هيئة التقييس لدول مجلس التعاون لدول الخليج العربية
GCC STANDARDIZATION ORGANIZATION (GSO)

Final Draft

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الرمان
POMEGRANATE

إعداد
اللجنة الفنية الخليجية لقطاع المواصفات الغذائية والزراعية

هذه الوثيقة مشروع لمواصفة قياسية خليجية تم توزيعها لإبداء الرأي والملحوظات بشأنها، لذلك فإنها عرضة للتغيير والتبديل، ولا يجوز الرجوع إليها كمواصفة قياسية خليجية إلا بعد اعتمادها من مجلس إدارة الهيئة.

ICS:67.080.10

تقـديـم

هيئــة التقييس لـدول مجلس التعـاون لـدول الخليج العربيـة هيئـة إقليميـة تضــم فـي عضـويتها الأجهـزة الوطنية للمواصفات والمقاييس في دول الخليج العربيـة ، ومـن مهـام الهيئــة إعداد المواصـفات القياسيــة الخليجية بواسطة لجان فنية متخصصــة .

وقـد قامت هيئة التقييس لـدول مجلـس التعــاون لـدول الخليج العربيــة ضـمن برنـامج عمل اللجنـة الفنيـة رقـم (5) " اللجنة الفنيـة الخليجية لمواصفات قطـاع المنتجات الغذائية والزراعية " بتحـديث المواصفة القياسية الخليجيـة رقـم GSO/ISO 23393 " ثمـار الرمـان- المواصـفات وطـرق الاختبـار " وقامـت الامارات العربية المتحدة بإعداد مشروع هذه المواصفة .

وقـد اعتمـدت هذه المواصـفة كلائحــة فنيـة خليجيـة فـي اجتمـاع مجلس إدارة الهيئـة رقـم ( ) الـذي عُقـد بتاريخ / / هـ ، الموافق / / م .

على أن تلغي المواصفة رقم (GSO/ISO 23393:2009) وتحل محلها .

Foreword

Standardization Organization for GCC (GSO) is a regional Organization which consists of the National Standard Bodies of GCC member States.

One of GSO main functions is to issue Gulf Standard/ Technical regulation through specialized technical committees (TCs).

GSO through the technical program of committee TC No: (5) "Technical Gulf committee for food and agriculture product standards" has updated the GSO standard No. GSO/ISO 23393" Pomegranate fruit – Specification and test methods" The draft standard has been prepared by (United Arab Emirates).

This standard has been approved as Gulf Technical regulation by GSO Board of Directors in its meeting No…./….held on / / H, / /

The approved standard will replace and supersede the standard No. (GSO/ISO 23393:2009).

POMEGRANATE

1. Scope

This Gulf Standard applies to fruits of commercial varieties of pomegranates grown from *Punica granatum* L., of the *Punicacea*e family, to be supplied fresh to the consumer after preparation and packaging. Pomegranates for industrial processing are excluded.

2. Complementary Standards

2. 1 GSO 9: Labeling of prepackaged foodstuffs.
2. 2 GSO/CAC 193: General Standard for Contaminants and Toxins in Food and Feed.
2. 3 GSO 382,383: Maximum allowable limits of pesticides residue in agricultural and food products.
2. 4 GSO 1016: Microbiological Criteria of Food Product- Part 1.
2. 5 GSO 1694: General principles of food hygiene.
2. 6 GSO ISO 7558: Guide to the Prepacking of Fruits and vegetables.

3. Definitions

For the purposes of this gulf standard, the following definitions apply:

3.1 Pomegranate
Fruit of the tree *Punica granatum* (L.).

3.2 Pest-infested pomegranate
Pomegranate damaged by insect and/or mite infestation.

3.3 Spoiled pomegranate
Pomegranate damaged by bruises, or darkened in colour, frozen, sun-burnt or showing the presence of visible decomposition caused by bacteria, fungi, visible mould hyphae or any other indications of disease.

