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PAKISTAN STANDARD SPECIFICATION FOR COOKING OIL (BLENDED) (3RD REVISION)

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0. FOREWORD

0.1 This Pakistan Standard was adopted by the Pakistan Standards & Quality Control Authority, Standards Development Centre on **23-06-2023** the draft finalized by the Oilseeds & their Allied Products Technical Committee has been approved by the National Standards Committee for Agriculture & Food Products.

0.2 Cooking Oil is the product of blending of permissible edible oils of vegetable origin which shall be refined, bleached and deodourized so as to conform to the given standard of quality for cooking oil as reproduced viz, Refined Cotton Seed Oil, Refined Groundnut Oil, Refined Low Erucic Acid Rape Seed (Canola Oil), Refined Sesame Seed Oil, Refined Sunflower Oil, Refined Maize (Corn) Oil, Refined Palmolein, Refined Soyabean Oil and Refined Safflower Oil.

0.3 In reparation of this standard, the views of the manufacturers, technologists, and testing authorities etc. have been taken into consideration.

0.4 This Pakistan Standard Specification was established in 1990, first revised in 2003 and revised in 2012 for the second time. Keeping in view the latest development in the Industries the Committee felt it necessary to revise again.

0.5 For the purpose of deciding whether a particular requirements of this standard is complied with the final value, observed or calculated, expressing the results of test or analysis shall be rounded off in accordance with PS-103. Method of Rounding of Numerical values". The number of significant places retained in the rounded off value shall be the same as that of the specified value in the standard.

0.6 All the ingredients and preparation, processing, packaging, storage and/or transportation shall be in accordance with PS 3733-2022 ® /OIC SMIIC 1 :2019 –Second Revision (Modified Adoption) for General Requirements for Halal Food.

1. SCOPE

1.1. This Standard prescribes the requirements and methods of sampling & test for Cooking Oil (blended).

2. TERMINOLOGY

2.1 **Cooking Oil** – means blending of Vegetable Oils of permissible edible grades of vegetable origin which shall be refined, bleached & deodourized so as to conform to the given standard of quality primarily intended for Cooking and /or frying as produced by blending the edible oil :-

i.	Refined Cotton Seed Oil
ii.	Refined Ground nut oil
iii.	Refined Low Erucic Acid
iv.	Refined Sesame Seed Oil
v.	Rapeseed (Canola Oil)
vi.	Refined Maize (Corn) Oil
vii.	Refined Palmolein.
viii.	Refined Soybean Oil.
ix.	Refined Sunflower Oil
x.	Refined Safflower Oil.

It shall be free from all harmful substances.

3. REQUIREMENTS:

3.1. Vitamin A-33000 I.U. assay variation 10 % I.U. of Vitamin-A shall be added per kg of the finished product. Test shall be carried out in the manner prescribed in 23 of PS: 56 for Methods of Sampling & Tests for Vegetable Oils and Fats.

3.2. The material shall be clear at the temperature 25^{o} C and free from adulterants, sediments, suspended and other foreign matter, separated matter and shall have acceptable taste and odour. It may contain antioxidants and synergists as prescribed in CAC / WHO be adopted or as prescribed in Pure Food Rules. It may contain any one of the antioxidants and synergists as prescribed in CAC / WHO not excess of the following limits noted against each.

1.	ANTIOXIDANTS	MAXIMUM LEVEL OF USE
i.	Propyl, Octyl, and dodecyl	100 mg/kg individually or in combination.
	Gallates.	
ii.	Butylated hydroxy tolence (BHT) Butylated hydroxyanibale (BHA)	200 mg/kg individually or in combination.
iii.	Any combination of gallates with BHA or BHT or both.	200 mg/kg but gallates not to exceed 100 mg/kg.
iv.	Natural & Synthetic tocopherols.	Not limited.
v.	Ascorbyl palmitate	200 mg / kg individually.
.	Ascorbyl stearate	incombination.
vii.	Dilauryl thiodipropionate	200 mg / kg.
viii)	Tertiary Butly Hydroquinone (TBHQ).	200 mg / kg.
2.	ANTIOXIDANTS SYNERGISTS	MAXIMUM LEVEL OF USE
	i. Citric Acids and its Sodium Salt. ii. ISO propyl citrate mixture iii. Phosphoric acid	0.01 % Max. 100 mg / kg individually or in combination.

