

# Technical Handbook on Edible Oil Fortification



**FORTIFIED**

**SAMPOORNA POSHAN  
SWASTH JEEVAN**



**Food Fortification  
Resource Centre**

[www.ffrc.fssai.gov.in/fortification](http://www.ffrc.fssai.gov.in/fortification)



  
FOOD SAFETY AND STANDARDS  
AUTHORITY OF INDIA

*Inspiring Trust, Assuring Safe & Nutritious Food*  
Ministry of Health and Family Welfare, Government of India



## FORTIFICATION

Food fortification is the addition of vitamins and minerals to a staple food or any other food that is consumed in fairly consistent and sufficiently large amounts. Generally, food fortification is undertaken at the industrial level, although food fortification can also take place at the household or community levels.

### WHY FORTIFY EDIBLE OILS AND FATS?

Recent National Nutrition Monitoring Bureau (NNMB) survey and a Report of the expert group of ICMR in 2012 has stated that India has very high burden of Vitamin A and D deficiencies, amongst both young children and adults particularly in urban areas are physically less active and have a very limited exposure to sunlight.

Since oil is consumed by all population groups, fortification of oil with certain micronutrients is a good strategy to address micronutrient malnutrition.

### ADVANTAGES OF FORTIFYING OIL

- A safe and effective means of improving public health
- Excellent vehicle for adding nutrients to the diet as consumption of oil is among all the population groups and is reasonably high
- Cost effective method to address the nutritional deficiencies.

### COST OF FORTIFICATION

It involves: 1) Fixed Cost (Equipment cost, laboratory setup if required by Food Business Operator, FBO)

2) Variable cost (Cost of premix, sample testing at a defined frequency)

The cost of fortification of oil with Vitamin A and D is minimal i.e. 8-10 paise per litre of oil. Including cost of premix and sample testing.

### STANDARDS FOR FORTIFICATION OF VEGETABLE OIL

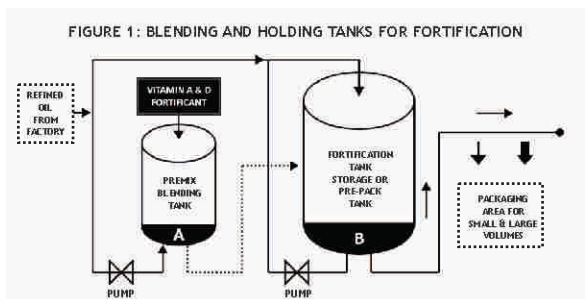
Vegetable Oil may be fortified with the following micronutrients, singly or in combination, at the level given in the table below:

Nutrient	Minimum Level Of Micronutrient	Source of Nutrient
Vitamin A	25 IU per gram of oil	Retinyl acetate, Retinyl palmitate and Retinyl propionate
Vitamin D2	4.5 IU per gram of oil.	Ergocalciferol, Cholecalciferol

### PROCESS OF OIL FORTIFICATION

The Process of oil fortification is very simple and easily achievable. The fortificants can be uniformly distributed in the oil without the need for elaborate equipment. The premix can be added directly to the holding/ churning tank (Tank B) as shown in Figure 1 or it can be diluted outside in a container and then can be added directly to the churner /Main Tank.

Dosing technology for adding anti-oxidants and other micro ingredients to oil is routine.



For most of the oils, a temperature of 40-50°C is required to ensure uniform mixing except soybean oil (less than or equal to 25°C). Minimal adjustments are required to add Vitamin A, D, and E.

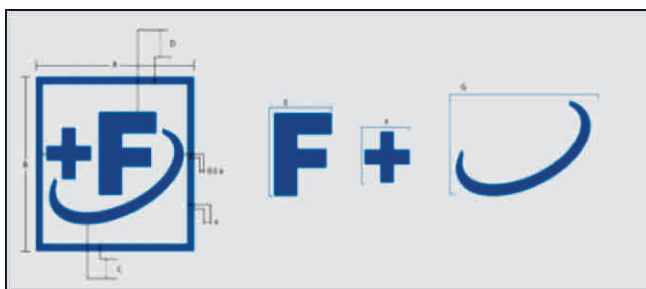
### PACKAGING AND LABELLING REQUIREMENTS

- All fortified food shall be packaged in a manner that takes into consideration the nature of the fortificant added and its effect on the shelf life of such food.
- Every package of fortified food shall carry the words “fortified with ..... (Name of the fortificant)” and the logo, as specified in the Schedule II of these Regulations, on the label.
- All other provisions under the Food Safety and Standards (Packaging and Labelling) Regulations, 2011, shall also apply to the fortified foods.
- All manufacturers and packers of fortified food complying with the provisions of the Act and rules or regulations made thereunder on fortified food shall be permitted to make a nutrition claim in relation to an article of fortified food under regulation 2.2.2(3) of the Food Safety and Standards (Packaging and Labelling) Regulations, 2011.