3.4 Immature pomegranate
Pomegranate obtained from an unripe pomegranate having poor flavour, hard tissues and undesirable appearance.

3.5 Fermented pomegranate
Pomegranate damaged by fermentation to the extent that the characteristic appearance and/or flavour is substantially affected.

3.6 Extraneous matter
Dirt, pieces of skin, calyx, leaf, peduncle, twigs, bits of wood or any other foreign matter among or on the pomegranate.

4. Requirements

4.1 In all classes, subject to the special provisions for each class and the tolerances allowed, the pomegranates must be:

- Whole;
- Sound; produce affected by rotting or deterioration such as to make it unfit for consumption is excluded;
- Clean, free of any visible foreign matter;
- Free of pests and damage caused by them affecting the general appearance of the produce;
- Free of abnormal external moisture, excluding condensation following removal from

cold storage;
- Free of any foreign smell and/or taste;
- Free of damage caused by frost;
- Free of damage caused by low and/or high temperatures;
- Free of sunburns affecting the arils of the fruit.
- The pomegranates must have reached an appropriate degree of development and ripeness in accordance with criteria proper to the varieties and to the area in which they are grown.
- The development and condition of the pomegranates must be such as to enable them to withstand transport and handling; and to arrive in satisfactory condition at the place of destination.
- The produce covered by this Standard shall comply with the maximum levels for Contaminants and Toxins established by the GSO standard referenced in item 2.2.
- The produce covered by this Standard shall comply with the maximum residue limits for pesticides established by the GSO standard referenced in item 2.3.
- The product covered by the provisions of this Standard shall be prepared and handled in accordance with the appropriate sections of the GSO standard referenced in item 2.5.
- The product should comply with any microbiological criteria established in accordance with the appropriate sections of the GSO standard referenced in item 2.4.

4.2 CLASSIFICATION

Pomegranates are classified in three classes as defined below:

4.2.1 Extra Class

Pomegranates in this class must be of superior quality. They must be characteristic of the variety. They must be free of defects, with the exception of very slight superficial defects, provided these do not affect the general appearance of the produce, the quality, the keeping quality and presentation in the package.

4.2.2 Class I

Pomegranates in this class must be of good quality. They must be characteristic of the variety. The following slight defects, however, may be allowed, provided these do not affect the arils of the fruit and the general appearance of the produce, the quality, the keeping quality and presentation in the package:
- Slight defects in shape;
- Slight defects in coloring;
- Slight skin defects including cracking.

4.2.3 Class II

This class includes pomegranates which do not qualify for inclusion in the higher classes, but satisfy the minimum requirements specified in Section 4.1 above. The following slight defects, however, may be allowed, provided these do not affect the arils of the fruit and retain their essential characteristics as regards the quality, the keeping quality and presentation:
- Defects in shape;
- Defects in coloring;
- Skin defects including cracking.

5. PROVISIONS CONCERNING SIZING

Pomegranate may be sized by count, diameter or weight in accordance with existing commercial trading practices. When such is the case, the package must be labelled accordingly.

A. When sized by count, size is determined by the number of individual fruit per package.

B. Pomegranate may be sized by diameter (the maximum diameter of the equatorial section of each fruit).

The following table is a guide and may be used on an optional basis.

Table A - Diameter

Size Code		**Diameter (mm)**
1	A	≥81
2	B	71 – 80
3	C	61 -70
4	D	51 – 60
5	E	40 – 50

C. Pomegranate may be sized by weight (the individual weight of each fruit).

The following table is a guide and may be used on an optional basis.

Table B - Weight

Size Code		**Weight (g)**
1	A	≥ 501
2	B	401 - 500
3	C	301 - 400
4	D	201 - 300
5	E	125 - 200

6. TOLERANCES

6.1 Quality tolerances

6.1.1 Extra Class

Five percent by number or weight of pomegranates not satisfying the requirements of the class, but meeting those of Class I or, exceptionally, coming within the tolerances of that class.

