**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 MILK?**
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.

During processing of standard, toned and double toned milk, the removal of fat leads to removal of vitamin A, which is a fat soluble vitamin. Therefore it becomes needful to add vitamin A back into the milk. Milk is also a good source of naturally present calcium and phosphorus. These are important for bone and teeth development. Since vitamin D is needed to help the calcium absorption, fortifying milk with additional vitamin D is highly beneficial.

Since milk is consumed by all population groups, fortification of milk with micronutrients such as vitamin A and D, is a good strategy to address micronutrient malnutrition of these micronutrients.

**ADVANTAGES OF FORTIFYING MILK**
- Milk fortification is a safe and effective means of improving public health.
- Fortified milk is an excellent vehicle for adding nutrients to the diet as milk is commonly consumed by all people. Its consumption by children is reasonably high.
- Cost effective method to prevent nutritional deficiencies.
- Vitamin A and D that are added to milk, help to improve body's immunity against infections, improve vision and help to make the bones strong.

**COST OF FORTIFICATION**
It involves:
1) Fixed Cost (Equipment cost, laboratory setup if required by the Food Business Operator)
2) Variable Cost (Cost of premix, sample testing at a defined frequency)

For fortifying milk using water-miscible premix of vitamin A and D, no additional equipment is required. The cost of premix is less than Rs 0.02 or 2 paisa per litre of milk. The cost of sample testing for fortification at a defined frequency is less than Rs. 0.03 or 3 paisa per litre. Hence fortification of milk is a very cost-effective strategy for providing vitamin A and D to all population groups.

**STANDARDS FOR FORTIFICATION OF MILK**
Standard, toned, double toned or skimmed milk may be fortified with the following micronutrients, singly or in combination, at the level given in the table below:

<table>
<thead>
<tr>
<th>S. No.</th>
<th>Nutrient</th>
<th>Minimum Level of Micronutrient per liter of toned/ double toned/ skimmed milk</th>
<th>Source of Nutrient</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Vitamin A</td>
<td>770 IU</td>
<td>Retinyl acetate, Retinyl palmitate and Retinyl propionate</td>
</tr>
<tr>
<td>2.</td>
<td>Vitamin D</td>
<td>550 IU</td>
<td>Cholecalciferol, Ergocalciferol</td>
</tr>
</tbody>
</table>
**PROCESS OF MILK FORTIFICATION**

The process of milk fortification is very simple and easily achievable. The fortificants are water soluble and can be uniformly distributed in the milk without the need for elaborate equipment. The premix can be added directly to the balance tank before pasteurization as shown in figure 1. This is a routine process in milk processing.

![Batch Mixing Process and Continuous Mixing Process](image)

**LABELLING REQUIREMENTS**

- Every package of fortified milk shall carry the words “Fortified with Vitamin A and Vitamin D” 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 milk, such as Ingredient declaration and Nutritional Information.
- All processors and packers of fortified milk 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.

![Logo Specifications](image)

Details of logo specifications: [http://ffrc.fssai.gov.in/fortification/jsp/logo.jsp](http://ffrc.fssai.gov.in/fortification/jsp/logo.jsp)
QUALITY ASSURANCE/QUALITY CONTROL
- Quantitative estimation of:
  - Vitamin A: AOAC 2011.07
  - Vitamin D: AOAC 995.05
- Qualitative estimation of Vitamin A: “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” (FIFO) system.
- Temperature of premix in bottle should not be more than 23°C to 32°C.
- Avoid direct touch, inhaling, and direct consumption of premix.

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.