



A “Toolbox” for the Reduction of Acrylamide in Fine bakery wares

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 Fine bakery wares

This brochure is designed to help manufacturers of fine bakery wares. For more detailed advice contact European Association for Chocolate, Biscuits and Confectionery Industries at caobisco@caobisco.be

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
- Acrylamide is formed at temperatures higher than 120°C
- The amount of acrylamide formed depends on
 - Temperature
 - Baking time
 - Recipe

Methods of Reduction for Biscuits, Crackers and Crispbread

The following “Tools” have been used successfully to reduce levels of acrylamide in different varieties of Fine bakery wares. However owing to the vast range of different recipes, ingredients and processes used in traditional biscuit manufacture there is no simple way to reduce acrylamide formation in Fine bakery wares. 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"> Sugars composition of cereal grains is not a key determinant of AA formation. Sulphur-deprived soils have been shown to impact the free Asn concentrations in certain cereal crops considerably. Less sulphur in the soil results in higher Asn levels in the crop and therefore higher risk of AA formation. Cooked wheat prepared from sulphur-deficient flour also impacts the spectrum of aroma compounds, and consequently the organoleptic properties. 	<ul style="list-style-type: none"> Some pre-processed ingredients may already contain high levels of acrylamide which could impact upon levels in the final product. When raising agents are used, for example in hard sweet biscuits, replacement of ammonium bicarbonate sometimes works. Alternatives are potassium carbonate with potassium tartrate or disodium diphosphate with sodium bicarbonate. Asparaginase is to try for certain products e.g. gingerbread, crispbread and shortsweet biscuits. Fructose used in products like gingerbread, should be replaced with glucose. Only low fructose glucose syrups should be used If less wholemeal flour is used less acrylamide will be formed 	<ul style="list-style-type: none"> Baking at a lower temperature for a longer time, but to the same final moisture content has been effective in lowering acrylamide in some products In-line feedback of cooking dependent on moisture content. 	<ul style="list-style-type: none"> There may be an impact on loss of stack height, flavour or texture. If sodium salts are used as an alternative take care not to end up with excessive sodium in the finished product The product will inevitably have a less dark, less ‘baked’ colour. Take care not to underbake the product as this could lead to microbiological problems on storage. Whole meal products are desirable from a nutritional and taste point of view