water and bottom sediment in Great Lakes areas of concern, 2010 to 2011-Collection methods, analyses methods, quality assurance, and data: U.S. Geological Survey Data Series 723
3. Erickson ML, Langer SK, Roth JL, Kroening SE. Contaminants of emerging concern in ambient groundwater in urbanized areas of Minnesota, 2009-12. U.S. Geological Survey Scientific Investigations Report 2014–5096. http://dx.doi.org/10.3133/sir20145096
4. U.S. Environmental Protection Agency. PBT Profiler. www.pbtprofiler.net
5. National Library of Medicine. Toxnet. http://toxnet.nlm.nih.gov/cgi-bin/sis/search2/r?dbs+lactmed:@term+@DOCNO+96
6. National Library of Medicine. Hazardous Substances Data Bank. http://toxnet.nlm.nih.gov/cgi-bin/sis/htmlgen?HSDB

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CLEAN WATER LAND & LEGACY AMENDMENT

Contaminants of Emerging Concern Program

Chemical Review Process

The Contaminants of Emerging Concern (CEC) program investigates the potential health concerns of contaminants of emerging concern in drinking water. This investigation includes a rapid assessment ('screening') to prioritize nominated chemicals for in-depth research and evaluation that result in drinking water guidance and information about exposure.

Chemical Nomination and Eligibility

Minnesota risk managers, stakeholders, and the public are encouraged to nominate contaminants for review. After chemicals are nominated, MDH program staff determine eligibility by examining the likelihood that the chemical will enter Minnesota waters and whether adequate guidance already exists.

Screening and Risk Based Selection

Program staff conduct a screening of where and how a contaminant is used in the state, its potential to enter the water supply, and its potential to harm humans. The results from the screening are used to prioritize nominated chemicals.

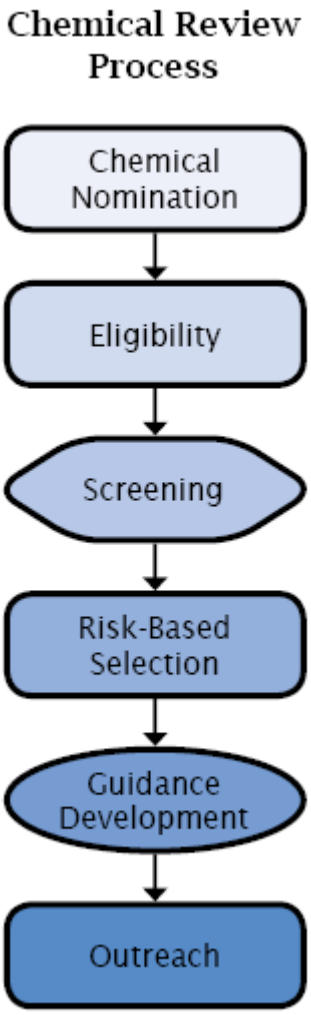
Chemicals having higher exposure and harm potential are selected for in-depth review and development of guidance (a contaminant water concentration that is not harmful to people). Chemicals that rank lower remain candidates for future in-depth review. For some contaminants, however, the information is too limited. For chemicals that are not selected for in-depth review, the results of the screening assessment are summarized in a Screening Profile. The screening and prioritization process is repeated as additional chemicals are nominated and screened.

Guidance Development

When a chemical is selected for a full review, program staff carefully review exposure and toxicological information to understand how humans may be exposed and what adverse health effects occur from exposure. Staff combine the results of in-depth analyses of toxicity and exposure to calculate a guidance, a level of contaminant in water that causes little to no harm to someone drinking the water.

Outreach

CEC program staff work to communicate the results of the chemical review process. This includes making key findings publicly available on web pages and at a variety of meetings and events. An email subscription service (GovDelivery) is also used to alert the interested public (subscribers) of chemical review activities and guidance values.



Subscribe to the CEC Program GovDelivery service to receive notification when reviews are initiated for water contaminants and other announcements by visiting: http://www.health.state.mn.us/cec