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البن ومنتجاته ـ حبوب البن المحمص

COFFEE AND COFFEE PRODUCTS - ROASTED COFFEE BEANS

ICS: 67.140.20

هذه الوثيقة مشروع للائحة فنية خليجية تم توزيعها لإبداء الرأي والملحوظات بشأنها، لذلك فإنها عرضة للتغيير والتبديل، ولا يجوز الرجوع إليها كلائحة فنية خليجية إلا بعد اعتمادها من الهيئة.

This document is a draft Gulf Technical Regulation circulated for comments. It is, therefore, subject to alteration and modification and may not be referred to as a Gulf Technical Regulation until approved by GSO.

Foreword

GCC Standardization Organization (GSO) is a regional organization which consists of the national standardization bodies of GCC member states. One of GSO main functions is to issue gulf standards and technical regulations through specialized technical committees.

GSO Ministerial Committee in its meeting number (…..) held on …./…../…..H, which corresponds to …../…./….., has approved the update of Gulf (Technical Regulation) GSO : titled "Coffee and coffee products - roasted coffee beans" in English language which was studied through the technical program of GSO Technical Committee for Food and Agricultural Products (…..) in …….. schedule. (Arabic) text is considered the official text in case of any conflicts between the two. This document will cancel and replace the Gulf Technical Regulation GSO 1391:2002 “Ground Roasted Coffee” and GSO 2197:2012 “Coffee And Coffee Products - Roasted Coffee Beans”.

Coffee and Coffee Products: Roasted Coffee Beans

1- Scope and Field of Application

This GSO standard is concerned with the requirements for whole and ground roasted coffee beans obtained by roasting green coffee beans of the genus (*Coffea*). It does not include ground roasted coffee to which added by any other additives and Instant Coffee.

2- Complementary Standards

2.1 GSO 9 “Labeling Of Prepackaged Food Stuffs”.

2.2 GSO 21 “Hygienic Requlation For Food Plants And Thier Personal”.

2.3 GSO 150 - 1 “Expiration Dates For Food Products -Part 1 : Mandatory Expiration Date”.

2.4 GSO 193 “Contaminants And Toxins In Food And Feed”.

2.5 GSO 382 “MAXIMUM LIMITS OF PESTICIDE RESIDUES IN AGRICULTURAL AND FOOD PRODUCTS”.

2.6 GSO 442 “GREEN COFFEE BEANS”.

2.7 GSO 839 “Food Packages - Part 1: General Requirements”.

2.8 GSO 1016 “Microbiological Criteria For Foodstuffs”.

2.9 GSO 1863 “Food Packages - Part 2: Plastic Package – General Requirements”.

2.10 GSO 2388 “Decaffeinated Coffee”.

2.11 GSO 2700 “Migration Limits Of Food Packages”.

2.12 GSO ISO 6670 “INSTANT COFFEE IN CASES WITH LINERS — SAMPLING”.

2.13 GSO ISO 11294 “Roasted Ground Coffee -- Determination Of Moisture Content -- Method By Determination Of Loss In Mass At 103 Degrees C (Routine Method)”.

2.14 The standard specification that will be approved by the Authority related to " Determination of the caffeine content".

2.15 The standard specification that will be approved by the authority related to " Determination of particle size of ground roasted coffee".

3- Definitions

3.1 Roasted coffee: Coffee obtained by roasting green coffee.

3.2 Roasting: Heat treatment which produces fundamental chemical and physical changes in the structure and composition of green coffee, bringing about darkening of the coffee and development of the characteristic flavour of roasted coffee.

3.3 Grinding: Mechanical operation intended to produce fragmentation of roasted coffee beans, resulting in ground coffee.

3.4 Ground roasted coffee: Product obtained by grinding roasted coffee.

3.5 Decaffeinated ground roasted coffee: Roasted ground coffee obtained from decaffeinated green coffee.

3.6 Agtron scale: a scale used to determine the grade of roasting color of coffee beans.

3.7 SCAA disk value: a colorimetric card used to determine the grade of roasting color of coffee beans.

3.8 Soxhlet extraction apparatus: is a solvent extraction device.

3.9 Thimble: the weight of the material to be extracted and placed in the extraction device.

4- Requirements

4.1 The green coffee beans used must comply with GSO standard stated in (2.6)

4.2 The product shall produce according to GSO standard stated in item (2.2).

4.3 The limits of pollutants and toxins shall not exceed the maximum limits approved in the GSO standard stated in item (2.4).

4.4 The limits of pesticide residues shall not exceed the maximum limits

approved in the GSO Standard stated in item (2.5).

