



A “Toolbox” for the Reduction of Acrylamide in Fried Potato Crisps

Acrylamide

Acrylamide is a substance that is produced naturally in foods as a result of high-temperature cooking (e.g. baking, grilling, frying).

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

Acrylamide in food potentially increases the risk of developing cancer for consumers in all age groups. It is therefore of major importance for the protection of public health that mitigation measures are applied to reduce the levels of acrylamide in food as low as reasonably achievable.

The FoodDrinkEurope Acrylamide Toolbox

Following the discovery of acrylamide in food, the industry and other stakeholders, including regulators, took action to investigate how acrylamide is formed and the possible methods that can be employed to reduce levels of acrylamide in foods using the ALARA principle. FoodDrinkEurope initiated and continues to coordinate efforts and pool results together to update 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 and at which production step
- Assists in implementing Commission Regulation (EU) 2017/2158, with the aim to achieve levels of acrylamide as low a reasonably achievable

ALARA

ALARA is an acronym for the concept “As Low As Reasonably Achievable”. This simply means that a Food Business Operator (FBO) takes appropriate measures to reduce the presence of a given contaminant in a final product to a minimum: taking account of the risk presented, but also taking account of other legitimate considerations, such as potential risks from other contaminants, organoleptic properties and quality of the final product, and the feasibility and effectiveness of controls.

To ensure continuing compliance with the ALARA concept the FBO should monitor the effectiveness of the implemented measures and should reassess these as necessary.

What can you do?

- Use this brochure to identify methods that you can use to reduce acrylamide levels.
- You will need to examine your production methods, raw materials, recipes, product quality and national legislation in order to identify the most appropriate “tools”.

- Consider that not all methods will apply to your manufacturing needs. You will need to assess the effectiveness of the mitigation measures by monitoring and use of the benchmark levels as performance indicators
- When benchmark levels are exceeded, you will need to review the mitigation measures applied and adjust processes with the aim to achieve levels as low as reasonably achievable below the benchmark level.

Acrylamide in potato crisps

This brochure is designed to help manufacturers of fried potato crisps. For more detailed advice contact the European Snacks Association (ESA) at esa@esasnacks.eu

Read the full toolbox at:

<https://www.fooddrinkeurope.eu/publication/fooddrinkeurope-updates-industry-wide-acrylamide-toolbox/>

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

Methods of Reduction Fried Potato Products: Potato Crisps

The following “Tools” have been used successfully to reduce levels of acrylamide in Potato Crisps.

Manufacturers are advised to select those “Tools” that are most suitable to their type of product, process methods and product quality specification.

Raw Materials Selection	Recipe Design	Process Design	Finished Product Attributes
<ul style="list-style-type: none"> • Select suitable potato varieties (reducing sugars and asparagine are the lowest for the regional conditions and specific end product). • Store environment controlled for temperature (> 6° C) and humidity. • Sprouting suppressed in long term stored potatoes using appropriate agents. • Test raw materials for sugars during storage. • Check incoming potatoes (set specifications for maximum content of reducing sugars in potatoes and also the maximum amount of bruised, spotted or damaged potatoes). 	<ul style="list-style-type: none"> • Some pre-processed ingredients may already contain higher levels of acrylamide which could impact upon levels in the final product. • Consider that, in some circumstances, thicker cut crisps could result in higher acrylamide levels as they require greater thermal input to create the end product. • Use of some ingredients may, in addition to flavour, compensate for lighter coloured crisps by providing additional colour. 	<ul style="list-style-type: none"> • Specify frying oil temperatures at the exit of the fryer (typically no more than 168°C). • Specify the moisture content post frying (The minimal moisture content shall not be lower than 1,0%). • Utilise inline feedback of cooking dependent on moisture content. • Inline post fryer colour / defects rejection. • Washing potato slices in warm / hot water to remove excess sugars. 	<ul style="list-style-type: none"> • Use in-line colour sorting (manual and/or optical-electronic) for potato crisps post frying.