

Acrylamide (Q&A)

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What is acrylamide?

Acrylamide is an organic compound used in the manufacture of polymers, which have applications in water and soil treatment and in production of plastics, glues, paper and cosmetics. Acrylamide can be formed as a result of cooking certain foods, particularly plant-based foods that are rich in carbohydrates and low in protein, at high temperatures.

When was acrylamide first detected in food?

2002, the Swedish National Food Authority reported the presence of acrylamide in a variety of fried, baked and roasted foods. Subsequent studies have confirmed the Swedish findings. Although the detection of acrylamide in food is relatively recent, it is likely to have been present in the human diet for thousands of years.

How is acrylamide formed in foods?

The formation of acrylamide in foods occurs as the result of a reaction known as the Maillard reaction, which is a chemical reaction between an amino acid (the building block of protein) and a sugar such as glucose, fructose or lactose. Heat is required to start the cooking reaction that causes a cascade of chemical changes which ultimately result in the “browning” of the food and the formation of a range of odour and flavour compounds.

The natural composition of foods such as cereals and potatoes (i.e. the relative amounts of asparagine and sugars) has an important effect on the formation of acrylamide during cooking. Factors such as variety, storage conditions and seasonal weather conditions are known to have an effect on the levels of sugars in potatoes. Weather, crop variety and the levels of sulphur in the soil and nitrogen fertilization have been found to have an influence on the levels of asparagine in cereals.

Which foods contain acrylamide?

Acrylamide is found in a wide range of foodstuffs that naturally contain the amino acid asparagine and sugars and that have been cooked at high temperatures (usually significantly above 100°C). Such foods include bread, French fries, potato crisps, biscuits and crackers, crispbreads, breakfast cereals, roast potatoes, bakery products and coffee.

Acrylamide is not only found in foods produced by food manufacturers, it is formed in traditional cooking methods such as baking, roasting and frying and is therefore also present in food prepared in the home or in restaurants.

Is there a risk from eating foods that contain acrylamide?

Dietary exposure to acrylamide has been identified as a potential concern by the Joint FAO/WHO Expert Committee on Food Additives (JECFA).

Acrylamide, at high concentrations, has been found to cause cancer in animals in laboratory tests; however, the effect of dietary intake of acrylamide on human health remains uncertain. There have been a number of studies on acrylamide and the risk to human health, but clear conclusions cannot be drawn as the results of such studies should not be looked at in isolation. JECFA states that additional long-term studies are needed to determine the precise level of risk for human health.

The European Food Safety Agency (EFSA) carried out an assessment on acrylamide and human health. The assessment considered related international developments, including work by JECFA. EFSA's opinion, published in June 2015, confirmed the findings from previous evaluations, that based on animal studies acrylamide potentially increases the risk of developing cancer for consumers in all age groups.

Should I change what I eat?

The advice from bodies such as the WHO and European national food authorities continues to be to follow established dietary guidelines and eat a balanced and varied diet, which includes plenty of fruit and vegetables and a moderate consumption of fried and fatty foods.

What is industry doing to reduce acrylamide in food?

Since the publication of the Swedish report in 2002 the food and drink industry has worked closely with research groups, national authorities and the European Commission to identify the cause for the formation of acrylamide in foods and to develop methods for the reduction of acrylamide.

The culmination of this work has been the publication by the European Food Industry association, FoodDrinkEurope (FDE), of the Acrylamide Toolbox for the reduction of acrylamide in food products. The Toolbox brings together those methods of acrylamide reduction that are known to work in the production process and reviews other proposed methods that are at either the pilot or laboratory scale stage. The objective of the Toolbox is to provide practical tools that food manufacturers can use to reduce acrylamide according to their particular situation. The Toolbox is a dynamic concept and is regularly updated as new mitigation methods are introduced.

Following a request from the Commission, FDE has produced a series of sector specific pamphlets based on the Toolbox aimed at small and medium sized food manufacturers. Translated into all official languages of the European Union the pamphlets provide details of all the tools that have been used to reduce acrylamide levels in food.

References:

1. [FoodDrinkEurope Acrylamide “Toolbox”](#)
2. European Food Safety Authority, Key Topics section: [Acrylamide](#).
3. World Health Organisation (WHO). Food Safety section: [Frequently asked questions - acrylamide in food](#).
4. EUFIC (2008). What happens when we cook food – understanding acrylamide formation. EUFIC Food Today n° 64.
5. Food Safety Authority of Ireland (FSAI) Factsheet: Acrylamide in Food. Issue 1, May 2009.
6. [European Commission recommendation of 10.1.2011 on investigations into the levels of acrylamide in food, Brussels, c \(2010\) 9681 final.](#)