TURKISH STANDARTS

TURKISH STANDARDIZATION INSTITUTION

HAZELNUT KERNELS STANDARD

TS 3075

(November 2002)

0. Subject, Definition, Content

0.1. Subject

This standard is about definition, classification, specifications, sampling, evaluation, analysis and presentation to the market of hazelnut kernels.

0.2. Definitions

0.2.1. Kernel

Hazelnut kernels of nuts free from shells of cultivated plants of *Corylus avellana* L and *Corylus maxima* Mill., and their hybrids.

0.2.1.1. Rounded kernel

Hazelnut kernels of which diameter is equal to or shorter than the length and round in shape.

0.2.1.2. Pointed kernel

Hazelnut kernels of which length is longer than the diameter and nut apex is pointed.

0.2.1.3. Other kernels
Hazelnut kernels other than rounded and pointed nuts.

0.2.1.4. Clean kernels
Hazelnut kernels which are free from visually detectable adhering dirt and any other foreign matter

0.2.1.5. Foreign matter
Any matter except whole kernel or kernel pieces hazelnut kernels.

0.2.1.6. Insect damaged hazelnut
Visually detectable damages on hazelnut kernels caused by insects and other animal parasites and presence of dead insects or insect remains.

0.2.1.7. Moldy hazelnut
Hazelnut kernels containing visible mould filaments by naked eye.

0.2 .1 .8. Pieces
Hazelnut kernels of which more than 1/3 of its size is missing and pieces which do not pass through round holed screen of 5mm diameter.

0,2.1.3. Rancidity
Formation of undesirable taste on hazelnut kernels due to oxidation of fat or free fatty acids.

0.2.1.10. Rotten
Hazelnut kernels of which chemical structure is significantly decomposed by action of microorganisms.

0.2.1.11. Shriveled hazelnut
The wrinkling of more than 50% of the skin surface of the hazelnut kernel which usually occurs in high cropping years, in seasons effected by drought stress or poor nutrition, and as an inherited trait.

0.2.1.12. Shrunken hazelnut
Formation of undeveloped hardy kernel due to excessive air temperature during rapid kernel growth after fertilization.

0.2.1.13. Stains and physiological changes
Alterations in color and taste of hazelnut kernels during drying or storage in undesirable conditions due to excessive heat (color changes in kernel cavity to brown or dark brown because of slight separation of cotyledons do not affect the taste and the smell of kernels, and these are not considered as defective kernels).

0.2.1.14. Twins
Development of two kernels in one nut.

0.2.1.15. Yellowing
Formation of dark yellow color at cut surfaces of kernels accompanied by softening or not softening and/or slight alterations in smell and taste.

0.2.1.16. Tumors

Formation of tumor (hard tissue) to cover the insect[1] damage and white and hard tissue formation with in the kernel meat due to insect damage (hard tissue smaller than 2 mm is not considered).

0.2.1.17. Invisible rot

Development of mould with in the kernel not detected from outside.

0.2.1.18. Invisible mold

Development of mold in kernel cavity not detected from outside.

0.2.1.19. Sour taste

Deteriorated kernels for taste color and smell which give slightly sour taste when eaten due to oxidation of fats.

0.2.1.20. Mechanically damaged

Formation of damages larger than 3 mm in diameter and deeper than 1.5 mm on kernels during shelling.

0.2.1.21.Pressed

Change in shape of kernel due to physical pressure and other reasons.

0.2.1.22. Crop year

The year hazelnuts are harvested.

0.3. Content

This standard contains sound and intact hazelnut kernels defined in titles 0.2.1, 0.2.1.1, 0.2.1.2 and 0.2.1.3., and defective kernels defined in titles 0.2.1.6 and 0.2.1.21.

1. Classification and Characteristics

1.1. Classification

Hazelnut kernels are grouped based on their shape and commercial definitions, are sized based on dimensions and are classified based on its characters.

1.1.1. Groups

Kernels are divided into three groups based on shape and commercial definitions;

- Rounded kernels (Tombul, Palaz, Mincane, Çakildak, Delisava, Foça, Kalinkara, Kan and Cavcava, etc.)
- Pointed kernels (Sivri, incekara and Kus)
- Other kernels (Badem, Ordu ikizi, Kargalak)

1.1.2. Sizes

Kernels are divided into two sizes based on their largeness;

- 9mm and over (Obligatory for Extra and Class 1, optional for Class II),
- 6mm-< 9mm (Piccolo, small)

1.1.3. Classes

Kernels are divided into three classes based on quality characteristics;

- Extra,
- Class I,
- Class II,

1.2. Characteristics

1.2.1. General characteristics:

Kernels should have following characters:

