

Benzo(a)pyrene in Drinking Water

Benzo(a)pyrene (BaP) is a contaminant sometimes found in drinking water. The Minnesota Department of Health (MDH) has developed a health protective guidance value for BaP in drinking water. This information sheet discusses BaP in water and its possible health effects.

What is benzo(a)pyrene (BaP)?

BaP is part of a group of chemicals called polycyclic aromatic hydrocarbons (PAHs). Sources of BaP can include industrial processes, cigarette smoke, grilled or broiled foods, wood fires, motor vehicle emissions, and many other activities that involve combustion of an organic (i.e., carbon-based) material.

BaP has been classified by the U.S. Environmental Protection Agency (US EPA) as a probable human carcinogen.¹ Animal studies show high doses of BaP can cause harmful changes to the nervous system (affecting learning and movement), reproductive organs, kidney, and other organs. There is concern that low level, long-term exposure increases the risk for developing cancer.

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

MDH has developed a health protective guidance value for BaP of 0.06 parts per billion (ppb) in drinking water. The guidance value is based on protecting people from cancer. This value is protective of all individuals, including those that may be sensitive to the effects of BaP. A summary of the MDH BaP water guidance can be found here:

www.health.state.mn.us/divs/eh/risk/guidance/gw/table.html.

How much BaP is in Minnesota drinking water and can it affect my health?

BaP is not common in Minnesota drinking water. BaP has been reported in Minnesota groundwater at concentrations up to 162 ppb. This is higher than the MDH guidance value of 0.06 ppb. However, this reported amount was from a hazardous waste site where BaP was known to be a contaminant in the groundwater. With the newly published MDH guidance value, site managers will be able to ensure that water with concentrations of BaP higher than the guidance value will not be consumed by humans. Based on Minnesota

At a Glance

Benzo(a)pyrene (BaP) is...

- a by-product from incomplete burning of combustible substances.



BaP enters your body mainly from...

- breathing air containing BaP, and
- eating food or drinking water containing BaP.

You can reduce your exposure to PAHs by...

- limiting your exposure to tobacco and wood smoke,
- eating less grilled or charred foods, and
- limiting your exposure to asphalt fumes.

groundwater data for BaP, it is not expected to be found at levels in drinking water in Minnesota that will harm people's health.

How can I reduce my exposure to BaP?

People are exposed to BaP because it is often found in air, water, food and soil. A few ways to lower your exposure to BaP include limiting the amount of grilled or charred foods you consume and limiting exposure to:

- smoke from tobacco products,
- wood smoke,
- vehicle exhaust, and
- coal tar-based asphalt, which contains high levels of PAHs.

How does BaP get into the environment?

BaP is formed when a material, such as gasoline or wood, burns incompletely. BaP sticks to very small particles that go into the air. People and animals may then breathe in particles that contain BaP or other PAHs. The particles and BaP eventually settle back onto the ground or into ponds, lakes or rivers. BaP can also be washed into water by rain. BaP may settle into the sediment or soil. When BaP is attached to particles in soil or water it can be swallowed by animals, including fish, or taken up by plants.

How long does BaP stay in the environment?

When BaP enters the environment, it can remain in the soil, water, or air, for weeks to years. It also breaks down into smaller molecules that remain in the environment for longer time periods.

What are the potential environmental impacts of BaP?

BaP can contaminate soils and sediments, and it can accumulate in animals and plants in water and on land. BaP may have adverse effects on wildlife. For example, in some types of fish and mollusks, BaP has been found to interfere with reproduction and development.

For more information contact:

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You can get more information at...

- Benzo(a)pyrene (BaP) Toxicity and Exposure Assessment for Children's Health (TEACH) Chemical Summary.
www.epa.gov/teach/chem_summary/BaP_summary.pdf
- Polycyclic Aromatic Hydrocarbons: Public Health Statement. Agency for Toxic Substances and Disease Registry (ATSDR).
www.atsdr.cdc.gov/phs/phs.asp?id=120&tid=25

References

1. US EPA, Integrated Risk Information System.
www.epa.gov/iris/subst/0136.htm