

CODEX ALIMENTARIUS

INTERNATIONAL FOOD STANDARDS



Food and Agriculture
Organization of
the United Nations



World Health
Organization

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STANDARD FOR QUICK FROZEN SPINACH

CXS 77-1981*

Adopted in 1981. Amended in 2019.

* Formerly CAC/RS 77-1976.

1. SCOPE

This Standard shall apply to quick frozen spinach of the species *Spinacia oleracea* L. as defined below and offered for direct consumption without further processing except for 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 spinach is the product prepared from fresh, clean, sound edible parts of the spinach plant conforming to the characteristics of the species *Spinacia oleracea* L., and which have been sorted, washed, sufficiently blanched to ensure adequate stability of colour and flavour during normal marketing cycles and properly drained.

2.2 Process Definition

Quick frozen spinach 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. 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 *Code of Practice for the Processing and Handling of Quick Frozen Foods* (CXC 8-1976).

2.4 Presentation

2.4.1 Style

- | | | |
|------------------------------------|---|--|
| (a) Whole Spinach | - | the intact spinach plant with root removed; |
| (b) Leaf Spinach | - | substantially whole leaves most of which are separated from the root crown; |
| (c) Cut-Leaf Spinach | - | parts of leaves of spinach generally larger than 20 mm in the smallest dimension; |
| (d) Chopped Spinach | - | parts of leaves of spinach cut into small pieces generally less than 10 mm in the largest dimension, but not comminuted to a pulp or puree - i.e. pieces smaller than 3 mm in dimension; |
| (e) Pureed Spinach (Spinach Puree) | - | spinach finely divided or finely chopped or having passed through a sieve such that the leaf particles are less than 3 mm dimension. |

2.4.2 Other Styles

Any other presentation of the product shall be permitted provided that it:

- is sufficiently distinctive from other forms of presentation laid down in this standard;
- meets all other requirements of this standard;
- is adequately described on the label to avoid confusing or misleading the consumer.

3. ESSENTIAL COMPOSITION AND QUALITY FACTORS

3.1 Optional Ingredients

Salt (sodium chloride)

Condiments, such as spices and herbs.

3.2 Quality Factors

3.2.1 General Requirements

Quick frozen spinach shall:

- (a) have a reasonably uniform green colour characteristic of the variety;
- (b) be clean, sound and practically free from foreign matter;
- (c) be free from foreign flavour and odour, taking into consideration any added optional ingredients;
- (d) be practically free from fibrous material and for the styles of Whole Leaf and Cut Leaf not materially disintegrated due to mechanical damage;

and with respect to visual defects or other defects subject to a tolerance, shall be:

- (e) practically free from sand and grit;
- (f) well drained and containing no excess water;
- (g) practically free from loose or detached leaves in **Whole** style only;
- (h) reasonably free from discoloured leaves or portions thereof;
- (i) reasonably free from flower stems (seed heads);
- (j) reasonably free from flower buds;
- (k) reasonably free from crown and portion thereof, except for **Whole** spinach;
- (l) practically free from root material;
- (m) reasonably free from extraneous vegetable material (E.V.M.).

3.2.2 Analytical Characteristics

- (a) Mineral impurities such as sand, grit and silt shall be not more than 0.1% m/m, measured on the whole product basis;
- (b) Salt-free dry matter - not less than 5.5% m/m.

3.2.3 Definition of Visual Defects

- | | | |
|--|---|---|
| (a) Loose leaves (Whole Style only) | - | leaves which are detached from the crown; |
| (b) Discolouration | - | discolouration of any kind on the leaves or stem portions and which materially detracts from the appearance of the product; |
| Minor | - | discolouration which is light in colour; |
| Major | - | discolouration which is dark in colour; |
| (c) Extraneous Vegetable Matter (E.V.M.) | - | harmless vegetable material such as grass, weeds, straw, etc. |
| Minor | - | E.V.M. which is green and tender; |
| Major | - | E.V.M. which is other than green or is coarse; |
| (d) Seed heads (flower stems) | - | the flower bearing portion of the spinach plant, which is longer than 25 mm; |
| (e) Flower buds | - | the separate flower buds detached from the seed head; |
| (f) Crowns (exclusive of Whole Style) | - | the solid area of the spinach plant between the root and the attached leaf clusters; |
| (g) Root material | - | any portion of the root, either loose or attached to leaves. |

3.2.4 *Standard Sample Size*

The standard sample size for segregating and evaluating visual defects shall be as follows:

Style	Standard Sample Size
Whole and Leaf	300 grams
Cut Leaf	300 grams
Chopped	100 grams
Pureed	100 grams

3.2.5 *Method of Examination*

For separation and enumeration of visual defects the test sample (standard sample size) is placed in water in a deep tray, and the leaves or leaf portion separated one by one.

