

CODEX STANDARD FOR QUICK FROZEN WHOLE KERNEL CORN**CODEX STAN 132-1981****1. SCOPE**

This standard shall apply to quick frozen whole kernel sweet corn of the species *Zea mays* L. convar. *saccharata* Koern as defined below and offered for direct consumption without further processing, except repacking, if required. It does not apply to the product when indicated as intended for further processing or for other industrial purposes.

2. DESCRIPTION**2.1 Product Definition**

Quick frozen whole kernel corn is the product prepared from fresh, clean whole sound, succulent kernels of sweet corn species *Zea mays* L. convar. *saccharata* Koern of either the white or yellow varieties by removing husk and silk; by sorting, trimming and washing; and by sufficiently blanching before or after removal from the cob to ensure adequate stability of colour and flavour during normal marketing cycles.

2.2 Process Definition

2.2.1 Quick frozen whole kernel corn is the product subjected to a freezing process in appropriate equipment and complying with the conditions laid down hereafter. This freezing operation shall be carried out in such a way that the range of temperature of maximum crystallization is passed quickly. The quick freezing process shall not be regarded as complete unless and until the product temperature has reached -18°C (0°F) at the thermal centre after thermal stabilization.

2.2.2 The recognized practice of repacking quick frozen products under controlled conditions is permitted.

2.3 Handling Practice

The product shall be handled under such conditions as will maintain the quality during transportation, storage, and distribution up to and including the time of final sale. It is recommended that during storage, transportation, distribution, and retail, the product be handled in accordance with the provisions in the Recommended International Code of Practice for the Processing and Handling of Quick Frozen Foods (CAC/RCP 8-1976).

2.4 Presentation**2.4.1 Colour**

(a) Yellow

(b) White

3. ESSENTIAL COMPOSITION AND QUALITY FACTORS**3.1 Optional Ingredients**

- (a) salt (sodium chloride)
- (b) condiments, such as spices and herbs
- (c) garnishes, such as pieces of green peppers or red peppers, or mixture of both, either of which may be sweet or hot and may be dried. Other vegetables may be used as garnishes. A garnish may not exceed 5 percent m/m of the finished food.

3.2 Quality Factors

3.2.1 General Requirements

Quick frozen whole kernel corn shall be:

- of similar varietal characteristics;
- of a reasonably uniform colour which may be slightly dull;
- before and after cooking, free from foreign flavour and odour, taking into consideration any added optional ingredients;
- reasonably tender;
- clean, free from sand, grit, insect contamination and other foreign material;
- reasonably free from loose skins;

and with respect to visual defects subject to tolerances shall be:

- reasonably free from ragged, crushed or broken kernels;
- reasonably free from damaged or blemished kernels;
- reasonably free from pieces of cob, husk or silk;
- practically free from harmless extraneous vegetable material; and
- reasonably free from pulled kernels.

3.2.2 Analytical Requirements

3.2.2.1 The Alcohol Insoluble Solids (AIS) content of the whole kernels shall not exceed 30% m/m (see Codex Alimentarius Volume 13).

3.2.2.2 The soluble solids content of the juice pressed from the kernels by refractometer at 20°C, uncorrected for acidity and expressed as degrees Brix on the International Sucrose Scales shall be not less than 20 (see Codex Alimentarius volume 13).

3.2.3 Definitions of Visual Defects

- (a) *Damage* or *blemish* means any kernel affected by insect injury or damaged by discolouration, pathological injury, mechanical injury, or by any other means to the extent that the appearance or eating quality is affected. This category of defect may be further classified as "minor", "major" or "serious" depending upon the extent to which the appearance is affected.

Minor - means damage or blemish that affects the kernel to only a slight degree.

Major - means damage or blemish that is quite noticeable and materially affects the kernel.

Serious - means damage or blemish that is very noticeable and of such nature that

it would customarily be discarded under normal culinary preparation.

- (b) *Cob* means the very firm to hard cellulose-like material to which the kernels of corn are attached and from which the kernels are removed during processing.
- (c) *Husk* means the membranous outer covering and one of the constituent parts of an ear of corn that is removed during processing.
- (d) *Silk* means the coarse thread-like filaments that are one of the constituent parts of an ear of corn. Such silk is found beneath the husk and in immediate contact with the corn kernels. Corn silk is normally removed during processing.
- (e) *Harmless extraneous vegetable material* means vegetable matter other than cob, husk, or silk which is harmless. Such material may include, but is not limited to, grass, weeds, leaves and portions of stalk. This category of defect may be further classified as "minor", "major" or "serious", depending upon the amount of severity of the material.

Minor - only slightly noticeable and affects the product to only a slight degree.

Major - readily noticeable and affects the product to a material degree.

Serious - very noticeable and objectionable and would customarily be discarded under normal culinary preparation.

- (f) *Pulled kernels* means kernels of corn that have been so cut or removed from the ear of corn that portions of cob or hard tissue remain. This category of defect may be further classified as "minor" or "major" depending upon the amount of adhering cob that is present.

Minor - slight amount of cob material or hard tissue remains around the base of the kernel.

Major - moderate to noticeable amount of adhering cob material. (If there is an excessive amount of cob material adhering, apply tolerance given in Table 1).

3.2.4 **Standard Sample Unit**

250 grammes

3.2.5 **Tolerances for Visual Defects**

For tolerances based on the standard sample unit indicated in Section 3.2.4, visual defects shall be assigned points in accordance with Table 1 in this Section. The maximum number of defects permitted in the Total Allowable Points rating indicated for the respective categories Minor, Major and Serious or the Combined Total of the foregoing categories.

