



Technical Specifications for the manufacture of:

Fortified Refined Flaxseed Oil
-FLAXSEED OIL-

Specification reference: **Flaxseed Oil**

Version: **2.0**

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1. INTRODUCTION

1.1 Product type

Flaxseed Oil (or Linseed oil) is derived from the dried ripe seeds of the flax plant (*Linum usitatissimum*, Linaceae). **Flaxseed Oil** distributed by WFP is fortified with vitamin A and vitamin D in proportions described in product specifications.

1.2 Standards and recommendations

Flaxseed Oil shall be manufactured in accordance with: “Recommended International Code of Practice: General Principles of Food Hygiene”, CAC/RCP 1-1969 Rev 3 1997 Amended (1999) including Annex “Hazard Analysis and Critical Control Point (HACCP) System and Guidelines for its application”.

2. RAW MATERIALS

2.1 Flaxseed

The flaxseed utilized for oil production shall have good quality.

2.2 Vitamins

Fortified vitamins (vitamin A and D) shall conform to Codex Standard CAC/GL 09-1987- General principles for the addition of essential nutrients to foods.

Vitamin premix should be purchased from a WFP approved suppliers: BASF (Stern Vitamin), DSM, Fortitech, Nicholas Piramal, Hexagon Nutrition or their authorized dealers and GAIN premix facility. Addresses of premix suppliers are on <http://foodquality.wfp.org>

Vitamin premix must be stored in a dry, cool and clean place where the temperature is a maximum of 25°C.

3. PROCESSING

Fortified **Flaxseed Oil** production must respect the national and international code practice for processing of this commodity.

For compliance with Codex standards, the processor must be able to demonstrate by principle and practice the adoption, implementation and recording of:

- Good Manufacturing Practice
- Hazard Analysis Critical Control Point program

In this context an appointed WFP Inspector / Quality Surveyor is entitled to visit the factory without prior notice during any period when WFP product is being manufactured to check that the GMP and HACCP systems are in place. The Inspector / Quality Surveyor may request to see:

- **Records** (i.e. names of people in charge of the process and quality control, temperatures of the process, mixing times / quantity, cleaning schedules, etc).
- **Procedures** (e.g. cleaning, personnel hygiene, HACCP, sampling and analysis).
- **Instructions** (e.g. process instructions, cleaning instructions).
- The **quality manual** for the process or factory.

The producer must be *registered under national food law* as a processor of foods for human consumption. In addition, the producer must have a *legal authorization* to produce this commodity in the country where the factory is located.

4. PRODUCT SPECIFICATIONS

4.1. Main requirements

Specification	Recommended value
Organoleptic	Neutral/bland taste; absence of foreign odours and flavours
Moisture and volatile matter	0.2% maximum
Insoluble impurities	0.05% maximum
Acid value	0.6 mg maximum of KOH/g oil
Color	4 Garner Color Scale
Soap content	0.005% maximum
Peroxide value	2 milliequivalents maximum of active oxygen per kg of oil
Melting point	-20°C maximum
Saponification value	188-195 mg KOH per g oil
Iodine value	155-205 g per 100g oil
Unsaponifiable matter	1.5% maximum
Refractive index (ND 40 ⁰ C)	1.478 – 1.483
Relative density (40 ⁰ C/water at 23 ⁰ C)	0.924-0.931
Authorized additives	
- <i>Butylated hydroxyanisol</i>	- 175 mg/kg maximum
- <i>Butylated Hydroxytoluene</i>	- 75 mg/kg maximum
Vitamin A	24000– 36000 UI per kg oil
Vitamin D	2400 – 3600 UI per kg oil

4.2 Additional Requirements

Flaxseed Oil shall meet the following additional requirements:

Shelf life: it shall retain above qualities for at least one year from date of manufacture when stored dry at ambient temperatures prevalent in the country of destination

Safety: it shall be free from objectionable matter; not contain any substances originating from micro-organisms or any other poisonous or deleterious substances such as anti-nutritional factors, heavy metals or pesticide residues, in amounts which may represent a hazard to health.

- Heavy metals
 - Lead (Pb) Max 0.1 ppm
 - Arsenic (As) Max 0.1 ppm
 - Iron (Fe) Max 1.5 ppm
 - Cooper (Cu) Max 0.1 ppm
- Polycyclic Adromatic Hydrocarbures (PAH)
 - PAH heavy Max 5 ppb
 - PAH total Max 25 ppb
 - Benzo(a)pyrene Max 2 ppb
- Free from radioactivity
- Free from Genetically Modified Organisms (GMO) (*if required by the contract*).

