

Carbadox Screening Profile

Carbadox is a contaminant that has been detected in Minnesota surface 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 January 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. CEC program staff have not yet selected carbadox for a full review.

Carbadox Uses

Carbadox is a veterinary pharmaceutical used to control dysentery in pigs. Carbadox is currently approved as a feed additive to promote growth in pigs. In April 2016 the US Food and Drug Administration (FDA) began taking steps to withdraw approval for using carbadox in pigs.¹

Carbadox in the Environment

Carbadox enters the environment through the waste of pigs, as well as when carbadox is thrown onto the ground or disposed of in waste piles. Once in the environment, carbadox will attach to soil and sediment. Carbadox is not expected to move easily into groundwater.

Carbadox has been detected in Minnesota surface water. One study detected carbadox in 14 Minnesota lakes, with a maximum concentration of 0.12 parts per billion (ppb).² To date, carbadox has not been found in Minnesota drinking water.

Exposure to Carbadox

Exposure to carbadox is unlikely, except for exposures occurring at workplaces where it is manufactured, packaged, or used. Human exposure to animal feeds containing carbadox should be minimized by taking precautions such as wearing protective clothing and using dust masks or respirators.

The use of carbadox is regulated by the FDA in order to prevent residues from entering the food supply. Instances where the improper use of carbadox resulted in food contamination have been rare.

Potential Health Effects

In laboratory animals, exposure to high levels of carbadox resulted in liver damage and at even higher doses developmental toxicity. Laboratory studies also show that carbadox and some of its breakdown products cause cancer in animals.³ In humans, repeated exposure to carbadox may cause heightened sensitivity to sunlight (photosensitization).⁴

Based on the screening assessment, the available information on carbadox may be sufficient for a full review. Carbadox ranked higher than other screened chemicals and MDH anticipates that it may be selected for full review in the future.

References

1. US Food and Drug Administration (FDA). Questions and Answers Regarding Carbadox. April 8, 2016. <http://www.fda.gov/AnimalVeterinary/SafetyHealth/ProductSafetyInformation/ucm494695.htm>
2. Ferrey M. Pharmaceuticals and endocrine active chemicals in Minnesota lakes. MPCA. 2013. <https://www.pca.state.mn.us/sites/default/files/tdr-g1-16.pdf>
3. WHO. Toxicological evaluation of certain veterinary drug residues in food. WHO Food Additives series 51 2003. <http://apps.who.int/iris/bitstream/10665/42800/1/924166051X.pdf>
4. National Institute for Occupational Safety and Health. Carbadox International Chemical Safety Cards. 2003. <http://www.cdc.gov/niosh/ipcsneng/neng1510.html>

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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.

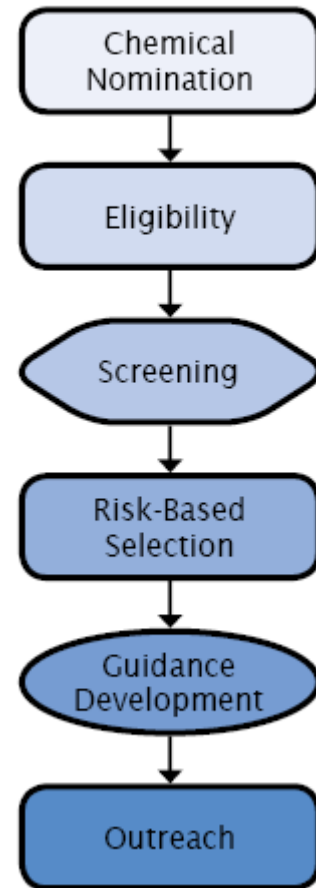
Guidance Development

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.

Chemical Review Process



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>