



Acrylamide in Foods

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A new cancer risk?

In April 2002, research conducted by scientists at the University of Stockholm in cooperation with experts at Sweden's National Food Administration indicated that when carbohydrate-rich foods such as potatoes, rice, cereals, or breads are heated at high temperatures they spontaneously formed acrylamide. Because acrylamide was known to be carcinogenic when fed to laboratory animals in large quantities, concern arose that acrylamide in the human diet might also be a carcinogen.

What is acrylamide?

Acrylamide is a solid consisting of white, odorless, flake-like crystals. It is used in the manufacture of plastics, including some food packaging, and in the production of synthetic rubber and some copolymers. Acrylamide is not added to foods. When added to water, it coagulates and traps suspended solids that can then be easily removed during the treatment of drinking water. Acrylamide does not bind to soil but is degraded by microorganisms within a few days in soil and water. The acrylamide that does not coagulate remains in the water as a contaminant that, under U.S. Environmental Protection Agency regulations, must be present at less than half a part per billion (0.5 ppb).

What's the latest news about acrylamide?

In June 2002, the World Health Organization (WHO) and the Food and Agriculture Organization (FAO) consultation, along with three U.S. Food and Drug Administration (FDA) experts, concluded that the presence of acrylamide in food is a major concern and additional research on mechanisms of formation and toxicity is seriously needed. Both the WHO/FAO consultation and

the FDA recommended eating a balanced diet rich in fruits and vegetables. Although the WHO/FAO consultation advised that food should not be cooked excessively, i.e., for too long or at too high a temperature, it also cautioned that it is important to cook all food—particularly meat and meat products—thoroughly to destroy foodborne pathogens (bacteria, viruses, etc.) that might be present.

Since then, studies of various foods including potato chips, french fries, and bread show acrylamide levels from 10 ppb to more than 2000 ppb. Measurable levels of acrylamide have also been found in banana chips, taco shells, pretzels, and roasted asparagus. The varying levels could be attributed to different cooking temperatures and times. Some foods contain the naturally occurring amino acid asparagine. When coupled with a carbonyl source, such as reducing sugars, asparagine forms a key precursor to acrylamide in foods. This finding suggests that there are ways to reduce acrylamide formation other than simply reducing cooking temperature. Studies are being conducted to determine the steps to regulate the rate of this reaction in food systems. This can help develop processing procedures to minimize the formation of acrylamide.

On December 4, 2002, the FDA and its Center for Food Safety and Applied Nutrition published a list of recently tested food products that were determined to contain acrylamide. The list included baby foods, breads, potato chips, snack foods, seasonings, and other widely used products. Results indicated that acrylamide is formed in foods during processing and its levels varied widely and were affected by simple preparations (e.g., toasting) often used at home. Those findings imply that acrylamide has been in our diets for generations.

In January 2003, a joint study by Swedish and U.S. researchers found no correlation between cancer and high intake of acrylamide in foods such as potato chips and french fries. The study, done in cooperation with Harvard University, indicated that eating foods containing high levels of acrylamide produced no greater than normal risk of intestinal, bladder, or kidney cancer. Thus, concerns about carcinogenicity arising from the earlier findings of Swedish research on formation of acrylamide in foods may be unjustified.

What do these research results mean to me?

One needs to be careful in assessing results of acrylamide studies to food. The FDA list of foods with acrylamide should not be taken as an indicator of product choices,

because differences in acrylamide levels in foods do not necessarily indicate differences in exposure or potential risk to consumers.

It is still not known how much acrylamide consumption is considered a health risk. Therefore, the FDA has initiated a plan to assess human dietary exposures and acrylamide's toxicology and to develop methods to reduce its formation in food. Until conclusions can be properly formulated, it is recommended that you follow nutritional guidelines by eating a balanced diet tempered with moderation.

Eating any food, cooked or uncooked, has associated risks. The many nutritional benefits offered by grains and potatoes much outweigh the miniscule amounts of contaminants that may be present.