

Secretariat of Agriculture, Livestock, Fishing and Food Undersecretariat of Agricultural Policy and Food National Food Administration	QUALITY PROTOCOL	
Code: SAA022	Version: 07	04.15.2008

QUALITY PROTOCOL FOR ENDIVE

Made official on:

Resolution SAGPyA Nr:

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INTRODUCTION

Endives are vegetables available in the market throughout the year, and are consumed raw in salads or cooked in hot dishes. Endive leaves are used for preparing a large number of varied dishes and they combine very well with other ingredients. For this reason, they are perfectly adequate for present culinary trends and the most important chefs in Argentina include them in their usual recipes.

Endives are varieties of chicory and belong to the Asteraceae family. Their chemical composition and properties make them very healthy as they have low calorie content and abundance of vitamins and minerals. Their main component is water (approximately 94%) and their carbon hydrates and fat content is very low. They are rich in fiber.

The main destination of endive production is the local market. Exports are mainly concentrated on MERCOSUR countries (Chile, Brazil and Uruguay).

Local market consumption is showing a marked increase, conditioned by the market positioning of endives that are considered to be a specialty. The present success of this product among consumers is mainly based on quality and nutritional aspects.

1. Scope

This protocol defines the quality attributes Endives must have to be authorized to carry the “Argentine Food - A Natural Choice” Seal. The objective of this document is to help endive producers to obtain differentiated quality products.

Endive producers must take into account that compliance with current regulations on Good Manufacturing Practices for the packing room, conditions for fresh vegetables and containers is implicit. These regulations are described in the Argentine Food Code – CAA (Chapter I “General provisions” – Resolution GMC Nr 080/96 incorporated to the Code by Resolution MsyAS Nr 587/97; Chapter XI “Vegetable Foods” – Articles 854; Chapter IV “Tools, Receptacles, Containers, Packaging, Equipment and Accessories”); Chapter V “Standards for food labeling and advertising”, Joint Resolution Nr 1/2008 and Nr 41/2008 “*Registering by the National Sanitary Register of Agricultural and Livestock Producers (RENSPA)*” and Resolution DFH Nr 24 dated 5/20/88 from the National Service for Agricultural Food Health and Quality (SENASA): *Minimum quality and health conditions for Endives in the local market*, or any other new regulation that may modify, replace or substitute those mentioned above.

Being a dynamic document, this protocol may be periodically revised according to the needs of the public and/or the private sectors.

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2. General Criteria

The differentiating attributes of endives stated in this protocol result from information relative to requirements to obtain the "Argentine Food - A Natural Choice" Seal sourced from different institutions and private companies. Specifications from Annex II of Regulation (EC) Nr 2213/83 "Quality Standards for Endives" (based on the "Extra class" classification) have also been considered.

Companies currently exporting incorporate attributes to their products in accordance with requirements in each destination market. In spite of their variety, it has been possible to unify criteria in a protocol that may comprise all the characteristics that define a differentiated quality product.

3. Grounds for determining differentiating attributes

Product Attributes

This protocol refers to vegetables obtained by root forcing of endive varieties (cultivars) derived from the *Cichorium intybus* L. var. *Foliosum* that are sold fresh in the market.

This document describes endive characteristics required to be considered a differentiated quality product. These requirements include preserving products from the moment of harvesting to guarantee the best sanitary and organoleptic conditions for fresh endives.

To this end, physical, biological and chemical parameters are stated establishing ranges and tolerance per attribute as it may correspond.

It must be pointed out that analyses required must be carried out by laboratories belonging to official networks, following recognized official methods. In case these requirements are not met, laboratories must be authorized to carry out the methods required.

Process Attributes

Good Farming Practices and Good Manufacturing Practices must be applied as it may correspond, from the moment of field production to product sale in the market.

Packing, storage and transportation must be functional to preserving the useful life of fresh endives.

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Packaging Attributes

This protocol applies only to packed endives: bulk presentation is excluded. Packaging must assure the integrity of products and the conditions required for their optimal preservation. It must also comply with current regulations for packaging in general.

