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Report Name: Draft National Food Safety Standard Code of Principle for The Control of Acrylamide Contamination in Food Notified to WTO

Country: China - People's Republic of

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Report Category: Trade Policy Monitoring, WTO Notifications, Sanitary/Phytosanitary/Food Safety, FAIRS Subject Report

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Report Highlights:

On July 11, 2024, China notified a new National Food Safety Standard Code of Practice for Principle for the control of acrylamide contamination in food to the World Trade Organization (WTO) under G/SPS/N/CHN/1311. China's SPS Enquiry Point at sps@customs.gov.cn will accept comments until September 9, 2024. This report provides an unofficial translation of the draft standard. Stakeholders should conduct their own review of the standard and provide comments as necessary.

Report Summary:

On July 11, 2024, China notified draft National Food Safety Standard Code of Practice for Principle for the control of acrylamide contamination in food to the World Trade Organization (WTO) under G/SPS/N/CHN/1311. China's SPS Enquiry Point at sps@customs.gov.cn will accept comments until September 9, 2024.

This standard specifies the basic requirements and management guidelines for the prevention and control of acrylamide in the raw materials and processing of potato products, roasted grain products, coffee and other food products. It applies to the prevention and control of acrylamide in food made from raw materials rich in reducing sugars and asparagine (including potatoes, grains, coffee, etc.) through thermal processing such as frying and roasting. The draft standard was developed with reference to the Codex Alimentarius Commission's standard of CAC/RCP 67-2009 Code of Practice for the reduction of Acrylamide in foods.

This report provides an unofficial translation of the draft notified standard. Stakeholders should conduct their own review of the standard.

BEGIN TRANSLATION

National Food Safety Standard

Principle for Control of Acrylamide Contamination in Food

1. Scope

This standard specifies the basic requirements and management guidelines for the prevention and control of acrylamide in the raw materials and processing of potato products, roasted grain products, coffee and other food products.

This standard applies to the prevention and control of acrylamide in food made from raw materials rich in reducing sugars and asparagine (including potatoes, grains, coffee, etc.) through thermal processing such as frying and roasting.

2.Terms and Definitions

2.1 Acrylamide

A low molecular weight, water-soluble organic compound. Food undergoes Maillard reaction from asparagine and reducing sugars to produce acrylamide under thermal processing conditions such as frying and roasting above 120℃.

2.2 Reducing sugar

Monosaccharides containing free aldehyde or ketone groups (such as glucose and fructose) and

disaccharides containing free aldehyde groups (such as lactose and maltose) have reducing properties. It has a significant impact on the flavor, color, and nutritional value of food.

2.3 Asparagine

A nonessential amino acid that is abundant in foods such as asparagus, potatoes, and milk. It is a precursor substance for the formation of acrylamide in thermally processed foods.

3. Raw and auxiliary materials

3.1 Basic requirements

3.1.1 Raw materials shall select from varieties with the lowest possible content of reducing sugars and/or asparagine.

3.1.2 Enzyme preparations, antioxidants, sodium pyrophosphate and other food additives used to reduce acrylamide should comply with the requirements of GB 2760.

3.2 Raw materials for potato products

3.2.1 Potato varieties with low reducing sugar content and high maturity should be selected as raw materials. Before processing, potatoes should be selected and sorted to remove immature tubers. The storage and transportation temperature of potatoes after harvest should not be lower than 6℃.

3.2.2 The content of reducing sugar in potatoes can be determined by selecting the color after frying or directly detected.

3.2.3 When potato flour is used as the main raw material, reducing sugar or other ingredients with low asparagine content (such as Rice noodles) can be used to partially replace potato flour.

3.2.4 Fried or roasted potato products should avoid using reducing sugar as syrup or sugar coating.

3.3 Raw and auxiliary materials for grain products

3.3.1 In mixed grain products, it is advisable to choose ingredients with lower asparagine content to replace some grains. The content of asparagine in different grains can refer to Appendix A.

3.3.2 For roasting or frying grain products, it is advisable to minimize the use of raw materials containing reducing sugars. If the product does not require browning reaction to form color, sucrose can be used instead of reducing sugar to reduce acrylamide production.

3.3.3 Other permitted ammonium salt free leavening agents can be used instead of ammonium bicarbonate in roasted grain products.

3.4 Coffee raw materials

3.4.1 Mature coffee beans should be selected as raw materials.

3.4.2 It is advisable to choose varieties with low levels of asparagine and/or reducing sugars. As for the content of asparagine in coffee, refer to Appendix A.