5. PACKAGING

Flaxseed Oil can either be packaged into 3 to 5 liters jerry cans or bottles of 1 to 1.5 liters, to constitute the primary packaging. The secondary packaging is cartons to facilitate transportation and storage.

5.1 Primary packaging

Jerry cans

The plastic containers must be of High Density Polyethylene (HDPE), with heat-sealed membranes and screw-top lids. They shall be made by blow-molding and be seamless so that they can not leak (except at the closure) unless ruptured. The containers must be suitable for foodstuffs, have stoppers fitted with safety devices and must be hermetically sealed. The containers shall have two flat walls, a built-in handle and a screw top.

Specifications:

- Material: HDPE
- Color: white/translucent
- Net weight per empty jerry can: 200 gm minimum for 5 liters jerry cans.
- Rated capacity: 3.0 or 5.0 liters
- Screw cap with inner plug
- Typical wall thickness: 1.0 mm (middle of side panels)

PET bottles

Bottles for **Flaxseed Oil** must be made of Polyethylene Terephthalate (PET). They shall be hermetically closed thanks to a safety device. PET bottles shall be suitable for foodstuff, clean and free from any abnormal odor.

5.2 Carton

Bottles and jerry cans are disposed into cartons.

They should be new, strong cardboard cartons containing either 4 to 6 jerry cans of 3 to 5 liters or 12 to 15 bottles of 1 or 1.5 liters.

Cartons should be manufactured from well constructed single wall, luted paper, corrugated board with a specific weight of approximately 750 grams per square meter. This specific weight corresponds to a carton weight of approximately 560 grams for golding.

- Cartons should have burst strength (edge crush test) of approximately 44 pounds per square inch or 3.2 kg/ cm² or equivalent.
- Carton seams should be glued.
- Substance of cartons 275-120-275 (750 grams per m²).

Dunnage of strong sheets, plywood has to be placed inside each container at every three layer of cartons to provide the required stacking strength.

6. MARKING

6.1 On jerry cans or bottles.

The following information should be available on bottles and cans

- Name of the product:
- Net content:
- Name and address of the supplier (including country of origin).
- Batch number (or SI).
- Production date.
- Additional marking as per contractual agreement.

6.2 On cartons

The following information should be available on each carton:

- Name of the product:
- Number of unit per carton
- Name and address of the supplier (including country of origin).
- Production date.
- Additional marking as per contractual agreement.

7. STORING

Flaxseed Oil must be stored under dry, ventilated and hygienic conditions.

8. ANALYTICAL REQUIREMENTS

Table 1: List of compulsory tests and reference methods

Nº	Test	Recommended value	Reference method*
1	Organoleptic	Neutral/bland taste; absence of foreign odours and flavours	
2	Moisture and volatile matter	0.2% maximum	ISO 662:1998 AOCS Ca 2d-25 IUPAC 2.601
3	Insoluble impurities	0.05% maximum	ISO 663:2007 AOCS Ca 3a-46 IUPAC 2.604
4	Acid value	0.6 mg maximum of KOH/g oil	ISO 660:2009 AOCS Cd 3d-63
5	Color	4 Garner Color Scale	ASTM D234 ISO 4630-1,2
6	Soap content	0.005% maximum	AOCS Cc 15-60 BS 684 Section 2.5
7	Peroxide value	2 milliequivalents maximum of active oxygen per kg of oil	ISO 3960:2007 BS 684-2.14:2001 AOCS Cd 8-53 AOAC 965.33 IUPAC 2.501
8	Melting point	-20°C maximum	AOAC 920.156 ISO 6321:2002
9	Saponification value	188-195 mg KOH per g oil	ISO 3657:2002 AOCS Cd 3-25
10	Iodine value	155-205 g per 100g oil	ISO 3961:2009 AOAC 993.20 IUPAC 2.205
11	Unsaponifiable matter	1.5% maximum	ISO 18609:2000 ISO 3596:2000 AOCS Ca 6a – 40 IUPAC 2.401
12	Refractive index (ND 40°C)	1.478 – 1.483	ISO 6320:2000 AOCS Cc 7-25 AOAC 921.08, IUPAC 2.102
13	Relative density (40°C/water at 23°C)	0.924-0.931	AOCS 10c-95 IUPAC 2.101
14	Vitamin A	24000– 36000 UI per kg oil	
15	Vitamin D	2400 – 3600 UI per kg oil	

* or equivalent