DIFFERENTIATING PRODUCT ATTRIBUTES

1- Quality attributes

Companies must provide evidence supporting their preference for the sampling method¹ they use, which must be representative of their production volume. They must also provide documentation informing the frequency of the following product quality controls.

1.1- Cultivars

Endive is a plant that belongs to the *Asteraceae* family, and its botanical name is *Cichorium intybus* L. var. *foliosum*.

The following varieties are recommended based on their quality attributes that meet the specifications of this protocol:

- Vintor.
- Zilia.
- Atlas.

1.2- General requirements

Endives must have the following general characteristics:

- Whole and free of deformities.
- Uniform size,
- Fresh in appearance,
- Clean, in particular free from spotted leaves and of any visible foreign matter,
- Cleanly cut at the base.
- No abnormal outside humidity,
- No foreign smell and/or taste,
- No reddish spots, burning or bruise signs.
- No damages caused by rodents or insects,
- No damages caused by disease or putrefaction,
- No flower stems exceeding three fourths of its length.

¹ Sampling methods mentioned in Resolution GMC Nr 99/94 – Point 6 “Sample taking”, and Regulation (EC) Nr 1882/2006 may be considered as reference.

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1.3- Specific requirements

In addition to complying with general requirements, endives must have the following characteristics to be considered a differentiated quality product:

- Typical development and color of its variety;
- Firm and regularly formed;
- Tight, i.e. acute and very tightly closed apex;
- The length of its external leaves must be equal to three quarters of its total length;
- No greenish color or glassy aspect.

Quality tolerance: 5% of batch.

a- Ripeness

Endives must have an optimal development at harvest time and its condition must be such as to enable them to endure transportation and handling to arrive in satisfactory condition at the place of destination. They must be harvested when they are adequately ripe in accordance with the following parameter:

- Apex size: 60% of total length of endive, with a +5% tolerance.

b- Color

Endives must be white to yellowish white. They must not show photosynthesis signs (greenish color). This is visually determined.

c- Size specifications

Following are provisions regarding caliber determined in different ways:

1. By diameter (measured at the larger section perpendicular to the longitudinal axis)

- Minimum diameter:
 - Endives less than 14cm long: 2.5 cm.
 - Endives 14cm long or longer: 3 cm.
- Maximum diameter: 6 cm.

2. By length.

- Minimum length: 7.5 cm.
- Maximum length: 18 cm.

Caliber tolerance: 10% of batch of endives with diameters and length varying +/- 1 cm

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as compared to specified measures. No tolerance is accepted for minimum diameter.

d- Dehydration signs

No dehydration signs are accepted in harvested endives. This is visually determined.

e- Diseases

No symptoms of fungal or bacterial diseases are accepted in this product. This is visually determined.

f- Mechanical damages

Damages in leaves or those produced by cutting elements are not accepted.

g- Putrefaction damages

Putrefaction damages are not accepted. This is visually determined.

1.4 Pesticides

Evidence must be provided that only products approved by a competent official authority are used. Residues must not exceed the Maximum Residue Limits (LMR in Spanish) established for this vegetable.

IMPORTANT: In case other determinations are carried out as a result of external demands or as a consequence of company internal controls that are not mentioned in this protocol, copy of related registers (internal and/or external) must be attached to audits corresponding to the "Argentine Food, A Natural Election" Seal.

PROCESS DIFFERENTIATING ATTRIBUTES

Management Systems

Producers aspiring to obtain the "Argentine Food, A Natural Choice" seal for their endives must comply with Good Farming Practices and Good Manufacturing Practices from the beginning of the farming process to end product sale in the market.

Traceability

Companies must comply with a traceability system that may provide all the information and registers necessary for carrying out a complete follow up of endives from their production farm to their sale point.

Process characteristics

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Endives are produced in two stages: field production of roots and indoor growing by means of hydroponics in a warm, humid environment protected from light.