3.4.3 The proportion of different varieties of coffee beans can be changed when mixing raw materials.

4 Processing

4.1 Basic requirements

4.1.1 The use of reducing sugars for coloring, coating, or adding spices using reducing sugars as carriers during food processing should be carried out after high-temperature processing.

4.1.2 During the processing, food additives such as enzyme preparations, antioxidants, and leavening agents can be used to reduce the generation of acrylamide. As for adjustments of the relevant formula, refer to Appendix A.

4.2 Potato products

4.2.1 Potatoes stored at low temperatures should be placed at 12°C to 15°C for an appropriate period of time before processing to reduce the content of reducing sugars. The placement time should reach an appropriate level of reducing sugar content, as determined in Appendix B.

4.2.2 Processing methods such as cleaning, blanching, rapid cooling after frying, far-infrared heating, and dry steaming can be used to reduce the acrylamide content in the product according to processing needs. For relevant production process improvements, please refer to Appendix A.

4.2.3 For pre-roasted or pre-made fries that are stored in refrigeration later on, it is necessary to extend the blanching time and/or increase the blanching temperature for the sliced fries for pre-treatment.

4.2.4 Attention should be paid to controlling the processing temperature and time, so that potato products should be fried to a light golden color during frying, and excessive frying should be avoided.

4.2.5 Sorting processes can be set up on the production line to remove products with abnormal fried color.

4.2.6 Food residues in the frying bed and fryer should be regularly cleaned, and oil filtration measures should be taken to promptly discharge the debris.

4.3 Grain products

4.3.1 It is advisable to use asparaginase or yeast fermentation to treat dough, in order to reduce the content of free asparagine in the dough.

4.3.2 Excessive roasting or frying should be avoided, and the color of the product should be as uniform as possible. Especially in the final stage of roasting or frying, when the moisture content of the product is low, the temperature should be lowered to avoid causing the surface of the product to darken and generate more acrylamide.

4.4 Coffee

4.4.1 According to the requirements of roasting degree, reasonable process parameters such as temperature and duration of each roasting stage from dehydration of green beans to the end of roasting should be set based on the size, density, texture, moisture content, and other conditions of the coffee beans. For different roasting process parameters, refer to Appendix A.

4.4.2 The temperature and time of each roasting stage should be accurately controlled, and the

connection between the "rise fall" temperature should be well done to ensure that the heat convection during the operation of the roasting equipment meets the process requirements. The green beans in the early stage of roasting should be dehydrated evenly, and the heat transfer efficiency in the middle and late stages of roasting should be uniform.

4.4.3 After roasting, the coffee beans should be rapidly cooled and allowed to settle before extraction. The setting of the settling time should match the storage method and grinding conditions of the coffee beans.

4.4.4 Roasting and cooling equipment, smoke exhaust pipes, dust collectors, etc. should be regularly cleaned to avoid affecting the accuracy of roasting temperature control or exhaust equipment and facilities.

5. Identification

Frozen potato and grain products should be labeled with cooking suggestions on the food packaging, such as frying, roasting temperature, and time.

Appendix A

Acrylamide control measures

Key links	Control measures	Examples of key parameters
Raw material selection	Choose appropriate varieties, with priority given to those with low reducing sugar or low asparagine content	Potato varieties with a reducing sugar content of less than 0.4% should be selected as much as possible for the production of fried potato chips; Roasting cereal products should choose cereal varieties with lower levels of asparagine as raw materials, such as wheat with asparagine content of 75-2200mg/kg, oats with 50-1400 mg/kg, corn with 70-3000 mg/kg, rye with 319-880 mg/kg, and rice with 16-25 mg/kg; Arabica and Robusta coffee varieties are commonly used in commercial production, with the former having a lower asparagine content than the latter. Therefore, the acrylamide content of roasted Arabica coffee beans (374 ng/g) is lower than that of Robusta coffee beans (708 ng/g). It is advisable to choose Arabica coffee with low asparagine content.
Formula adjustment	Non ammonium salt leavening agent	Sodium bicarbonate and acid sodium pyrophosphate are used as leavening agents.
	Food additives that help reduce the production of acrylamide	Using enzyme preparations for food processing such as asparaginase, and ferment the dough with yeast.
	Replace some raw materials with low reducing sugar or low asparagine ingredients	For example, Rice noodles partially replaces potato flour.
	Adjust pH value	For example, acid sodium pyrophosphate is used during the blanching process, or citric acid, glycine, lactic acid, etc. are used to adjust the pH value.
	Dilute raw materials/adjust the size of processing blocks and slices	Potato raw materials should be cut into thicker and more uniform fries to minimize the specific surface area of the food. For example, coarse fries with good uniformity (such as 14 mm × 14 mm) produce less acrylamide during processing than fine fries (such as 8 mm × 8 mm).
Raw material storage	Warm up placement	Potatoes stored at low temperatures need to be placed in a higher temperature environment (such as 12℃~15℃) for several weeks to reduce the increase in reducing sugar content caused by low-temperature storage. The time required for reheating can be determined based on the measurement of reducing