4.5 The microbiological limits shall not exceed the maximum limits approved in the GSO Standard stated in item (2.8).

4.6 The expiration dates of food products shall be according to GSO standard stated in item (2.3).

4.7 Food additives are not permitted.

4.8 The caffeine content shall not be less than 0.8% by mass, and for decaffeinated it shall not be more than 0.1%.

4.9 The product shall be free from foreign matters, impurities, insects and their parts or wastes.

4.10 It shall retain its natural properties and be free from rancidity or any foreign odors.

4.11 It shall be homogeneous in color, ranging from light to dark brown.

4.12 The moisture content shall not exceed 5% by mass.

4.13 The total ash shall not exceed 5% by mass.

4.14 The acid insoluble ash shall not exceed 1% by mass.

4.15 The water-soluble matter shall be between 25% - 32% by mass.

4.16 The alkalinity of the water-soluble ash in milliliters of 0.1 N hydrochloric acid per gram of material shall be between 3.5 - 7.

4.17 The petroleum ether extract shall not be less than 8.5% by mass.

4.18 The decaffeinated whole and ground roasted beans shall be comply with the GSO standard stated in (2.10).

4.19 The acrylamide content in roasted coffee beans shall not exceed 400 µg/kg.

4.20 The particle size of the ground roasted beans shall be in accordance with the following table:

Table (1): The particle size of the ground roasted beans

Type	% by weight retained on 710-microns sieve	% by weight retained on 500-microns sieve	% by weight retained on 355-microns sieve
Fine	10	15	50

Medium	20	20	30
Coarse	30	25	15

4.21 The roasting color grades using by Agtron scale or SCAA disk value shall be according to the following table:

Roasting color	Description	Grades	
		Agtron scale	SCAA disk value
Light	a light brown in color with no oil on the surface of beans	80-90	85
Medium	a medium brown in color which has a stronger flavor, and may exhibit a slight oily surface	50-60	55
Moderately dark	a moderately dark brown in color with some oil on the surface and slightly bittersweet aftertaste.	40-50	45
Dark	a dark brown in color which has a glossy oily surface and a pronounced bitterness. The colors of roasting run from slightly dark to charred	30-40	35

5- Sampling

5.1 The samples shall be drawn according to the GSO standard stated in (2.12).

6- Examination and testing methods

6.1 The caffeine content can be determined according to the GSO standard stated in (2.14).

6.2 The moisture content can be determined according to the GSO standard stated in (2.13) or using moisture measuring devices.

6.3 The total ash can be determined according to the following method:

6.3.1 **Procedure:** Weigh accurately about 5 g of the material in a platinum dish. Heat at 100 ºC ± 2 ºC until water is expelled and then heat slowly over a flame until swelling ceases. Ignite in a muffle furnace at 550 ºC ± 10 ºC until grey ash results. Cool the dish in a desiccator and weigh. Repeat this process of heating for 30 min, cooling in a desiccator, and weighing until the difference between two successive weighing is less than one milligram. Record the lowest mass.

6.3.2 **Calculation:**

Total ash (dry basis) = $\frac{10000\ (m_2-m)}{(m_1-m)(100-H)}$percent by mass

M_2 = the mass in g of the dish with the ash

M= the mass in g of the empty dish

M_1= the mass in g of the dish with the material (coffee powder)

H= the percentage of moisture

6.4 The acid insoluble ash can be determined according to the following method:

6.4.1 **Reagent:** Dilute hydrochloric acid, approximately 5 N, prepared from concentrated hydrochloric acid.

6.4.2 **Procedure:** Add 25 mL of dilute hydrochloric acid to the ash contained in the dish, then Cover the dish with a watch-glass and heat it on a water-bath for 10 min. After that cool and filter the contents of the dish through Whatman filter paper No. 42 or its equivalent and wash the filter paper until the washings are free from the acid. Return the filter paper and the residue to the dish. Keep it in an electric air-oven maintained at 135 ºC ± 2 ºC for about 3 h. Ignite in a muffle furnace, cooling and weighing at half-hour intervals until the difference in weight between the two successive weighing at half-hour intervals until the difference in weight between the two successive weighing is less than one milligram and record the lowest mass.

6.4.3 **Calculation:**

The acid insoluble ash (dry basis) = $\frac{10000\ (W_2-W)}{(W_1-W)(100-M)}$

W_2 = the mass in g of dish with acid insoluble ash

W= the mass in g of the empty dish

W_1= the mass in g of dish with the material
M= the percentage of moisture

6.5 The water-soluble matter can be determined according to the following method:

6.5.1 **Procedure:** Weigh accurately about 2 g of the material in a 500-mL Erlenmeyer flask and add 200 mL of water and reflux over a low flame for one hour, then cool and filter through a Whatman filter paper No. 1 or its equivalent, wash three times with 10 mL to 15 mL of water finally make up to 250 mL in a graduated flask, after that shake well and pipette a 50 mL aliquot in a tared dish and evaporation, dry for one hour in an oven at 100 ºC ± 2 ºC, cool in a desiccator and weigh, then repeat this process of heating for 30 min, cooling in a desiccator and weighing until the loss in mass between two successive weighing is less than one milligram and record the lowest mass.