Root harvest and forcing are carried out by stages in order to maintain product offer throughout the year.

Afterwards harvest roots are stored in refrigerating chambers. Before entering the forcing chambers roots are subject to low temperatures for a period of time that depends on the requirements of each variety.

Root forcing must be carried out in the dark, with controlled temperatures and humidity. The ideal temperature for forcing chambers is when the apex has a temperature of 20-21°C. This way commercial ripeness is reached in 21 – 28 days, without considering other factors of the crop.

Preparation of endives.

Preparation is essential for maintaining the desired quality characteristics in the end product.

This process stage must be carried out in a low light environment to prevent endives from acquiring a greenish color.

The following steps must be followed during the preparation stage:

- a- To eliminate roots by means of a clean cut.
- b- To carry out a first selection to eliminate pieces that do not satisfy general requirements.
- c- To clean endives with the purpose of eliminating external leaves that may be dirty, malformed or deteriorated.
- d- To pack the product in a refrigerated room with the corresponding monitoring of temperature.
 - Temperature range at packing room: 10 to 13°C.
 - Temperature range at storing room: 1.5 to 2°C.

Product useful life

A 15-day shelf life of the product without photosynthesis (without acquiring a greenish color) must be guaranteed. In order to achieve this, following conditions are to be observed throughout storage and transportation:

- Relative Humidity (RH): 80% +/- 5%.
- Temperature (°C): 2 to 6 °C.
- Lighting: products must be transported in darkness and must be always protected from light.
- Storage and transportation areas must be exclusively used for end products and must be kept closed and free from contaminants.

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IMPORTANT: Products covered by this protocol and by SAGPyA Resolution Nr 392/05 must be separated from the rest, and batches and shipments must be correctly identified in order to ensure they are handled separately from products not protected by the Seal. To this end, companies must count with documentation and registers safeguarding the goods carrying this mark.

PACKAGING DIFFERENTIATING ATTRIBUTES

Packaging content must be homogeneous and include endives of the same origin, variety and quality. The visible part of the packaging content must be representative of the entire contents.

Packaging tolerance: the maximum difference in endive length is limited to 5 cm.

Packaging characteristics

Packaging must be free from any foreign matter and must be presented in perfect hygiene and sanitary condition. All materials in contact with endives must be authorized by a competent health authority.

Polypropylene, micro-perforated and transparent bags must be used as primary packaging to assure product integrity. They act as a filtering unit and allow an optimal gas interchange thus increasing product useful life.

Polypropylene trays with PVC (Resinite) film are also accepted according to the market of destination.

Products must be then covered with sulfite paper, blue or black cover, as secondary packaging, to avoid light filtration and consequently photosynthesis.

Third packaging must be made of raw materials that may offer adequate mechanical resistance and commercial quality for product protection (Ex. Conifer, virgin, non whitened, and with adequate weight, kraftliner type cardboard) or waxed or paraffined waterproof cardboard. In case adhesives are used for box assembling they must be humidity resistant.

Endives must be placed in orderly horizontal layers. Small packaging units must contain only one layer of endives. The Seal may be exhibited on the label of the primary and/or secondary packaging or in both.

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GLOSSARY

- **Tight:** Leaves are very close together without leaving open spaces.
- **Glassy aspect:** Leaves must not be brittle if they are to reach consumer in optimal condition.
- **Damages:** Endive defects or alterations caused by physical, physiological or mechanical actions that demerit the appearance or the commercial and edible quality of produce.
- **Greenish color:** Characteristic color produced by the action of light on the epidermis tissue.
- **Whole:** Endive free of any mutilation, damage or harm that may favor lack of integrity.
- **Primary packaging:** The Argentine Food Code defines it as the packaging that is in direct contact with the product it contains.
- **Secondary packaging:** It is the packaging for containing one or more primary packaging units.
- **Packaging:** It is the packaging for containing one or more secondary packaging units.
- **Forcing:** Process by which endive roots are placed in hydroponic chambers, sprouting chambers under controlled temperature and humidity to enable their development and later harvest in a period of 21 to 28 days.
- **Clean:** Endives must be free of dirt, or any other type of foreign matter.
- **Length:** Total length of endive measured from the base to top end.
- **Base level:** The union of the root with the stem.
- **Foreign odor and taste:** Different from those common or normal in the variety. They may be caused by application of chemical substances to the crop (pesticides, herbicides, fertilizers, etc) or by use of containers previously used for other products.
- **Putrefaction:** Damages caused by microorganisms implying some degree of tissue putrefaction, disintegration or fermentation.
- **Acute end:** The distal part where leaves close must not be open. It must be tightly closed.

