

**POSSIBLE MITIGATION MEASURES FOR ADDITION/AMENDING
THE MITIGATION MEASURES AS PROVIDED FOR IN ANNEX I TO
[COMMISSION REGULATION \(EU\) 2017/2158](#).**

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COCOA POWDER (input FDE)

1. Agronomy:

Sugar levels in cocoa beans show no correlation to the amount of AA formed during roasting

2. Processing

- FBOs shall identify the critical roast conditions to ensure minimal acrylamide formation within the target flavour profile.
- Control of roast conditions (duration and temperature) shall be incorporated into a Pre-requisite Program (PRP) as part of Good Manufacturing Practice (GMP).

VEGETABLE CRISPS (OTHER THAN POTATO CRISPS) (input FDE)

While the mitigation methods for this category are similar to those used for potatoes, achieving reductions to acrylamide levels comparable to those seen in potato products is not realistic. This category includes a wide range of crops, which generally have higher levels of acrylamide precursors than the potatoes used for making crisps.

- Vacuum frying process, under reduced pressure, is used when frying banana or vegetable chips. This process uses a much lower frying temperature (80 to 95 degrees Celsius), and there's no risk of acrylamide formation as a result of the frying process.
- Lowering the frying temperature reduces the acrylamide formation /The ripeness of banana is a factor (<https://onlinelibrary.wiley.com/doi/abs/10.1111/jfpp.12739>)

FRIED ONION RINGS (BATTERED AND BREADED) (input FDE)

- monitor the quality of the frying oil by measuring the Di- and Polymerized Triacylglycerols (DTPG) values. By carefully managing these parameters, they ensure that the oil remains within stable limits. This is also relevant for reactions that occur during frying, such as the Maillard reaction, where acrylamide can form as a byproduct when reducing sugars react with the amino acid asparagine at higher temperatures.
- Frying at approximately 180°C ensuring consistent cooking without unnecessary heat stress on the product and oil.

POTATO-BASED PRODUCTS (input EUPPA)

Mitigation measures additional to mitigation measures referred to in Annex I to Regulation (EU) 2017/2158 sections I and II based on EUPPA's Code of Practice for managing acrylamide formation during the production and final preparation of French fries, other cut processed potato products and other potato-based dishes

Potato storage and transport

Potato lots shall be tested for reducing sugars before being used in production, in order to help map and control potential sources of acrylamide formation.

Testing results shall be used to guide processing decisions (e.g. blanching intensity, dextrose addition, frying parameters) and, where necessary, to support decisions on conditional acceptance or rejection of raw material lots.

Avoid using potatoes that have been subject to excessive low temperature sweetening during storage (at/or below 4-6 °C). Where appropriate and practical, potato suppliers should consider reconditioning potatoes to reduce acrylamide precursors, before storage release, if measured sugar levels at the point of use indicate this will be beneficial.

Recipe and process design

Rösti and other potato products made of shredded potatoes; other potato products made of preformed mashed potatoes that are not breadcrumb-coated

For this category, it is important to reduce to a minimum the use of sugars in formulation.

As these products are typically made from small shreds, blanching may remove a significant proportion of reducing sugars; in such cases, limited and controlled addition of sugars may be technically necessary to achieve the desired final colour.

E450 can be used for this products category.

Potato croquettes and other potato-based dishes made of preformed mashed potatoes that are breadcrumb-coated:

For potato-based products made of preformed potatoes, it is important to reduce to a minimum the use of sugars in formulation.

It is also very important to define the characteristics of batter and bread to reduce the presence of sugar and to obtain the right golden colour within the defined time and temperature.

In some recipes, dextrose is also added to influence the final colour of the product after frying by consumer. The addition of dextrose must be controlled because a too high concentration will result in higher acrylamide values.

Testing, validation and verification

Specific to French fries and other cut potato products: Manufacturers shall establish a continuous product-testing program to validate the finished frying colour of the product directly coming from the production line. Product samples shall be cooked using recommended cooking times and temperatures, as defined in the product specifications. The production process shall be adapted (e.g. limiting dextrose dosage, increasing blanching time, lowering the pre-frying temperature) when the result of the product colour testing is outside product specifications' limits.

Specific to Other potato-based dishes (heated in oven or frying): Rösti and other potato products made of shredded potatoes; other potato products made of preformed mashed potatoes that are not breadcrumb-coated : For this category, manufacturers shall establish a continuous product-testing program to validate the finished frying colour of the product directly coming from the production line (when possible/relevant). Product samples shall be cooked using recommended cooking times and temperatures, as defined in the product specifications. The production process shall be adapted (e.g. modifying the time and temperature parameters of the frying process) when the result of the product colour testing is outside product specifications' limits.

Potato croquettes and other potato-based dishes made of preformed mashed potatoes that are breadcrumb-coated, Product samples shall be cooked using recommended cooking times and temperatures, as defined in the product specifications. The production process shall be adapted (e.g. modifying the time and temperature parameters of the frying process) when the result of the product colour testing is outside product specifications' limits. Where colour charts (e.g. USDA/Munsell) are not suitable due to coating or product characteristics, alternative validated indicators should be used.

COFFEE AND COFFEE SUBSTITUTES

Mitigation measures additional to mitigation measures referred to in Annex I to Regulation (EU) 2017/2158 sections V - Coffee, VI – Coffee substitutes containing more than 50 % cereals and VII – Coffee substitutes containing more than 50 % chicory based on information provided by Kerry

Under the part “Processing” add in the three sections:

The use of the enzyme amidase should be considered to lower the acrylamide content as amidase is capable of reducing acrylamide after heat processing,