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 can cause cancer in animals and experts believe it could 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 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.

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 possible methods that can be employed to reduce levels of acrylamide in foods using the ALARA principle. FoodDrinkEurope 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

ALARA

ALARA is an acronym for the concept "As Low As Reasonably Achievable". This simply means that a Food Business Operator FBO) should take 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 review them as necessary.

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 crisps

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

Read the full toolbox at:
http://www.fooddrinkeurope.eu/publication/fooddrinkeurope-updates-industry-wide-toolbox-to-help-manufacturers-further/

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

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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
• Only use suitable (low sugar) potato varieties. • Store environment controlled for temperature (> 6° C) and humidity. • Sprouting suppressed in stored potatoes using CIPC. • In-coming potatoes checked at plant.	• Some pre-processed ingredients may already contain high levels of acrylamide which could impact upon levels in the final product. • Thicker cut crisps may result in increased acrylamide levels as they require higher 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.	• Optimised and strictly defined cooking conditions (management of oil / temperature / dwell time) to produce a product with a golden yellow colour. • In-line feedback of cooking dependent on moisture content. • In-line post fryer colour / defects rejection. • Washing potato slices in warm / hot water to remove excess sugars. • Adequate peeling: Reducing sugars can be higher in the peel layer of some varieties.	• Off-line for colour.