3.2.1. Colour :- It should not contain any added colouring matter and flavour, except permitted natural flavour.

3.2.2. The clarity of the material shall be judged by the absence of turbidity after keeping the filtered sample at $25^{o}C$ for 24 hours.

3.2.3. The material shall also comply with the requirements given in Table-1.

4. PACKING

4.1 Cooking Oil shall be packed in well-closed tin containers made from food grade material and it shall conform to PS: 4773 for Tinplate containers for Ghee, Banaspati, Cooking Oil/Edible Oils or the material shall be packed in suitable sealed flexible packs of Food Grade material (PS: 4797 Flexible Packs for the packing of Banaspati, Ghee, Cooking Oil & Edible Oils.

4.2 The weight of container for Cooking Oil should be as follows:

Volume of Finished Product Litre	**Weight of Tin Containers (gm)**
16	880 to 890
10	660 to 670
05	330 to 340
03	200 to 210
01	-
500 ml	-
250 ml	-
100 ml	-

5. MARKING

5.1 The Container/Packs shall be marked with the following particulars.

i. Name of the material in block letter e.g. “COOKING OIL” Blended.
ii. Name and address of the manufacturer.
iii. Date of manufacture and Date of expiry
(PS:4449 sExpiration periods for food product shall be strictly followed).
iv. Net volume of the content in litre and weight of Tin Container in gm/kg.
v. The name of each oils hall be declared on the ingredients list in decending order according to the percentage of each.
vi. The words contain Vitamin-A 33000 I.U. to 45000 I.U. and Vitamin-D_3 3000 I.U. to 4500 I.U. per kg of the finished product when packed.
vii. Pakistan Standard Number, PS Mark and licence number
viii. Storage conditions.
ix Product shall be labelled in accordance with the Pakistan Standard for Labelling of Prepackaged Foods (PS: CXS 1-2021), in addition to category specific labelling / marking requirement(s).

TABLE – 1
REQUIREMENTS FOR COOKING OIL (BLENDED)

S.No.	CHRACTERISTIC	LIMITS
1.	Moisture matter volatile percent by wt. max.	0.1
2.	Insoluble impurities percent by weight, Max.	0.05
3.	Matter volatile at 105°C	Not more than 0.2%
4.	Free Fatty Acid (as oleic acid) percent by weight, max.	0.2
5.	Unsaponifiable matter percent by weight, max.	1.50
6.	Saponification value. Mg KOH/g	185 to 196
7.	Colour in a 5¼ inch cell on a lovibond scale max.	* R - 5.0 Y - 50.0
8.	Peroxide value, expressed as in eq. oxygen per kg, max.	10
9.	Anisidine Value max / ***Rancidity (Kries Test)	3.0 R
8.	Cloud point max.	$10^{O}C$
9.	Vitamin-A	33000 I.U. to 45000 I.U per kg of the finished product.
10.	Vitamin-D_3	3000 I.U. to 4500 I.U. per kg of the finished product.
11.	Iodine value (Wijs) min.	80
12.	Soap content, ppm.max.	50
13.	Iron (Fe)	Not more than 1.5 mg/kg
14.	Copper (Cu)	Not more than 0.1 mg/kg
15	Lead (Pb)	Not more than 0.1 mg/kg
16.	Arsenic (As)	Not more than 0.1 mg/kg

* Colour produced in Kries Test shall be interpreted along with Peroxide Value and shall be sensory test as negative. If the colour is not deeper than 3.0 R 1 inch cell lovibond scale.

NOTE: Vitamin-A & D_3 in Bulk Oils on Import Stage is not necessary.

6. SAMPLING

6.1 Representative samples of the material shall be drawn as prescribed in PS-56-1996.

7. TESTS

7.1 The relevant testing methods of ISO, CAC, and of other internationally recognized standard methods, may be taken in to account for analysis purpose.

7.2 Quality of reagents:- Unless specified otherwise analytical grade chemical and distilled water (PS-593) shall be used in tests.

NOTE:- Analytical grade chemical shall mean chemical that do not contain impurities which affect the result of analysis.

ANNEXURE –
A

RANCIDITY KRIES TEST-QUANTITATIVE

1. **Principle.**

The sample is reacted with phloroglucinol in diethyl ether solution. When the products are extracted with hydrochloric acid a red aqueous solution is obtained if the material is rancid. The colour is measured by means of a colour comparator or colorimeter, and the results are expressed in red units on the Lovibond scale.

2. **Reagents.**

The following reagents are required.

