Minnesota Department of Health

CONTAMINANTS OF EMERGING CONCERN PROGRAM

Androstenedione Screening Profile

Androstenedione is a contaminant that has been detected in surface water in Minnesota. 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 2016. 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. Androstenedione has not yet been selected for a full review.

Androstenedione Uses

Androstenedione is a hormone that occurs naturally and is also manufactured. Humans and animals naturally produce androstenedione to make sex hormones like testosterone and estrogen. Androstenedione is also made into a pill or spray form to be used as a steroid to help build muscle.

Until 2005, androstenedione was produced and sold as a dietary supplement. The Anabolic Steroid Control Act of 2004 listed androstenedione as a harmful anabolic steroid instead of a dietary supplement.[1]

Androstenedione in the Environment

Androstenedione enters the environment when humans and animals naturally produce the hormone. The chemical also enters the environment through waste streams from producing and using androstenedione as a steroid.[2]

The Minnesota Pollution Control Agency (MPCA) detected androstenedione in 30 percent of the 50 Minnesota lakes it tested in 2012. The highest level of androstenedione detected was 0.0075 ppb.[3]

Exposure to Androstenedione

People are exposed to androstenedione through using androstenedione as a performance-enhancing steroid. People can also be exposed to the hormone through working somewhere that makes androstenedione.[2]

Potential Health Effects

Long-term exposure or use of androstenedione may have serious health risks.[4] Men's testicles may get smaller while their breasts become larger, and men may become impotent. Women's voices may deepen; they may bald, grow more facial hair, have irregular menstrual cycles, and get blood clots. Children and adolescents exposed to too much androstenedione may stop growing too early or may start puberty very early.[2] It is unclear if androstenedione increases cancer risk in humans.[4] High levels of androstenedione have produced cancer in some laboratory animals.[5]

Based on the screening assessment, a full review of androstenedione may be possible. Androstenedione ranked higher than other nominated CEC chemicals. We anticipate that androstenedione may be selected for full review in the future.

References

1. Anabolic Steroid Control Act of 2004, Pub. L. 108-358, 118 Stat. 1661, codified as amended at title 108 U.S.C.
2. US National Library of Medicine. Hazardous Substances Data Bank. Searched "androstenedione". https://toxnet.nlm.nih.gov
3. MPCA. 2013. Pharmaceuticals and Endocrine Active Chemicals in Minnesota Lakes. https://www.pca.state.mn.us/sites/default/files/tdr-g1-16.pdf
4. U.S. Food and Drug Administration. 2014. Questions and Answers: Androstenedione. http://www.fda.gov/Food/ComplianceEnforcement/ucm081788.htm
5. Blystone et al. 2011. Toxicity and carcinogenicity of androstenedione in F344/N rats and B6C3F1 mice. Food and Chemical Toxicology 49:2116-2124.

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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.

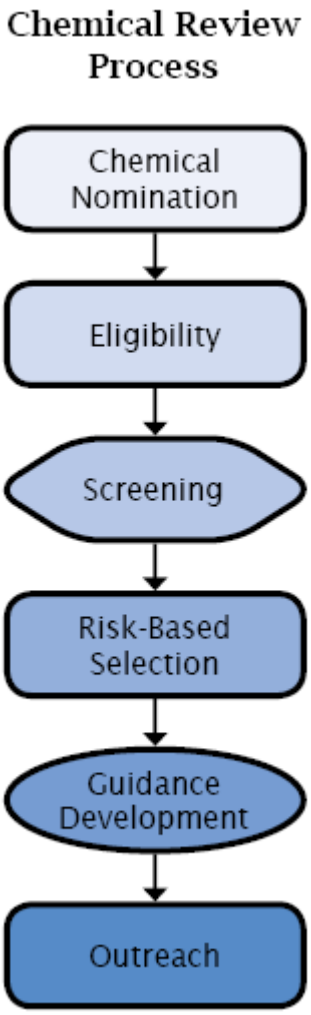
Chemicals having higher exposure and harm potential are selected for in-depth review and development of guidance (a contaminant water concentration that is not harmful to people). Chemicals that rank lower remain candidates for future in-depth review. For some contaminants, however, the information is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