



A “Toolbox” for the Reduction of Acrylamide in some Foods for Infants and Young Children

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 as 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 some Foods for Infants and Young Children

This brochure is designed to help manufacturers of foods for infants and young children. For more detailed advice contact Specialised Nutrition Europe (SNE) at secretariat@specialisednutritioneurope.eu
Read the full toolbox at:

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

Methods of formation

- Acrylamide is formed via the reaction of asparagine, which is naturally present in grains, potatoes and fruits, and reducing sugars such as fructose and glucose.
- Acrylamide is formed at temperatures higher than 120°C. Formation accelerates rapidly as moisture falls below 5%.
- The amount of acrylamide formed depends on:
 - Temperature of final cooking
 - Cooking time
 - Amount of asparagine and reducing sugars in key ingredients like wheat and prunes

Methods of Reduction in foods for Infant and Young Children

The vast range of different recipes, grains, ingredients and processes used in infant and young children products manufactured means there is no single, simple way to reduce acrylamide formation. For example, wheat-based cereals generally contain more asparagine than rice or maize based cereals, each grain has its own distinctive nutritional and eating characteristics. Prunes also generally have higher acrylamide formation compared to other fruits. Manufacturers are advised to select those “Tools” that are most suitable to the type of product that they are producing and to contact SNE for more advice (secretariat@specialisednutritioneurope.eu).

Product	Raw Material Selection	Recipe Design	Process Design
Processed Cereals-based foods and Biscuits	<ul style="list-style-type: none"> Free asparagine (Asn) concentration is the critical component for the formation of acrylamide (AA) in cereal products. <p>Agronomy: For wheat grain the importance of maintaining soil sulphur levels must be stressed to farmers.</p> <ul style="list-style-type: none"> Ensure selection of flour raw material with low Asparagine levels. <p>Acrylamide content is highly dependent on the raw material selection/origin and a big variability remains.</p>	<ul style="list-style-type: none"> Decrease the content in reducing sugar-containing ingredients (like honey and fruits) or the use combination of multiple cereal grains in one recipe. Replace Fructose by another sugar, like glucose. Use of Asparaginase enzyme as processing aid to reduce levels of acrylamide in preprocessed ingredients. 	<ul style="list-style-type: none"> Addition of asparaginase at the wet-mixing step under controlled time and temperature conditions.
Savoury Meals and Low-acid Baby Jars	<ul style="list-style-type: none"> Selection of raw material cultivars (e.g. potatoes, sweet potatoes) with low Asparagine levels. 	<ul style="list-style-type: none"> Avoid adding ingredients that may contribute to the increase of reducing sugars in the recipe. For example, product containing sweet potatoes are of greater risk, due to relatively higher amounts of AA precursors. 	<ul style="list-style-type: none"> Reduction of time and temperature conditions of baby jars heat treatment can result in lower levels of AA.
Prune – based foods	<ul style="list-style-type: none"> Change of specification of prune puree – work with prune suppliers to optimise heat treatment regimes. 		<ul style="list-style-type: none"> Reduction of time and temperature conditions of baby jars heat treatment can result in lower levels of AA.

Important considerations: Any changes (**lowering**) of thermal input to reduce acrylamide in baby foods must be carefully considered due to (**more severe**) microbiological risks