

Acrylamide in Food

Frequently Asked Questions

No	Question	Answer
A	General Questions	
1.	What is acrylamide?	<p>Acrylamide is a chemical that is used to make polyacrylamide materials. Polyacrylamide is used in the treatment of drinking-water and waste water where it is used to remove particles and other impurities (see Question 15). It is also used to make glues, paper and cosmetics. Polyacrylamide materials contain very small amounts of acrylamide.</p> <p>Acrylamide is also used in the construction of dam foundations and tunnels, and appears to be produced in some foods prepared at high temperatures.</p>
2.	What is the problem?	<p>Acrylamide is known to cause cancer in animals. Also, certain doses of acrylamide are toxic to the nervous system of both animals and humans.</p> <p>In April 2002 the Swedish National Food Authority reported the presence of elevated levels of acrylamide in certain types of food processed at high temperatures. Since then, acrylamide has been found in a range of cooked and heat-processed foods in other countries, including The Netherlands, Norway, Switzerland, the United Kingdom and the United States.</p> <p>Previous concerns about acrylamide were focused on workers using acrylamide in their jobs, and cigarette smoking.</p>
3.	How/why does acrylamide form when food is cooked at high temperatures?	<p>There is currently little information about, and poor understanding of, how acrylamide is formed in foods. It appears to be produced naturally in some foods that have been cooked or processed at high temperature and the levels appear to increase with the duration of heating. The highest levels found so far were in starchy foods (potato and cereal products).</p> <p>Further research is needed to explain why acrylamide forms in food as well as the conditions that promote or reduce its presence in food.</p>

4.	What can be done to avoid acrylamide in food? Should I stop eating starchy foods including potato chips/potato crisps?	<p>We don't know exactly at what temperature acrylamide is formed in food. However acrylamide has so far not been found in food prepared at temperatures below 120 degrees Celsius, including boiled foods.</p> <p>Food should not be cooked excessively, i.e. for too long or at too high a temperature. However, all food, especially meat and meat products, should be cooked sufficiently to destroy food poisoning bacteria.</p> <p>The information available on acrylamide so far reinforces general advice on healthy eating, including moderating consumption of fried and fatty foods. There is not enough evidence about the amounts of acrylamide in different types of food to recommend avoiding any particular food product.</p>
5.	Are home-cooked foods safer than pre-cooked, packaged or processed foods?	Elevated levels of acrylamide have been found in home cooked foods, as well as pre-cooked, packaged and processed foods.
B	QUESTIONS RELATED TO CANCER	
6.	What is the risk of me getting cancer from acrylamide? Now? Longer-term? Which type of cancer?	<p>The theoretical models to predict whether cancer would develop in humans as a result of ingesting acrylamide in food are not reliable enough to develop firm conclusions about risk. When investigated in rats, acrylamide has a similar potency to certain other well-known carcinogens formed through cooking. For humans, the relative potencies of cancer-causing agents in food are not known. However, levels of acrylamide in the diet are likely to be higher than those of other known carcinogens.</p> <p>Prolonged exposure to acrylamide has caused a range of tumours in animal tests (rats and mice), including in the adrenal glands and testes. In humans, studies of workers exposed to acrylamide through air and contact with their skin found no evidence of cancer – however, such human evidence is often difficult to obtain. The International Agency for Research on Cancer (IARC) under WHO has classified acrylamide as "probably carcinogenic to humans" on the basis of the evidence from animal studies.</p>
7.	Is it accurate to say that something is a risk for humans if the only cancer studies have been done on rats (and other animals)?	There are examples of substances causing cancer in animals, where it has been concluded that this is not relevant to humans. However, a number of substances causing cancer in animals do also cause cancer in humans. Therefore, it is established practice to assume that an animal carcinogen is potentially carcinogenic to humans unless proven otherwise. Such proof – which does not exist for acrylamide - could be that the mechanism by which the substance causes animal tumours is not relevant to humans.
8.	Is any level of	Acrylamide belongs to the group of chemicals thought to have no reliably identifiable 'threshold' of effects, meaning that very low

	acrylamide in food acceptable?	<p>concentrations will also result in very low risks, but not in zero risk: some risk is always present when the chemical is ingested. However, for these carcinogens, risk is thought to increase with increasing exposure.</p> <p>What constitutes a tolerable level of risk for acrylamide is not just a scientific question, since a number of other considerations are necessary to define the acceptability of risk to a given society.</p> <p>Very low risks (even of cancer), such as those that are less than one in one million, are considered to be acceptable to some consumers. To others this is unacceptable. The important pre-requisite for any decision is, however a clear picture of the nature and level of the risk, as well as the potential for lowering this level. This clear picture does not exist for acrylamide at present.</p>
9.	Is it true that there are carcinogens in everything we eat?	No. Although many foods might contain some potentially carcinogenic elements, the effect on human health is often not known with any great degree of certainty. Also carcinogens vary in potency, and research can assist in identifying those substances of greatest concern. The potential risks posed by weakly carcinogenic substances occurring in food should be managed in an appropriate manner but often need to be accepted or tolerated by society.
10.	Does food represent the greatest source of acrylamide or are there other sources?	The levels of acrylamide found in some foods are much higher than the levels recommended for drinking-water, or levels expected to occur as a result of contact between food and food packaging (from paper) or use of cosmetics. However, exposure from smoking cigarettes may be significant.
C	Questioning the Evidence	
11.	The evidence seems incomplete. Are you certain that I will run an increased risk of getting cancer from eating some foods?	<p>It is true that the current evidence is incomplete. Further information needs to be obtained to better understand the formation of acrylamide in food, the possible health impact that this might have, and the measures that might be successful in reducing the levels in food.</p> <p>It cannot now be categorically stated what fraction of the cancers, which we know are caused by food in general, can be attributed to acrylamide in food.</p>
12.	Is acrylamide produced naturally in the body? Could this have invalidated the results?	There is no evidence that acrylamide is produced in the human body and certainly not at the levels that have been measured. Various experiments have all but ruled out this hypothesis.
13.	How credible are all the results? The number of food types tested was small and the samples of food tested varied widely in their acrylamide content.	The Swedish announcement was the first report of the presence of elevated levels of acrylamide in food. However acrylamide has now also been found in food samples from the Netherlands, Norway, Switzerland, the United Kingdom and the United States. More foods need to be tested, and the mechanism of formation of acrylamide in food needs to be better understood, so that the levels in particular food types can be predicted.

14.	Can we trust what the food industry tells us about how they prepare their processed foods?	The food industry recognizes the implications of consumers perceiving their products as unsafe, as well as their liability in selling a product that is potentially harmful to the consumer. Oversight by governments will provide some level of assurance for consumers on the safety of food products on the market and also verifies (or not) claims by the food industry about how they prepare their processed products.
D	Acrylamide in Water	
15.	Why is polyacrylamide used in the treatment of drinking-water?	Polyacrylamide is used as a one of a variety of cleaning agents, combining with solid material making it easier to filter/remove unwanted substances from water. There are only very low levels of acrylamide in polyacrylamide.
16.	Is there a guideline stating the maximum limit for acrylamide in water?	According to the WHO Guidelines for Drinking-water Quality, the guideline value (the concentration representing the tolerable risk to the health of the consumer over a lifetime of consumption) is 0.5 micrograms per litre in drinking-water. Concentrations in drinking-water can be controlled by product and dose specification. The European Union's legal limit for drinking-water is 0.1 micrograms per litre of water. Some countries, like the United States and Japan, have regulations on treatment techniques, rather than a water quality standard value for acrylamide.