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- **Tolerance:** Maximum and minimum percentages (%) per unit (endive) or packaging, as it may correspond.

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Audit date:

Auditing company:

Audited company:

Location:

Town or city:

Telephone:

Name of company's employee responsible for quality / position

Product: Endive

Reference protocol code: SAA022

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Auditor's Signature	Name	

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RESULTS

Attributes	Compliance		Observations
	YES	NO	
PRODUCT			
1. Crop: Cichorium intybus L. var. foliosum.			
2. Specific requirements:			
a. Verify compliance with requirements indicated in the protocol. Tolerance: 5%			Verify register/s and record date.
b. Ripeness: Apex size: 60% of total length of endive. Tolerance: +5%.			Verify register/s and record date
c. Color: white to yellowish white. Greenish color not accepted. (Visually determined)			Verify register/s and record date.

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Attributes	Compliance		Observations
	YES	NO	
d. Size: comply with calibers defined in the protocol. Caliber tolerance: 10 % No tolerance is accepted in minimum diameter.			Verify register/s and record date.
e. Dehydration signs: No signs accepted. (Visually determined)			Verify register/s and record date.
f. Diseases: absence. (Visually determined).			Verify register/s and record date.
g. Mechanical Damage: No damages accepted.			Verify register/s and record date.
h. Putrefaction damage: No damages accepted. (Visually determined).			Verify register/s and record date.
3. Pesticides: Verify the use of products approved within Maximum Residual Limits (MRL) established for this crop.			Verify register/s and record date and result of each analysis.

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Attributes	Compliance		Observations
	YES	NO	
PROCESS			
Harmlessness assurance system (GAP – GMP):			
1. Verify registers of the traceability system implemented from farming to final product.			Verify register/s and record date
2. Demonstrate training of farm's workers.			Verify register/s and record date and type of training.
3. Quality control and registers of water used in farming.			Verify register/s and record date and results.
4. Quality control of raw materials received.			Verify register/s and record date.
5. Verify training of packing personnel.			Verify register/s and record date
6. Verify registers of SSOP applied to packing.			Verify register/s and record date

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Attributes	Compliance		Observations
	YES	NO	
Characteristics of the process			
1. Preparation: comply with steps described in the protocol.			Verify register/s and record date
1.1 Packing temperatures: 10 to 13°C			Verify register/s and record date
1.2 Storage temperatures: 1,5 to 2°C			Verify register/s and record date
2. Useful life: 15 days on shelves without photosynthesizing.			Verify register/s and record date
3. Characteristics of storage and transportation			
3.1 Relative Humidity (RH): 80% +/- 5%			Verify register/s.
3.2 Temperature (°C): 2 to 6.			Verify register/s.

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Attributes	Compliance		Observations
	YES	NO	
3.3 Verify temperature control requirements in storage chambers.			Verify registers of entry into the packing room and time in the cold store of each batch.
Packaging			
a. Compliance with the characteristics defined in the protocol.			Verify register/s.
b. Packaging tolerance: the maximum difference in endive length is limited to 5 cm.			Verify register/s.
c. Packaging must contain only endives of the same origin, variety and quality group.			Verify register/s

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Conclusions

Audited company's employees interviewed: _____

 On behalf of the auditing company

 In agreement, on behalf of the audited company

Signature and name

Signature and name

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