- Kernels should be intact. Missing the tegument and small damages not more than 3 mm diameter and 1.5 mm deep are not considered as defective kernel.
- Kernels should be dry. Kernels should be free from abnormal external moisture, moisture content should not be more than 6%.
- Kernels should be clean and contain no visible foreign matter.
- Kernels should be sound. Rotten and rancid kernels not suitable for consumption are not considered as sound kernel.
- Kernels should be fully developed. Shriveled and shrunken kernels are not considered as fully developed.
- Kernels should not be rancid.
- Kernels should not contain defects which make kernels unsuitable for consumption[2]
- Kernels should be free from alive insects and rodents whatever their stage of development.
- Kernels should be free from any damages caused by insects, rodents and other parasites.
- Kernels should be free from mold.
- Kernels should be free from foreign smell and taste.

1.2.2. Group characteristics

1.2.2.1. Group characteristics of rounded hazelnut kernels

The widest diameter on equatorial plane of the kernel should be equal or near to their length and they should be round (spherical) in shape.

1.2.2.2. Group characteristics of pointed hazelnut kernels

The widest diameter on equatorial plane of the kernel should be shorter than their length and they should be pointed in shape.

1.2.2.3. Group characteristics of other hazelnut kernels

Other hazelnut kernels should have group characteristics other than rounded and pointed hazelnut kernels.

1.2.3. Class characteristics

1.2.3. 1. Extra

Hazelnut kernels in this class should be in superior quality They should have characteristics of extra class and/or commercial type[3].

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[2] *Unless kernels loose its Quality characteristics and become unsuitable for consumption, changes in smell and taste can be tolerated.*

[3] *Commercial type means hazelnuts kernels in each lot are in same type and appearance or could be mixed of cultivars officially defined by producer country.*

Hazelnut kernels should be free from any defects. However slight superficial alterations which do not effect the visual appearance, quality, keeping the quality and marketing in packages do not considered as a defect.

1.2.3.2. Class I

Hazelnut kernels in this class should be in good quality. They should have characteristics of class I and/or commercial type. Slight alterations in shape and color which do not effect the visual appearance, quality, keeping the quality and marketing in packages are allowed.

1.2.3.3. Class II

Hazelnut kernels in this class do not have the characteristics of Extra and Class I classes but have minimum requirements defined above. In this class there may be defects which do not effect the visual appearance, quality, keeping the quality and marketing in packages.

1.2.4. Size characteristics

Sizing is determined by measuring the diameter at equatorial section by means of round-holed screens. The sizing is expressed by the largest and smallest sizes. The smallest size and a statement "and above" and the largest size and a statement "and below" are used.

The minimum size in Extra and Class I is 9 mm. In piccolo hazelnuts or similar types, diameter between 6 mm-<9 mm is allowed in sizing.

In sized kernels, the difference between minimum and maximum diameter should not exceed 2 mm. For Extra and Class I kernels, all the diameters are allowed over the minimum diameter.

To prevent confusion, the use of term of "and less" is not allowed on products prepared under a certain sized label.

1.3. Tolerances

1.3.1. Quality tolerances

Quality tolerances for classes are given in **table 1.**

1.3.2. Size tolerances

Kernel diameters can be out of the range in each class by 5 % in rounded kernels and by 10 % in pointed kernels by weight. In case of sizing in 1 mm intervals in each class, these tolerances are increased to 10% for rounded kernels and 15 % for pointed kernels by weight. Tolerances in each given diameters is ±0,2 mm.

1.3.3. Mineral impurity

Ashes insoluble in hydrochloric acid must not exceed 1 g/kg.

Table 1- Quality tolerances

Maximum allowed defects	Tolerances allowed (% in weight)		
	Extra	Class I	Class II
Rancid*, rotten, moldy, having bad smell and taste, damaged by insects or rodents [4] (+)	1	2,0	3
Not fully developed, including shrunken and shriveled, stained, yellowish tumor formed kernels	2	4	8
Mechanically damaged kernels[5]	3	8	10
Twins (not included in total tolerance)	2	5	8
Inshell hazelnuts, pieces of shell and tegument, hazelnut cracks and dust	0,25	0,25	0,25
Foreign matter	0,05	0,05	0,05
Total tolerance[6] (maximum)	5	12	16

* An oily appearance of the kernel meat does not necessarily indicate rancidity.
+ Living insects or remains of animals are allowed inadmissible in any class.
The maximum tolerance is 10% for Extra and Class I which include kernels produced in the same region but different in cultivar, commercial type and shape. If cultivar and commercial type is marked, these specifications are also applied to Class II.
[4]) If an "old crop" statement is declared for the product these tolerances are increased to 1.5 96, 2.5 % and 4 % respectively in Extra, Class I and Class II.
[5] The percentage of kernel pieces may not exceed 0,5 %, 1,0 %, and 2,0 % for Extra, Class I and Class II, respectively.
[6] If an "old crop" statement is declared, the total tolerances for Extra, Class I and Class II are 6 %, 13 % and 18 %.