		sugar content in potatoes or by observing changes in frying color (light golden yellow is preferred).
Production process improvement	Potato frying	**Soak.** Soak potato chunks or slices in 40℃ water for 20 min to reduce the asparagine and reducing sugar content on the surface of potatoes.
		Scald. Cut or slice potatoes and blanch them in water at 70-100 ℃ for 3-10 minutes to reduce the surface asparagine and reducing sugar content.
		Control the processing temperature and time, with low temperature/short time being preferred. The initial oil temperature for processing potato products should not exceed 175 ℃, and it is advisable to fry until a light golden color is achieved, without excessive frying. The amount of fries added should be maintained to ensure that the oil temperature is at around 140 ℃ when entering the pot and around 160 ℃ when exiting the pot. Low temperature vacuum frying can be chosen instead of high-temperature frying.
		Fried or roasted colors. It is advisable to fry fries until they turn light golden brown, and excessive frying or roasting should be avoided.
	Grain frying or roasting	Select grain varieties with lower levels of asparagine as raw materials; In mixed grain products, it is advisable to choose ingredients with lower asparagine content to replace some grains. When roasting grain products, excessive roasting should be avoided, and the product color should be as uniform as possible.
	Coffee bean roasting	**Dehydration and yellowing of coffee beans.** Raw coffee beans are obtained by processing the collected coffee fruits through dry or wet methods. When the moisture content of raw coffee beans is higher than 12%, the dehydration temperature should be slightly higher; If the moisture content is below 10%, the fire should be mild. When the green grass and grain flavors of coffee beans disappear and turn into a toasted bread flavor, it can be determined that dehydration is complete.
		Coffee beans heat. After the coffee beans are dehydrated, if the beans become slightly soft, you can increase the heat.
		Burst I of coffee beans. When the temperature rises between 170 ℃ and 205 ℃, the coffee beans enter the caramelization and Maillard reaction stage. Generally, the burst I temperature of a traditional drum roaster is 180 ℃ to 190 ℃, which lasts for 1-2 minutes.

		Attention should be paid to reducing the fire of coffee beans.
		Burst II of coffee beans. After 1-2 minutes of burst I, the coffee beans switch from heat release to heat absorption, and the furnace temperature rises to 210 ℃, emitting small and rapid sounds of burst II, beginning to enter the medium deep roasting stage.
		Feeding of coffee beans. At the end of roasting, the furnace temperature should be controlled below 230 ℃. After roasted, coffee beans should be quickly cooled to avoid excessive roasting.
		Exhaust. After roasting is completed and subjected to a certain static process (commonly known as exhaust), acrylamide will gradually decrease to equilibrium with the loss of volatile and semi volatile substances (especially water vapor).
		24_04509_00_x1311 control of acrylamide contamination in food. In the industrial production of food coffee, drum baker are commonly used to heat coffee beans at atmospheric pressure. New coffee processing technologies such as superheated steam and vacuum roasting can improve roasting efficiency, shorten roasting time, and reduce acrylamide content.

Appendix B

Guidelines for Reducing Acrylamide in Different Food Categories

Controlled food categories	Operating instructions
Potato products	1.The "appropriate level" mentioned in the main text refers to the level of reducing sugar that has been fried to a light golden color through trial frying; 2. The transportation and storage temperature of potatoes should not be lower than 6 ℃. Low temperature storage can lead to an increase in reducing sugar content in potato tubers. Before processing, it is recommended to place them at 12 ℃ to 15 ℃ for an appropriate period of time to reduce reducing sugar content.
Coffee	1. Based on the size, density, texture, and moisture content of the coffee beans, set the temperature time and other process parameters for each roasting stage reasonably; 2. Pre-check the equipment before operation to verify the internal heat conduction efficiency and uniformity; 3. Vacuum roasting is an effective method to reduce the acrylamide content in coffee, and the volatilization rate of acrylamide is increased under low pressure conditions; 4. During the roasting process, the temperature and time of each heat transfer stage, such as strong heat, medium heat, and low heat, should be precisely controlled, and the connection between the "rising and falling" temperatures of each stage should be well done; 5. After roasting, appropriate methods should be used to quickly cool down the coffee beans. Such as air drying, air cooling, water cooling, etc.

Attachments:

No Attachments.