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Bisphenol A in Drinking Water

Bisphenol A (BPA) is a common industrial chemical used in many consumer products. In 2011, BPA was listed as one of the Toxic Free Kids Act Priority Chemicals.[1] BPA has the potential to be present in drinking water sources in Minnesota. The Minnesota Department of Health (MDH) developed a health-based guidance value for BPA in drinking water and does not expect levels of BPA in drinking water to harm Minnesotans.

What is BPA?

Bisphenol A (BPA) is a chemical commonly used in plastics, food can liners, thermal paper (like that used for some receipts), and some dental sealants. BPA is present in many consumer products. Plastics made with BPA will usually have a recycling code of #7 (for "other plastics,") but not all #7 plastics contain BPA.

BPA meets the definition of a Priority Chemical under the Toxic Free Kids Act because it is endocrine active, infants and children are more likely to be exposed, it is widely used, and it has been found widely in people.[1]

Has BPA been found in Minnesota waters?

BPA is not routinely monitored in Minnesota drinking water, but studies have occasionally found it at low levels in residential and municipal drinking water wells.[2,3] The U.S. Environmental Protection Agency (EPA) reports that BPA concentrations in U.S. drinking water are typically below 1 part per billion (ppb).[4]

BPA has occasionally been found in shallow monitoring wells at up to 4.5 ppb[5,6] and in water leaving wastewater treatment sites at up to 22 ppb.[7,8] It has also been found at less than 0.1 ppb in several Minnesota streams and rivers that receive wastewater, and at 3.2 ppb in Lake Superior.[6]

What is the MDH guidance value for BPA in drinking water?

Based on the best available data, MDH developed a guidance value of 20 ppb. A person drinking water at or below these levels would have little or no risk of any health effects from BPA.[9]

At a Glance

BPA is…

- A chemical used in some plastics, food can linings, thermal receipt paper, and dental sealants.

BPA enters your body from…

- Eating canned food, or food that has been in contact with plastics containing BPA.
- Ingestion of house dust or breast milk, contact with thermal receipt paper, or use of dental sealants.

Your exposure to BPA can be reduced by….

- Avoiding older baby bottles that predate the Minnesota BPA ban.
- Avoiding reusable water bottles that contain BPA.
- Switching to food in glass jars or fresh or frozen foods instead of canned, or choosing BPA-free cans, if available.
- Washing your hands frequently if you handle a lot of thermal paper or cash.

BPA in drinking water is safe if…

- The level is lower than the MDH guidance value of 20 ppb.

Can BPA in drinking water affect my health?

BPA can disrupt the endocrine system by acting like a hormone or changing the way hormones act. The endocrine system includes several glands (such as ovaries, testes, pituitary, and thyroid) and hormones. Studies in rodents show that high oral doses of BPA may affect development, reproductive organs and functions, and organs such as the liver, kidney, and thyroid. MDH does not expect current levels of BPA found in drinking water to harm Minnesotans.

How are people exposed to BPA?

Most people are exposed to BPA through food.[10] BPA enters food through contact with materials containing BPA, such as the resins that line the inside of food cans. Plastic baby bottles were once a major source of BPA exposure for infants, but this exposure is expected to decrease as BPA baby bottles are phased out. BPA is present on the surface of thermal receipt paper and can enter the body through the skin or from hand-to-mouth contact. BPA can transfer from receipts to paper currency in your wallet. Dental sealants can be a source of exposure for a short time after they are applied. Indoor air and house dust can contain small amounts of BPA. Infants, toddlers, and children have higher levels of BPA exposure than adults.[10,11]

How does BPA get into the environment?

Most of the BPA released by industry goes to landfills, and some studies have found high levels of BPA in water leaching out of landfills. Some municipal wastewater in Minnesota contains BPA at low concentrations.[5,7] Studies from other countries have found high levels of BPA in wastewater from paper recycling. In surface water, BPA breaks down over a period of a few days. It is not likely to build up over time in the bodies of fish or other animals.

What Minnesotans Need to Know

Exposure to BPA is likely to decrease amongst infants and children due to federal and state bans of baby bottles and children's cups that contain BPA. In addition, manufacturers are making BPA-free alternatives available for other consumer products, which may lead to reduced exposure to people and lower levels of BPA in the environment.

References

1. MDH. Toxic Free Kids Act: Priority Chemicals. January 2011. www.health.state.mn.us/divs/eh/hazardous/topics/toxfreekids/priority.html
2. Lee KE et al. (2004). Presence and distribution of organic wastewater compounds in wastewater, surface, ground, and drinking waters, Minnesota, 2000-02. U.S. Geological Survey (USGS). Scientific Investigations Report 2004-5138. http://pubs.usgs.gov/sir/2004/5138/
3. Minnesota Pollution Control Agency (2012). Endocrine active chemicals and other contaminants of emerging concern in Minnesota's groundwater, 2009-2010. Doc. No. WQ-CM4-03. www.pca.state.mn.us/index.php/water/water-types-and-programs/groundwater/new-report-on-chemicals-in-groundwater.html
4. EPA (2010). BPA action plan. www.epa.gov/oppt/existingchemicals/pubs/actionplans/bpa_action_plan.pdf
5. Erickson ML (2012). Steroidal hormones and other related compounds in shallow groundwater in nonagricultural areas of Minnesota—Study design, methods, and data. USGS. Data Series 663. http://pubs.usgs.gov/ds/663/
6. Erickson ML et al. (2014). Contaminants of emerging concern in ambient groundwater in urbanized areas of Minnesota, 2009–12: U.S. Geological Survey Scientific Investigations Report 2014–5096, 38 p., with appendix, http://dx.doi.org/10.3133/sir20145096
7. 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. USGS. Data Series 575. http://pubs.usgs.gov/ds/575/
8. Lee KE et al. (2007). Endocrine active chemicals and endocrine disruption in Minnesota streams and lakes—implications for aquatic resources, 1994–2008. USGS. Sci. Investigations Report 2010–5107. http://pubs.usgs.gov/sir/2010/5107/
9. www.health.state.mn.us/divs/eh/risk/guidance/gw/bpatoxsumm.pdf
10. Von Goetz N et al. (2010). Bisphenol A: How the most relevant exposure sources contribute to total human exposure. Risk Anal. 30(3):473-487.
11. LaKind JS and Naiman DQ (2008). Bisphenol A (BPA) daily intakes in the United States: Estimates from the 2003-2004 NHANES urinary BPA data. J. Exposure Sci. and Env. Epidem. 18:608-15.

CLEAN WATER LAND & LEGACY AMENDMENT

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