3.2.6 *Tolerances for Visual Defects*

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

TABLE 1
Whole Leaf and Cut Leaf Style
(Standard Sample Size 300 grams)

Defect	Unit of Measurement	Defect Categories			
		Minor	Major	Serious	Total
(a) Loose Leaves (Whole Style only)	Each Leaf	1			
(b) Discolouration	Each 4 cm ²				
Minor		1			
Major			2		
(c) E.V.M.	Each 5 cm				
Minor		1			
Major			2		
(d) Seed heads	Each whole head		2		
	Each portion	1			
(e) Crowns (exclusive of whole style)	Each whole crown		2		
	Each part				
(f) Root material	Each piece			4	
TOTAL ALLOWABLE POINTS		20	10	4	20

TABLE 2
Chopped Style
(Standard Sample Size 100 grams)

Defect	Unit of Measurement	Defect Categories		
		Minor	Major	Total
(a) Discolouration	Each cm ²			
Minor		1		
Major			2	
(b) E.V.M.	Each 1 cm			
Minor		1		
Major			2	
(c) Flower Buds	Each 50 pieces	1		
(d) Crown Material	Each piece		2	
(e) Root Material	Each piece		2	
TOTAL ALLOWABLE POINTS		20	10	20

TABLE 3
Pureed Style
(Standard Sample Size 100 grams)

Defect	Allowance
Any dark particle or flower bud	Shall not affect the overall appearance of the product

3.2.7 Definition of "Defective" for Quality Factors

Any sample unit taken in accordance with an appropriate sampling plan with an AQL 6.5, (see relevant Codex texts on methods of analysis and sampling) and which is adjusted to a standard sample size for applying the tolerances relating to "Visual Defects", shall be regarded as "defective" for the respective characteristics as follows:

- (a) any sample unit that fails to meet the requirements of 3.2.1 and the analytical requirements of Section 3.2.2;
- (b) any sample unit that fails the Total Allowable Points for Defect Categories, Minor, Major or Serious; or which fails the Total Allowable Points for the combined **total** of the respective defect categories as given in Section 3.2.6.

3.2.8 Lot Acceptance for Quality Factors

A lot is considered acceptable when the number of "defectives" as defined in Section 3.2.7 does not exceed the acceptance number (c) of an appropriate sampling plan with an AQL of 6.5, (see relevant Codex texts on methods of analysis and sampling). In applying the acceptance procedure each "defective" (sub-paragraph (a) or (b) of Section 3.2.7) is treated individually for the respective characteristics.

4. FOOD ADDITIVES

None permitted.

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 *General Principles of Food Hygiene* (CXC 1-1969), 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 *General Standard for the Labelling of Prepackaged Foods* (CXS 1-1985), the following specific provisions apply:

6.1 The Name of the Food

6.1.1 The name of the food as declared on the label shall include "whole spinach", "leaf spinach", "cut leaf spinach", "chopped spinach" or "spinach puree".

6.1.2 If the product is produced in accordance with Section 2.4.2, the label shall contain in close proximity to the word "spinach" such additional words or phrases that will avoid misleading or confusing the consumer.

6.1.3 When any ingredient, other than salt, has been added which imparts to the food the distinctive flavour of the ingredient, the name of the food shall be accompanied by the term "with x" or "x flavoured", as appropriate.

6.1.4 The words "quick frozen" shall also appear on the label, except that the term "frozen"¹ may be applied in countries where this term is customarily used for describing the product processed in accordance with Section 2.2 of this Standard.

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 spinach in bulk, the information required above shall either be placed on the container or to 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 Section 6.1.4 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 spinach shall:

- (a) protect the organoleptic and other quality characteristics of the product;
- (b) protect the product against microbiological and other contamination;
- (c) protect the product from dehydration and, where appropriate, leakage as far as technologically practicable;
- (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

For checking the compliance with this Standard, the methods of analysis and sampling contained in the *Recommended Methods of Analysis and Sampling* (CXS 234-1999) relevant to the provisions in this Standard shall be used.

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