

A “Toolbox” for the Reduction of Acrylamide in Fried Potato Products/French Fries

Acrylamide

Acrylamide is a substance that is produced naturally in foods as a result of high-temperature cooking, e.g., baking, grilling, or frying. Acrylamide can cause cancer in animals and experts believe it can probably cause cancer in humans. Although acrylamide has probably been part of our diet since man first started cooking, because of concerns over safety, world experts have recommended that we reduce the levels of acrylamide in foods.

Acrylamide has been found in a wide variety of foods, including those prepared industrially, in catering and at home. It is found in staple foods such as bread, potatoes as well as in some specialty products such as crisps, biscuits and coffee.



The CIAA Acrylamide Toolbox

Following the discovery of acrylamide in food, the food industry and other stakeholders, including regulators, took action to investigate how acrylamide is formed in foods and possible methods that can be employed to reduce levels of acrylamide in foods. The European Food and Drink Federation (CIAA) coordinated the efforts and pooled the results together to produce the Acrylamide Toolbox.

What does the Toolbox do?

- Details existing methods to reduce acrylamide in foods
- Allows users to assess and evaluate which reduction measures to use

This brochure is designed to help manufacturers of French fries and fried potato products.

For advice, contact the European Potato Processors Association (UEITP) info@fvphouse.be

What can you do?

- Use this brochure to identify methods that you can use to reduce acrylamide levels
- Not all methods will apply to your manufacturing needs
- You will need to examine your production methods, recipes, product quality and national legislation in order to identify the most appropriate “tools”.



Acrylamide in potato products

Methods of formation

- Acrylamide is formed via the reaction of asparagine and reducing sugars (both naturally occurring in potatoes)
- Acrylamide is formed at temperatures higher than 120 °C
- The amount of acrylamide formed depends on
 - Temperature of final cooking
 - Cooking time
 - Amounts of asparagine and reducing sugars in the potato

Tools to try

- Control the levels of reducing sugars
- Blanch potato strips in hot water for a longer period of time to remove reducing sugars and control colour.
- Control the temperature & time of final cooking
- Aim for a lighter golden colour when cooking

Methods of Reduction for finished French Fries

The following “Tools” have been used successfully to reduce levels of acrylamide in French fries. Manufacturers are advised to select those “Tools” that are most suitable to their type of product, process methods and product quality specification. info@fvphouse.be

Manufacturing Stage	Reduction Measures	Comments
Agronomical: sugar content of potatoes	Select potatoes cultivars with levels of reducing sugars as low as reasonably achievable taking into account regional and seasonal variability. Selection of potato suitability for the product type should be based on a colour assessment of a fried sample or the capability of other tools to control acrylamide.	Test incoming deliveries of potatoes for sugar levels, or fry test them (aim for a light golden colour). Avoid potatoes that give a dark product.
Agronomical: potato storage and transport	Store potatoes at > 6°C. Control storage conditions from farm to factory; in cold weather, protect potatoes from cold air. Avoid deliveries of potatoes that have been standing outside (unprotected) over night in freezing conditions.	Fry test potatoes that have been stored at low temperatures for long periods of time. If the product is dark, consider leaving the potatoes to warm up over a period of two weeks. Fry test regularly.
Processing: pre-treatment, blanching	Blanch potato strips in water to lower sugar levels before cooking.	Addition of sodium acid pyrophosphate during the last stage of blanching can reduce acrylamide levels in the final product.
Processing: pre-treatment, par frying	Par fry French fries.	Acrylamide is mostly formed during the final stages of cooking. Little or no acrylamide can be found in par-fried French fries.
Processing: French fries thickness	Cut thicker French fries.	Thicker French fries contain less acrylamide than thinly cut French fries.
Final preparation	When cooking French fries, follow the packaging cooking instructions. Do not overcook (cook until light golden colour; when cooking smaller amounts reduce cooking time, when frying do not cook above 175 °C).	Frying at lower temperatures to the same colour will increase fat levels in the final product.