2.1 Phloroglucinol solution, 1 g/1 in diethyl ether. It is essential to prepare the solution on the day of use.

2.2 Hydrochloric acid, concentrated, 36% (m/m), 11 N.

3.0 Apparatus.

The following apparatus is required.

3.1 Colour comparator or colorimeter.

NOTE:- It is essential to maintain the colour matching apparatus in good condition in accordance with the manufacturer's instructions.

3.2 Glass cell, 1 inch (25.4 mm) light path.

4. Sampling & preparation of the sample for analysis.See (PS-56)

4.1 **Procedure**

Weigh, to the nearest 0.01 g, 0.8 g to 10.2 g of the sample into a 100 ml beaker. Melt the sample on a water bath to a temperature not more than 10^{o} C above its melting point and whilst stirring gently add 20 ml of the phloroglucinol solution (2.1) to dissolve the sample, taking care because of the flammable nature of the warm solvent.

Transfer the solution to a 100 ml separating funnel, add 10ml of hydrochloric acid (2.2) and shake well. Allow the mixture to settle into two phases, then run off the acid phase into a 1 inch (25.4 mm) glass cell.

CAUTION: Take great care when shaking and handling mixtures of warm ether and hydrochloric acid. Wear eye goggles and perform the operations behind a safety screen.

Read the colour of the solution in the comparator using yellow, red, and, if necessary, blue slides in order to obtain the best match.

4.2 **Expression of results:**

Express the rancidity index as units on the red Lovibond scale; the equivalent CIE (Commission International de 1'Eclairage) colour co-ordinates using CIE standard illuminant B are as shown in table –2.

Table –2 Equivalence of CIE colour coordinates to Lovibond units.

Lovibond unit	CIE co-ordinates		
	x	x	x
0.1 red	0.348	0.351	0.300
3.0 red	0.380	0.327	0.293
8.0 red	0.430	0.262	0.308
20.0 red	0.543	0.298	0.159
20.0 yellow	0.449	0.494	0.057
10.0 blue	0.201	0.184	0.615

A very faint red colour does not necessarily denote rancidity. A colour up to 3 red units is considered to indicate incipient rancidity. A colour between 3 and 8 red units is considered to indicate rancidity towards the end of the induction stage. Over 8 red units is considered to indicate definite rancidity.
For dark-coloured or green fats the above does not necessarily apply because of interference by water-soluble colouring matter in the material.

Before judging a fat, it is advantageous to have some knowledge of the history of the material under test.

NOTE: Rancidity develops rapidly: therefore once the induction period is well established, it is necessary to adhere to an agreed time of testing when comparing results obtained by sellers and buyer's premises and the date and time noted on the test certificate. The seller should be notified the same day.

5. **Test Report.**

See PS-56

ANNEXURE – B.
DETERMINATION OF CLOUD POINT

DEFINITION

The cloud point is that temperature at which, under the conditions of this test, a cloud is induced in the sample caused by the first stage of crystallization.

SCOPE

Applicable to all normal animal and vegetable fats.

APPARATUS

1. Oil sample bottle –115 mL (4 oz).
2. Thermometer – range – 2 – 68 ^{0}C, AOCS Specification H 6 – 40.
3. Water bath – made up of water, chipped ice and water; or chipped ice, salt and water, depending on the temperature required. The temperature of the cloud point bath shall not be less than 2 ^{0}C, nor more than 5 ^{0}C below the cloud point. Either a beaker or insulated container is convenient for the test.

PROCEDURE

1. The sample must be completely dry before making the test. If the sample contains traces of moisture, it should be filtered through suitable filter paper. Heat 60 – 75 g of sample to 130 ^{0}C (see Notes, 1) just before making the test.

2. Pour 45 ml of the heated fat into the oil sample bottle. Begin to cool the bottle and contents in the water bath, stirring enough to keep the temperature uniform. When the sample has reached a temperature about 10 ^{0}C above the cloud point, begin stirring steadily and rapidly in a circular motion so as to prevent super cooling and solidification of fat crystals on the sides or bottom of the bottle.

3. From this point on, do not remove the thermometer from the sample; doing so may introduce air bubbles which will interfere with the test. The test bottle is maintained in such a position that the upper level of the sample in the bottle is level with the water in the bath.

4. Remove the bottle from the bath and inspect regularly. The cloud point is that temperature at which that portion of the thermometer immersed in the oil is no longer visible when viewed horizontally through the bottle and sample.

NOTE:

1. It is essential that the sample be heated to 130°C to destroy any crystal nuclei.