Minnesota Department of Health

CONTAMINANTS OF EMERGING CONCERN PROGRAM

Estrone Screening Profile

Estrone 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 November 2011. 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 estrone for a full review.

Estrone Uses

Estrone is a hormone produced naturally in humans and animals. Estrone is a component of some medications used for the treatment of menopausal and premenopausal symptoms. Estrone is produced naturally by men and women, but women produce much higher levels than men. It is the most abundant natural estrogen produced by postmenopausal women. The placenta also produces estrogens, including estrone, during pregnancy.

Estrone in the Environment

Estrone enters the environment when it is excreted from humans and animals. The spreading of poultry and cattle waste on agricultural land increases the risk of estrone contaminating the groundwater.[1] Estrone may persist in the environment.[2]

Estrone has been detected at up to 0.038 parts per billion (ppb) in treated wastewater, and up to 0.010 ppb in waters downstream of wastewater treatment plants.[3,4] Estrone was detected in sediment upstream and downstream of wastewater treatment plants, as well as in Minnesota lakes.[4]

Estrone is a concern for aquatic wildlife, due to its potential to disrupt the reproductive and endocrine systems of fish and other wildlife.[1]

Exposure to Estrone

Aside from being naturally produced in the body, exposure to estrone may occur through eating foods naturally containing estrone, such as meat, dairy, and eggs, drinking contaminated water, or taking medication with estrone as an ingredient.

Estrone is not easily absorbed by the body, due to the quick breakdown of estrone by the GI system and liver.

Potential Health Effects

Adverse health effects from prescribed doses of estrone can include cancer, cardiovascular effects, stroke, dementia, and others.[5] Drinking water contaminated with low levels of estrone is not likely to pose a health risk.

Based on the screening assessment, a full review of estrone may be possible; however, it is ranked lower than other nominated CEC chemicals at this time.

References

1. Ying G, Kookana RS, Ru YJ.2002. Occurrence and fate of hormone steroids in the environment. Env Intl; 28:545. http://www.lu.lv/ecotox/publikacijas-3-kursa-studentiem/Steroid_hormones_EI.pdf
2. Casey FXM, Simunek J, Lee J, Larsen GJ, Hakk H. Sorption, mobility, and transformation of estrogenic hormones in natural soil. J Environ Qual. 2005;34:1372-1379.
3. Lee KE, et al. 2011. Endocrine active chemicals, pharmaceuticals, and other chemicals of concern in surface water, wastewater-treatment plant effluent, and bed sediment, and biological characteristics in selected streams, Minnesota 2009: USGS Data Series 575.
4. Minnesota Pollution Control Agency. Wastewater Treatment Plant Endocrine Disrupting Chemical Monitoring Study. 2011. http://www.pca.state.mn.us/index.php/view-document.html?gid=15610
5. National Library of Medicine. Daily Med. Premarin Drug Label. Updated Sept. 2013. http://dailymed.nlm.nih.gov/dailymed/drugInfo.cfm?setid=87e2da8d-432c-4ed5-67a1-dc26294b2295

For more information, contact:
Minnesota Department of Health Environmental Health Division
Contaminants of Emerging Concern Program
health.legacy@state.mn.us

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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.

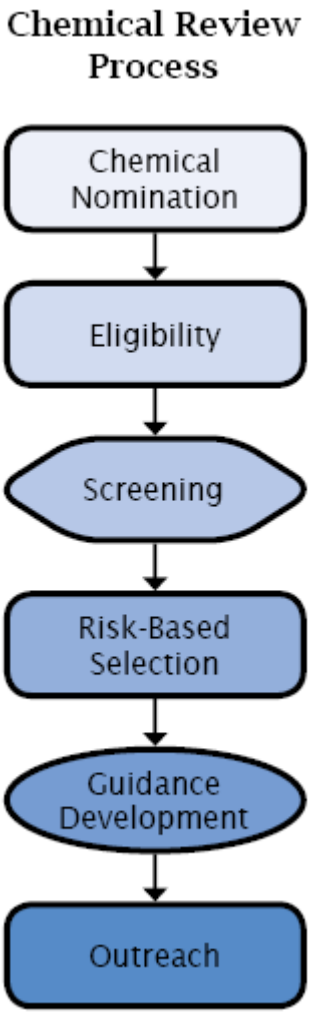
Chemicals having higher exposure and harm potential are selected for in-depth review and development of guidance (a contaminant water concentration that is not harmful to people). Chemicals that rank lower remain candidates for future in-depth review. For some contaminants, however, the information is 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