6.5.2 **Calculation:**

The water-soluble matter (dry basis) $= \frac{50000\ (m_2 - m_1)}{m(100 - H)}$

M_2 = the mass in g of the dish with the ash
M= the mass in g of the empty dish
M_1= the mass in g of the dish with the material (coffee powder)
H= the percentage of moisture

6.6 The alkalinity of the water-soluble ash can be determined according to the following method:

6.6.1 **Reagent:** Standard hydrochloric acid, dissolve 0.5 g of methyl orange in 500 mL of distilled water. Filter, if necessary.

6.6.2 **Procedure:** Titrate the filtrate obtained in Clause B.1 with standard hydrochloric acid, using the methyl orange indicator. Note the volume in milliliters of the acid used then calculate the quantity of 0.1 N hydrochloric acid required to neutralize the water-soluble ash from one gram of the dry material.

6.7 The petroleum ether extract can be determined according to the following method:

6.7.1 **Apparatus:** Soxhlet extraction apparatus.

6.7.2 **Reagent:** Petroleum ether, distilling below 60 ºC.

6.7.3 **Procedure:** weigh accurately about 10 g of the material in a suitable thimble and dry for 2 h at 100 ºC ± 2 ºC. Place the thimble in the

soxhlet extraction apparatus and extract with the solvent for about 16 h. Dry the extract contained in the Soxhlet flask, the empty weight of which has been previously determined, at 95 ºC to 100 ºC for an hour. Cool in a desiccator and weigh. Continue the alternate drying and weighing at 30 min intervals until the loss in weight between two successive weighings is not more than one milligram. Record the lowest weight.

6.7.4 **Calculation:**

Percentage by weight: $= \frac{10000\,(W_1 - W_2)}{W(100 - M)}$

W_1 = The mass in g of Soxhlet flask with the petroleum ether extract.

W_2= The mass in g of Soxhlet flask, clean and dry.

W= The mass in g of the material taken for test.

M= The percentage of moisture.

6.8 The particle size of ground roasted beans can be determined according to the GSO standard stated in (2.15).

6.9 The color of the roasted bean can be determined using Agtron scale or SCAA disk value.

7- Packaging, transportation and storage

7.1 Whole and ground roasted beans shall be packed in suitable packages according to the GSO standard stated in (2.7, 2.9, 2.11).

7.2 The packed product shall be transported in a way as to protect it from contamination.

7.3 The packed product shall be stored in clean and well-ventilated sores away from sources of heat, moisture, and harmful materials, preferably in packages or bags that prevent direct exposure to sunlight.

8- Labelling

Without prejudice to the requirements given in the GSO standard stated in (2.1), the following information shall be declared on each bag or container:

8.1 Product name (whole roasted bean) or (ground roasted bean) depends on the product type.

8.2 Grading according to roasting color (light or medium or moderately dark or dark).

8.3 Grading according to the particle size of ground roasted bean (fine, medium, coarse).

8.4 In the case of decaffeinated coffee, it shall be labelled on the product and the name of the solvent used.

المصطلحات الفنية

بن محمص.....Roasted coffee

بن محمص مطحون.....Ground roasted coffee

جهاز أقترون.....Agtron scale

بطاقة مقياس اللون.....SCAA disk value

جهاز استخراج.....Soxhlet extraction apparatus

كشتبان.....Thimble

فرن مافيل.....Muffle furnace

مجفف.....Desiccator

زجاج ساعة.....Watch-glass

References

1. USDA: CID Coffee, Tea, Cocoa, Beverage Mixes, and Water https://www.ams.usda.gov/grades-standards/cid/beverages
2. CBI: Entering the European market for coffees roasted at origin https://www.cbi.eu/market-information/coffee/roasted-coffees/market-entry#:~:text=Commission%20Regulation%20(EU)%202017%2F,coffee%20is%20400%20%CE%BCg%2Fkg.
3. FSSAI: manual of methods of analysis of foods beverages: tea, coffee, chicory https://fssai.gov.in/upload/uploadfiles/files/Manual_Beverages_08_07_2022.pdf
4. EAS 105: Roasted coffee beans and roasted ground coffee – Specification