DELAWARE HEALTH AND SOCIAL SERVICES
Division of Public Health

Frequently Asked Questions

ACRYLAMIDE

What is acrylamide?
Acrylamide (CAS#**:** 79-06-1) is a chemical that occurs as a solid crystal or in liquid solution. It is primarily used for industrial purposes for reacting with other chemicals to create copolymers, another chemical with different properties than the two original chemicals. Trace amounts of unreacted acrylamide generally remain in copolymers used in various processes such as the production of paper, dyes and plastics, and the treatment of drinking water, sewage, and waste.

Why should I be concerned?
Acrylamide can irritate the eyes and skin and cause nervous system effects such as numb limbs, weakness, and exhaustion. Recent findings reported the detection of acrylamide in certain foods, although it is not added to foods during processing or preparation. Relatively high levels were reported in potato chips and French fries, with lower levels in some breads and cereals. The U.S. Environmental Protection Agency (EPA) classified acrylamide as a Group B2, probable human carcinogen as well as a neurotoxin. In addition to food, acrylamide is also found in cigarette smoke, another leading cause of exposure to humans. Although this chemical is found in foods at levels below those shown to produce neurotoxic effects, scientists do not yet know if acrylamide in food poses a health risk for humans.

How can people be exposed to acrylamide?
People can be exposed to acrylamide by breathing it in, absorbing it through their skin, ingesting it, or having it touch their eyes. In September 2002, researchers discovered that the naturally occurring amino acid that can be found in many vegetables, called asparagines, can form acrylamide when heated to high temperatures (greater than 120 degrees C or 248 degrees F). Asparagines form when frying, baking, and broiling foods that contain certain natural sugars.

How does acrylamide work, and how can it affect my health?
Historically, high levels of acrylamide in the workplace caused neurological damage. Although acrylamide is not proven to cause cancer in humans, it has been shown to cause cancer in laboratory rats. Therefore, it is considered as a probable human carcinogen by both the EPA and the International Agency for Research on Cancer (IARC). It is not known whether the levels in foods are significant enough to cause cancer. Additional research will need to be conducted to better understand the mechanism of the formation of acrylamide in food; the nature and extent of uptake from food by humans; and the relationship between acrylamide in food and cancer in humans.

What factors limit use or exposure to acrylamide?
There are regulations in place for when acrylamide is used to treat water. For food, longer cooking times form more acrylamide. Lower-heat methods of cooking, such as microwaves and boiling, appear less likely to cause the formation of acrylamide in foods.

Are there any regulations and recommendations for acrylamide?
No regulations exist governing acrylamide in food. The World Health Organization is not currently changing any dietary recommendations and continues to support diets rich in fruits and vegetables and containing fewer fattening foods.

Technical information

CAS Number: 79-06-1

Chemical Formula: C_3H_5NO

Carcinogenicity (EPA): B2 (Probable human carcinogen).

MCL (Drinking Water): Treatment Technique. Each water system must certify, in writing, to the state (using third-party or manufacturer's certification) that when acrylamide and epichlorohydrin are used to treat water, the combination (or product) of dose and monomer level does not exceed the levels specified, as follows:

- Acrylamide = 0.05% dosed at 1 mg/L (or equivalent)
- Epichlorohydrin = 0.01% dosed at 20 mg/L (or equivalent)

OSHA Standards: TWA 0.3 mg/m^3 [skin]

NIOSH Standards: Ca TWA 0.03 mg/m^3 [skin]

Resources

Acrylamide in Food and Cancer Risk, National Cancer Institute, http://www.cancer.gov/cancertopics/factsheet/risk/acrylamide-in-food

Agency for Toxic Substance and Disease Registry (ATSDR) 2022. *ToxFAQs™ for Acrylamide;* https://wwwn.cdc.gov/TSP/ToxFAQs/ToxFAQsDetails.aspx?faqid=1162&toxid=236

Agency for Toxic Substance and Disease Registry (ATSDR). 2012. Toxicological Profile for Acrylamide; https://wwwn.cdc.gov/TSP/ToxProfiles/ToxProfiles.aspx?id=1112&tid=236

The National Institute for Occupational Safety and Health(NIOSH).2019. Pocket Guide to Chemical Hazards entry for Acrylamide; https://www.cdc.gov/niosh/npg/npgd0012.html

United States Environmental Protection Agency. 2000. Hazard Summary for Acrylamide; https://www.epa.gov/sites/default/files/2016-09/documents/acrylamide.pdf