

NOTE ON MILK FORTIFICATION

A. BACKGROUND

Micronutrient deficiency is the consequence of a diet lacking in essential vitamins and minerals and continues to pose a major public health problem for populations of many low-and middle-income countries.

One of the solutions to address micronutrient deficiencies is Food Fortification- a cost effective and complementary strategy that has helped virtually eliminate many nutrition disorders from the more industrialized countries in the world. It also serves as a useful tool to address the issue as it reaches out to a wider at-risk population through the existing food delivery systems.

Milk is one of the most nutritious foods. It is a staple food in India which is consumed by almost all age groups. Milk is a good carrier for fortification because vitamin A and D are fat soluble. Vitamin D promotes and aids in calcium absorption. Therefore, to make the best absorption of calcium from milk, it is important to have Vitamin D for better absorption of calcium.

B. SCIENTIFIC EVIDENCE

Global evidence states that mandatory milk fortification legislation was first introduced in 1935. Currently, there are fourteen countries that have mandated milk fortification. Eleven of the fourteen countries fortify milk with both Vitamin A and D. Costa Rica is additionally fortifying with iron and folic acid. China and Canada are adding calcium, in addition to Vitamin A and D.

A recent research studied the effects of fortified milk on morbidity in young children in north India. The results showed that regular intake of fortified milk resulted in 18 percent lower incidence of diarrhea, 26 percent lower incidence of pneumonia, 7 percent fewer days with high fever and 15 percent fewer days sick with severe illness¹.

C. 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.

D. MILK INDUSTRY STRUCTURE IN INDIA

Total milk produced in India is 4380 LLPD (Lakh Litres Per Day) in which 1300 LLPD is contributed by organised sector and 70% is contributed by unorganised sector. Total fortifiable milk (liquid milk) is

¹ Sunil Sazawal et. al. Effects of fortified milk on morbidity in young children in north India: community based, randomised, double masked placebo controlled trial, BMJ. 2007 Jan 20; 334(7585): 140. Source <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC1779825/>

produced by organised sector is 410 LLPD including private dairies and cooperatives. Until later 2018, 21.53% of the milk produced by the organised sector is fortified.

E. TECHNOLOGY 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. It can be done in any of the two ways either Batch mixing process or Continuous mixing process.

F. ROLE OF MILK FORTIFICATION IN PREVENTING VITAMIN A AND D DEFICIENCY

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. 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.

G. FSSAI CREATED AN ENABLING ENVIRONMENT

FSSAI has released the Standards for fortification of Standardised, Toned Milk, Double Toned, Skimmed Milk or Standardised Milk. As per the FSSAI standards, milk needs to be fortified with Vitamin A and D at a level of 270 µg RE - 450 µg RE per litre and 5 µg -7.5 µg per litre, respectively.

3. Fortified Milk

Toned, double toned, skimmed milk or standardized milk, when fortified, shall be fortified with the following micronutrients, at the level given in the table below:

Sl. No.	Nutrients	Level of nutrient per litre of toned/double toned/skimmed milk/ Standardized Milk	Source of nutrient
1.	Vitamin A	270 µg RE - 450 µg RE	Retinyl acetate or Retinyl palmitate
2.	Vitamin D	5 µg -7.5 µg	*Cholecalciferol or *Ergocalciferol (*Only from Plant source)

Note: Vitamin A (retinol): 1 IU= 0.3 µg RE (Retinol Equivalent); Vitamin D (Cholecalciferol or Ergocalciferol): 1 IU= 0.025 µg

Source: Fortification regulations

FSSAI has also notified a logo, called the +F for easy recognition of the fortified products.

Some of the dairy players who are currently fortifying their milk variants as per FSSAI standards are:

Dairy Cooperatives

1. Chhattisgarh State Co -Operative Marketing Federation Ltd. Devbhog
2. Delhi Milk Scheme (DMS) DMS
3. Haryana Dairy Development Cooperative Federation Ltd. Vita
4. Jharkhand State Cooperative Milk Producers Federation Ltd. Medha
5. Maahi Milk Producer Company Ltd. Maahi
6. Madhya Pradesh State Cooperative Dairy Federation Ltd. Sanchi
7. Mother Dairy Fruit & Vegetable Pvt. Ltd. Mother Dairy
8. Odisha State Cooperative Milk Producers' Federation Ltd. OMFED
9. Punjab State Cooperative Milk Producers Federation Ltd. Verka
10. Rajasthan Cooperative Dairy Federation Ltd. Saras
11. West Assam Milk Producers' Cooperative Union Ltd. Purabi
12. Uttarakhand State Dairy Coop. Federation Ltd.
13. Bihar State Milk Co-operative Federation Ltd. Sudha
14. Pradeshik Cooperative Dairy Federation Ltd. Parag
15. Karnataka Milk Federation
16. Nalagonda Milk Union
17. Maharashtra Rajaya Sahakari Dugdh Mahasangh Maryadit Mahanand Dairy
18. Krishna Milk Union

Private Dairies

1. Britannia Industries Ltd.
2. Creamline Dairy Products Ltd.
3. Dairy power Ltd.
4. Goma Foods Pvt. Ltd.
5. Heritage Foods Ltd.
6. Kwalitiy Ltd.
7. Milky Moo PAN
8. Nestle India Pvt. Ltd.
9. Uttar Pradesh Pradeshik Cooperative Dairy Federation Ltd.
10. Sunfresh Agro Industries Pvt. Ltd.
11. Prabhat Dairy Uttar
12. VRS Foods Pvt. Ltd.

H. COST OF MILK FORTIFICATION

The incremental cost of fortification is ~ 2 paise per litre of milk. Thereby, making it a cost effective, sustainable and supplementary intervention.