1. *3.4. Crops of different years*

Crop of different years should not be mixed,

1. 4. *Code numbers for specifications, evaluations and Analyses*

Code numbers for specifications, evaluations and analyses are given in ***table 2.***

Table 2- Code numbers for specifications, control and analysis.

Specifications	Specification code number	Control and analysis code number
General characteristics	1.2.1	
Evaluation of product	1.2.1	2.2.2
Determination of moisture content	1.2.1	2.3.1
Group characteristics	1.2.2	2.2.2
Class characteristics	1.2.3	2.2.2
Size characteristics	1.2.4	2.2.2
Determination of foreign matter	1.3.1	2.3.3
Determination of minerals	1.3.3	2.3.2
Labeling and packaging	3.1-3.2	2.2

2. Sampling, Evaluations and Analysis

2.1. Sampling

A lot is defined hazelnut kernels which are in same group, class, size, production year and package, and submitted evaluations at once. Unit in evaluation is outer package.

Large packages including smaller packages are considered as a one unit. No less than 5 samples, between 5-10% of sample is randomly taken from each lot. If the number is decimal, then it is rounded to upper whole number.

For sampling, each large package is opened one by one, and the content is poured on evaluation table or brand, then mixed. Approximately 1 kg of random sample is taken.

If small packages are in large package, small packages are randomly taken to make 1 kg sample, this packages are opened and the content is poured on evaluation table or brand and mixed.

2.2. Evaluations

2.2.1. Evaluation of package

Evaluation of the package and packaging material is determined by investigating specifications prints and label visually and by weighting. The results are compared to specifications given in titles 3.1 and 3.2.

2.2.2. Evaluation of hazelnut kernels

Evaluation of hazelnut kernels is done by touching, looking, smelling, cracking, tasting, screening and weighting in samples taken from evaluation table and results are compared to specifications given in title 1.2.

2.3. Analysis

2.3.1. Determination of moisture content of hazelnut kernels 2.3.1.1.

Method 1 - Reference method

2.3.1.1.1. Principle

The moisture content of hazelnut kernels is determined as weight loss by drying kernels in an oven at 103±2°C at ambient air pressure for 6 hours.

2.3.1.1.2. Tools

2.3.1.1.2.1. Ceramic mortar with appropriate pestle or food chopper

2.3.1.1.*2.2.* Analytical balance assensitive to I mg

2.3.1.1.2.3. Cylindrical, flat bottomed glass or metal containers, 12 cm in diameter and 5 cm in depth, provided with well fitting lids

2.3.1.1.2.4. Electrically heated temperature controlled oven with good natural ventilation, regulated so that the temperature is maintained at 103±2°C

2.3.1.1.2.5. Desiccator containing an effective desiccant (e.g. calcium chloride) and provided with a metal plate which allows the containers to cool rapidly.

2.3.1.1.3. Sample preparation

Kernels are separated from teguments (testa) and grinded in mortar or chopped by a food chopper into a small pieces 2 - 4 mm in size.

2.3.1.1.4. Moisture determination process

Dry the containers and their lids in the oven for at least 2 hours and transfer to the desiccator. Allow the containers and lids to cool to room temperature.

Moisture content is determined on 4 samples /50 g each. Weigh the empty

container and lid to the nearest 0.001 g (M_0).

50 g sample is weighted in weighted containers. Spread the material all over the base of the container, seal the container quickly with the lid and weigh the whole (M1). These operations are performed as quickly as possible

The open containers, with their lids beside them, are placed in the oven (Title 2.4).

The oven is closed and allowed to dry for 6 hours. The oven is quickly opened, the containers are covered with their individual lids, and placed in the desiccator to cool up to the ambient temperature (Title 2.5). After cooling to ambient temperature, the covered dish is weighted to the nearest 0.01 g (M_2).

The moisture content of the sample, as percentage by mass is given by the expression:

$$\text{Moisture content (\%)} = \frac{(M,-M_2)}{(M,-M_0)} X\ 100$$

Where;

M 1 : Sample weight (g) before drying +tare (g) M_2: Sample weight (g) after drying +tare (g) M_0: Weight of the container (g)

After determination of moisture content on 4 samples on average is calculated and compared to title 1.2.1.

2.3.1.2. Method *2*- Rapid **Method**

2.3. 1.2.1. Principle

Determination of the moisture content using a measuring instrument based on the principle of electrical conductivity. The measuring instrument must be calibrated against the laboratory method.