6.1.2 Class I

Ten percent by number or weight of pomegranates not satisfying the requirements of the class, but meeting those of Class II or, exceptionally, coming within the tolerances of that class.

6.1.3 Class II

Ten percent by number or weight of pomegranates satisfying neither the requirements of the class nor the minimum requirements, with the exception of produce affected by rotting or any other deterioration rendering it unfit for consumption.

6.2 Size tolerances

For all classes, 10% by number or weight of pomegranates corresponding to the size immediately above and/or below that indicated on the package.

7. PRESENTATION REQUIREMENTS

7.1 Uniformity

The contents of each package must be uniform and contain only pomegranates of the same origin, variety, quality and size (if sized). the visible part of the contents of the package must be representative of the entire contents. sales packages may contain

mixtures of varieties of different colors and sizes provided they are uniform in quality and for each variety concerned, its origin.

7.2 Packing

Pomegranates must be packed in such a way as to protect the produce properly. The materials used inside the package must be new, clean, and of a quality such as to avoid causing any external or internal damage to the produce. the use of materials, particularly of paper or stamps bearing trade specifications is allowed, provided the printing or labelling has been done with non-toxic ink or glue.

Pomegranates shall be packed in each container in compliance with the gulf standard referenced in item 2.6.

The containers shall meet the quality, hygiene, ventilation and resistance characteristics to ensure suitable handling, shipping and preserving of the pomegranates. Packages must be free of all foreign matter and smell.

8. SAMPLING

The laboratory must receive a sample which is truly representative and has not been damaged or changed during transport or storage.

9. TEST METHODS

Samples of pomegranates shall be tested for conformity of the product to the requirements by the test method specified in Annex A.

The phenolic compounds content shall be tested in accordance with Annex B.

10. LABELLING

Without prejudice to the provisions of the Gulf standards referenced in item 2.1, the container and case shall be marked or labelled with the following particulars:

10.1 The name of the product or variety, and the trademark or brand name, if any;

10.2 The name and address of the producer or packer, trade mark;

10.3 The class of product;

10.4 The expiry date;

Annex A
(normative)

Determination of the content of pest-infested and spoiled pomegranate, immature fruits, extraneous matter and deviations from the main colour

A.1 Principle

A test portion of pomegranate fruits is visually inspected by physical separation of the damaged pieces, immature fruits and extraneous matter from the sound, healthy and ripe pieces of the sample.

A.2 Procedure

Weigh to the nearest 0,02 g, a test portion of about 500 g. Separate carefully, by hand or using tweezers, the pest-infested and spoiled pomegranates, immature fruits, extraneous matter and the pomegranates which show deviations from the main colour.

Weigh to the nearest 0,02 g, each of the categories separately.

A.3 Calculation

The proportion, *p*, expressed as a percentage by mass, of each category separately is equal to

$$\rho = \frac{m1}{m0} \times 100\ \%$$

where

m_0 is the mass, in grams, of the test portion;

m_1 is the mass, in grams, of the relevant category (see A.2).

A.4 Test report

The test report shall specify:

a) all information necessary for the complete identification of the sample;

b) the sampling method used, if known;

c) the test method used, with reference to this International Standard;

d) all operating details not specified in this International Standard, or regarded as optional, together with details of any incidents which may have influenced the test result(s);

e) the test result(s) obtained, or, if the repeatability has been checked, the final quoted result obtained.

Annex B
(normative)

Folin-Ciocalteu method for measurement of total phenolics

B.1 Principle
This procedure is based on the quantitative analysis of phenolic compounds by phenol reagent.

B.2 Reagent
Use only reagents of recognized analytical grade and distilled or demineralized water or water of equivalent purity.

B.2.1 Folin-Ciocalteu phenol reagent, commercially available, ready prepared.

Before analysis, Folin-Ciocalteu phenol reagent should be diluted to 1:10 by using distilled water. Discard any unused diluted reagent.

Store according to manufacturer's recommendations, and ensure that the reagent is protected from light.