All dimensions in mm

A	B	C	D	a	E (w*h)	F(w*h)	G(w*h)
20	20	2.2	3.1	0.8	7.27*9.51	5.67*5.84	16.98*10.93
40	40	4.4	6.3	1.7	14.54*19.03	11.35*11.68	33.96*21.87
80	80	8.9	12.5	3.4	29.08*38.07	22.7*23.36	67.92*43.75
160	160	17.9	25.4	6.9	58.17*76.14	45.39*46.72	135.85*87.5
320	320	35.6	50.6	13.8	116.35*152.29	90.77*93.44	275.25*175.01

### TECHNICAL SPECIFICATIONS FOR THE CHURNS AND THE OIL FORTIFICATION PROCESS TECHNICAL SPECIFICATIONS OF CHURNS



### QUALITY ASSURANCE/QUALITY CONTROL

- Quantitative determination of vitamins A and D : “HPLC” (every 6 months minimum)
- Qualitative estimation : “Antimony trichloride test” (Batch wise)
- Record keeping of all the reports
- Central Quality Assurance Audit
- Central Analytical Laboratory (NABL Accredited )
- External Laboratory approved by FSSAI

### HANDLING AND STORAGE OF PREMIX

Premix bottles should be stored in safe, cool, clean and dark place away from chemical products or other potential contaminants.

- Follow “first-in, first-out” system.
- Temperature of premix in bottle should not be more than 23° to 32° C
- Avoid direct touch, inhaling, and direct consumption of premix.

S. No.	SPECIFICATION	5 TON CHURN	10 TON CHURN
1	THICKNESS OF PLATE OF CYLINDER	5 MM	8 MM
2	DIAMETER OF THE CYLINDER	1.65 Meter	2.0 METER
3	HEIGHT OF THE CHURN SHELL (H=2D)	3.30 Meter	4.0 METER
4	VOLUME OF THE CHURN	7.1 KL	14.2 KL
5	CONE HEIGHT AND VOLUME EXTRA	YES	YES
6	AGITATOR, = 1/2 D,	YES	YES
7	AGITATOR SYSTEM	5.0 HP	7.5 HP
8	VITAMIN ADDING FUNNEL	YES	YES
9	COVERING OF CHURN, 1/3 FLIP TOP	YES	YES
10	OIL INLET , NEAR BOTTOM WITH VACUUM BRACKING SYSTEM	YES	YES
11	LUG SUPPORT, WITH OUT COLUMN	YES	YES
12	WORKING PLATFORM OF CHEQUERED PLATE , 0.75 METER WORKING AROUND THE DIAMETER, WITH SUPPORT ON CHURN WITH RAILING AND STAIRS	YES	YES



## Food Fortification Resource Centre

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*A forum to promote good health & improved quality of life*

The Food Safety and Standards Authority of India (FSSAI) has established a Food Fortification Resource Centre (FFRC), within FSSAI, as a "Resource Hub" to focus on:

- Building consensus and engaging all stakeholders and sharing innovations on food fortification.
- Fostering knowledge on food standards and food safety technology and processes, premix and equipment procurement, quality assurance and control.
- Building the capacity for strengthening 'Regulatory Monitoring'.
- Providing evidence based policy recommendations for scaling up staple foods fortification in the public funded programmes like the PDS, ICDS and MDM
- Promoting awareness on good nutrition, fortification and creating markets for fortified foods.

### Food Fortification Resource Centre (FFRC)

- Encourages food industry to adopt food fortification as an industry norm.
- Systematically synchronizes the efforts to
  - Strengthen collaborations.
  - Catalyse consensus building between government, industry partners and academia.
  - Move the agenda of food fortification, as a part of its obligation to support availability of safe and 'wholesome' foods.

## FOOD SAFETY & STANDARDS AUTHORITY OF INDIA

FDA Bhawan near Bal Bhavan, Kotla Road, New Delhi - 110002 India.

EPABX : 011-23236975

Telefax: 011-23220994

Tollfree Number: 1800112100

[www.fssai.gov.in](http://www.fssai.gov.in)