2.3.1.2.2. Tools

2.3.1.2.2.1. Ceramic mortar with appropriate pestle or food chopper.

2.3.1.2.2.2. Measuring instrument based on the principle of electrical conductivity.

2.3.1.2.23. Determination

The glass is filled with the substance to be examined (previously grounded) and the press is applied on the sample until a constant pressure is obtained.

The values obtained is read on the scale

After each reading, clean the glass thoroughly with a spatula, stiff bristled brush, paper napkin or compressed air. The results are compared with title 1.2.1.

23.2. Determination of mineral impurities

Determination of mineral impurities is done based TS 1 128 ISO 763. The results are compared to specifications given in title 1.3.3.

233. Determination of foreign matter

Determination of foreign matter is done on 1 kg samples taken from evaluation table according to title 3.1. Foreign matter are separated, weighted and percentage is calculated. The results are compared to specifications given in title 1.3.1.

2.4. Comparison of the results

A product of a Lot is considered suitable for standards if the results of evaluations and analyses are in accordance with standards

2.5. Report for evaluation and analyses[1]

The information below should be mentioned in the report of evaluation and analyses:

- Name and address of company,
- Name and address of laboratory evaluations and analyses are made,

NOTE of TSE: All the referred standard numbers, publication dates, Turkish and English definitions are given at the beginning of the article.

-Name, job title and responsibility of lab. personnel who made evaluations and analyses,
- Dates of sampling, evaluations and analyses,
- Definition of the sample
-Code numbers of standards applied to evaluations and analyses,
- Presentation of the results,
- Processes applied in analyses to prevent the factors which can change the results of evaluation and analyses,
-Processes applied in analyses but not considered as a obligatory however mentioned in methods of evaluation and analyses,
- Incompliance weather or not in standards,
-Serial number and date of the report, page number of each page and number of total pages.

Validity of the control certificate is good for 60 days if the product meets this standards.

3. Presentation to the Market

Hazelnut kernels are presented to the market in packages.

Hazelnut kernels should be transported to market under healthy conditions without decomposition.

3.1. Packaging

3.1.1. Uniformity

The content of each package should be uniform for group, class and size and include hazelnut kernels from the same source of group or commercial type or class. The product seen through the package should be representative of the product inside.

3.1. *2.* Package

Hazelnut kernels should be packed in such a way to protect the product properly.

The materials used inside the package should be new, clean and can protect the quality of the product from any external or internal damage. Especially the materials used in paper, stamps and labels, and glues and ink used in printing and labeling should not be toxic to the product.

Packages should be free from all foreign matter.

Hazelnut kernels are presented to the market either in bag s or in strong packages. Small consumer packages in each large package should be in same weight include hazelnut kernels in the same class, cultivar and commercial type.

3.2. Labeling

The information below should be printed on each side of package that label should be visible, easily readable and not erasable:

-Commercial name and address of the company, or short name and address or trade mark[7]

-The shipping label (where applicable): Shipping label should correspond with the shipping label on the Bill of Loading,.

-Origin of product: Country of origin, and, in request, name of the growing region or national, regional or local name,

-Mark and number of this standard (TS 3074),

-Number of the lot,

-Name of the product (Hazelnut kernels),

- Production region,

-Group,

- Class,

-Size,

-Crop year,

- Expiration date of product advised *by* the company,

-Weight[8] (gross and net). If the gross weight is indicated, the tare of packaging material must not exceed 2.5% for sacks in larger than 50 kg, and 3.0 % for sacks in lesser weight. If the nuts are presented in double sacks other than paper or polyethylene, the net weight must be indicated.

Net weight, or number of pre packages followed by net unit weight for packages containing pre-packages.

In small packages printing n ame of company or short name and address or trade mark, name of product class and weight are enough.

In export products, these information should be printed in foreign language besides Turkish. Pictures and other information can be printed on packages in c ondition that statement should be true and not contradicting the label.

4. Other Conditions

Packages containing hazelnut kernels should not be stored with materials which gives bad smell and causes dirtiness, in processing rooms, storage rooms or vehicles.

-Packages should be stored in cool, and aerated storage rooms, and should not be left, loaded or unloaded in the rain.

-The packages of hazelnut kernels should be stored on wooden pallets as piles of not more than 10 packages, and enough space should be given between piles for aeration in storage rooms.

- Hooks should not be used for loading and unloading inshell hazelnut bags.

[7] *The national legislation of a number of European countries requires the explicit declaration of the name and address 8 Net weight has to be indicated at the request of the importer or the importing country.*

4.1. Grower/handler or seller who declares the production of inshell hazelnuts under standards are obliged to present a "certificate of control" upon request. On this certificate, information below should be reported;

- Hazelnut kernels carry the specifications in title 1,

-Evaluations and analyses in title 2 were completed and the results are in accordance with standards.

Reference

UN/ECE TRADE/WP 7/GE 2/1998/14