B.2.2 Sodium carbonate, 75 g Na_2CO_3 diluted to 1 l by using distilled water.

B.2.3 Standard phenolic compound solutions.

For preparing the calibration curve, gallic acid or ferulic acid could be used as a standard phenolic compound. Prepare a 500 mg/l gallic acid or ferulic acid stock-solution and dilute it to obtain the following series of working solution: 0,25 mg/l, 50 mg/l, 100 mg/l, 125 mg/l and 250 mg/l.

B.3 Apparatus
Usual laboratory apparatus and, in particular, the following.

B.3.1 UV/VIS spectrophotometer (725 nm).

B.3.2 Waring blender.

B.4 Procedure
B.4.1 Extraction
Blend 100 g pomegranate fruit by using the blender (B.3.2).

Weigh 10 g and make to volume with distilled water into 100 ml and mix. Filter through filter paper.

B.4.2 Absorbance determination
Add 0,2 ml pomegranate extract and 1,15 ml distilled water and then 0,15 ml Folin-Ciocalteu phenol reagent. Mix well and let the mixture sit at room temperature for 5 min. Add 1,5 ml sodium carbonate solution (B.2.2) and mix well. Let the mixture sit at room temperature for 90 min and read the absorbance at 725 nm by using UV/VIS spectrophotometer (B.3.1).

B.4.3 Calculation

Calculate the amount of phenolic compounds, $m_{t,p}$ by using the following formula:

$$mtp = \frac{(20.9 \times A) - 0.44}{100} \times f \times \frac{V_e}{V_a} \times \frac{100}{m_s}$$

where

mt, p is the mass, in milligrams, of the total phenolic per 100 g gallic acid or ferulic acid;

A is the absorbance (abs. at 725 nm);

f is the dilution factor, in millilitres;

V_e is the extract volume, in millilitres;

V_a is the assay volume, in millilitres;

m_s is the mass of the sample in grams.

Annex C
(informative)
Some characteristic compositional data of pomegranate

	Variation limits		
	min.	**max.**	**mean**
Relative density (20/20 °C)	1,054	1,074	1,068
Soluble solid (mass fraction, %)	12,6	18,70	15,80
Titratable acidity (g/l)	1,9	58,40	10,34
pH Value	2,4	4,41	3,18
Protein (N × 6,25) (mass fraction, %)	0,106	0,422	0,184
Total phenolic compounds (mg/l)	575	1972	1303
Prolin (mg/l)	1	23	7,6
Ash (g/l)	1,88	6,11	3,64
ORGANIC ACIDS			
Citric acid (g/l)	0,28	32,8	6,88
L-Malic acid (g/l)	0,0	2,83	0,72
D-Isocitric acid (g/l)	13,9	186	54,92
SUGARS			
Reducing sugars (g/l)	110,4	194,2	143,6
Sucrose (g/l)	0	0	0
Glucose (g/l)	47,1	82,7	61,03
Fructose (g/l)	41,8	97,8	63,56
VITAMINS			
Thiamin (mg/kg)	39,4	86,9	57,85
Riboflavin (mg/kg)	1,21	8,47	3,71
Ascorbic acid (mg/kg)	40	246	117
MINERALS			
Potassium (K) (mg/kg)	809	2251	1439
Calcium (Ca) (mg/kg)	61	207	78,5
Sodium (Na) (mg/kg)	4,41	45,8	18,9
Magnesium (Mg) (mg/kg)	18,37	81,5	38,65
Phosphorus (P) (mg/kg)	17	88,1	42,8
Iron (Fe) (mg/kg)	3,75	17,1	6,62
Copper (Cu) (mg/kg)	0,72	3,97	1,81
Zinc (Zn) (mg/kg)	1,4	5,7	2,35
Manganese (Mn) (mg/kg)	0,1	0,79	0,33

References:

- Codex Alimentarius Commission, *Pomegranate*, CODEX STAN 310-2013.
- International Organization for Standardization (ISO), Pomegranate fruit – Specification and test methods, ISO 23393:2006.