



A “Toolbox” for the Reduction of Acrylamide in Bread Products

Acrylamide

Acrylamide is a substance that is produced naturally in foods as a result of high-temperature cooking (e.g. baking, grilling and 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, world experts have recommended that we reduce the levels of acrylamide in foods, because of concerns over safety

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 bread products

This brochure is designed to help bread manufacturers of fine bakery wares. For further advice please contact AIBI aisbl - International Association of Plant Bakers at info@aibi.eu

Read the full toolbox at:

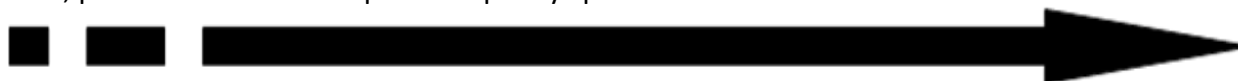
<http://www.fooddrinkeurope.eu/publication/fooddrinkeurope-updates-industry-wide-toolbox-to-help-manufacturers-further/>

Methods of formation

- Acrylamide is formed via the reaction of asparagine and reducing sugars (both naturally occurring in cereals)
- Acrylamide is formed at temperatures higher than 120°C
- The amount of acrylamide formed depends on
 - Temperature
 - Baking time
 - Recipe

Methods of Reduction for Bread Products

The following “tools” have been used successfully to reduce levels of acrylamide in bread products. 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, replacement of ammonium bicarbonate sometimes works. Alternatives are potassium carbonate with potassium tartrate or disodium diphosphate with sodium bicarbonate. The addition of calcium salts (calcium carbonate or calcium sulphate) has shown to reduce the formation of acrylamide. Asparaginase is to try for certain products e.g., crispbread. If less wholemeal flour is used less acrylamide will be formed. This is not desirable from a nutritional and taste point of view. 	<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. Adjust the time and temperature during baking to avoid excessive browning of the crust. 	<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.