Table 1

Defects	Unit of Evaluation	Defect Categories			Total
		Minor	Major	Serious	
Damage or blemish	Each kernel				
minor	" "	1			
major	" "		2		
serious	" "			4	
Harmless EVM	Each piece				
minor	" "	1			
major	" "		2		
serious	" "			4	
Pulled kernels	Each kernel				
minor	" "	1			
major	" "		2		
Total allowable points		60	40	20	60

Pieces of cob - maximum tolerance

0.6 cubic centimetres

Husk - maximum tolerance

4.4 square centimetres

Silk - maximum tolerance

160 cm

Ragged, crushed or broken kernels

(60 pieces)

3.3 Definition of "Defective" for Quality Factors

Any standard sample unit taken in accordance with the FAO/WHO Codex Alimentarius Sampling Plans for Prepackaged Foods (AQL - 6.5) (CAC/RM 42-1969) (see Codex Alimentarius Volume 13) shall be regarded as a "defective" for the respective characteristics as follows:

- (a) when it fails to meet 3.1(c)
- (b) when it fails to meet the general requirements (3.2.1); or
- (c) when it fails to meet the analytical requirements (3.2.2); or
- (d) when it exceeds the "total allowable points" in any one or more of the defect categories, including "total" in Table 1; or
- (e) when it exceeds any one or more of the tolerances for cob, husk, silk, ragged, crushed or broken kernels, given in Section 3.2.5.

3.4 Lot Acceptance for Quality Factors

A lot will be considered acceptable when the number of "defectives" as defined in para. 3.3 does not exceed the acceptance number (c) for the appropriate sample size as specified in the FAO/WHO Codex Alimentarius Sampling Plans for Prepackaged Foods (AQL-6.5) (CAC/RM 42-1969) (see Codex Alimentarius Volume 13). In applying the acceptance procedure each defective (as defined in paragraph 3.3, sub-paragraphs (a) to (e)) is treated individually for the respective characteristics.

4. FOOD ADDITIVES

4.1 Citric or malic acid, as processing aids for use in the blanching or cooling water in accordance with GMP.

4.2 **Carry-over principle**

"Section 3" of the "Principle Relating to the Carry-over of Food Additives into Foods" as set forth in Volume 1 of the Codex Alimentarius shall apply.

5. **HYGIENE**

5.1 It is recommended that the product covered by the provisions of this standard be prepared and handled in accordance with the appropriate sections of the Recommended International Code of Practice - General Principles of Food Hygiene (CAC/RCP 1-1969, Rev. 2 (1985) Codex Alimentarius Volume 1), and other Codes of Practice recommended by the Codex Alimentarius Commission which are relevant to this product.

5.2 To the extent possible in Good Manufacturing Practice, the product shall be free from objectionable matter.

5.3 When tested by appropriate methods of sampling and examination, the product:

- shall be free from microorganisms in amounts which may represent a hazard to health;
- shall be free from parasites which may represent a hazard to health; and
- shall not contain any substance originating from microorganisms in amounts which may represent a hazard to health.

6. **LABELLING**

In addition to the requirements of the Codex General Standard for the Labelling of Prepackaged Foods (CODEX STAN 1-1985 (Rev. 1-1991) Codex Alimentarius Volume 1) the following provisions apply:

6.1 **The Name of the Food**

6.1.1 The name of the food as declared on the label shall include the designation "corn".

6.1.2 In addition, there shall appear on the label in conjunction with or in close proximity to the word "corn":

- (a) The words "whole kernel" except that the description "whole grain", "cut", "sweet" or "kernels" may be used if this is customary in the country where the product is sold.
- (b) The colour "yellow" or "white" except that the colour "golden" may be used in lieu of "yellow" if this is customary in the country where the product is sold.

6.1.3 The words "quick frozen" except that the word "frozen"¹ may be applied in countries

¹ "Frozen" - this term is used as an alternative to "quick frozen" in some English-speaking countries.

where this term is customarily used for describing the product processed in accordance with subsection 2.2 of this standard.

6.1.4 When any ingredients other than salt have been added which imparts to the food the distinctive flavour of the ingredients or appearance of the garnish, the name of the food shall be accompanied by the term "with X" or "X flavoured", as appropriate.

6.2 Additional Requirements

The packages shall bear clear directions for keeping from the time they are purchased from the retailer to the time of their use, as well as directions for cooking.

6.3 Bulk Packs

In the case of quick frozen whole kernel corn in bulk, the information required above shall either be placed on the container or be given in accompanying documents, except that the name of the food accompanied by the words "quick frozen" (the term "frozen" may be used in accordance with sub-section 6.1.3 of this standard) and the name and address of the manufacturer or packer shall appear on the container.

7. PACKAGING

Packaging used for quick frozen whole kernel corn shall:

- (a) protect the organoleptic and other quality characteristics of the product;
- (b) protect the product from microbiological and other contamination;
- (c) protect the product from dehydration and, where appropriate, leakage as far as technologically practicable; and
- (d) not pass on to the product any odour, taste, colour or other foreign characteristics throughout the processing (where applicable) and distribution of the product up to the time of final sale.

8. METHODS OF ANALYSIS AND SAMPLING

See Codex Alimentarius Volume 13.