

Food Fortification- An Overview

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One-third of the global population suffer from micro-nutrient deficiencies or hidden hunger. It is a major threat to public health both in developed and developing countries. For a nation to prosper, the population needs to have access to safe and nutritious food. With the absence of a balanced diet, lack of variety in the diet or unavailability of food, one does not get adequate micronutrients. This hinders the growth and development of the individual. One of the strategies to address this problem is the fortification of food. This method serves as a channel to reduce nutrient deficiencies prevalent in various staple foods. Food Fortification is a process of addition of one or more micronutrients to the food for improving the quality of the food and making it healthier. Nutrients like Iron, Iodine, Zinc, Vitamins A & D are widely added to staple foods such as rice, wheat, oil, milk and salt to improve their nutritional content. It is a cost-effective, safest and sustainable way to fight micronutrient deficiency. The substance that is added to the food to provide micronutrients in the process of fortification is known as fortificant and the resultant food that has undergone the process of fortification is called fortified food.

Food Fortification includes commercial and industrial fortification, bio-fortification and home fortification. Commercially available foods are fortified by extracting micronutrients through microbial fermentation or chemical synthesis during manufacturing. This method is called commercial and Industrial fortification. Foods like cooking oil, flour, butter, sauce, etc. are fortified by using this method. Bio-fortification is a modern agricultural practice followed to increase the nutritional value of the crop. This is done through genetic engineering or traditional breeding techniques. Golden rice is a popular example of bio-fortificant which contains twice the amount of iron and beta-carotene in it. Home fortification on the other hand uses micronutrient supplements like spreads, powders, crushable/ soluble tablets to add nutrient to our food. Vitamin D drops and micronutrient powders which we get from the markets are home fortificants.

For fortification, we should consider that when the fortified food is consumed by the target population, its consumption will not lead to toxicity, it does not alter the properties like taste, flavour, colour and shelf-life of the food, it is cost-effective and is monitored and controlled centrally.

FSSAI ensures that quality additions should be assured by manufacturers before the sale of the product. It suggests fortifying only 30-50 % food. The label of all the fortified foods should possess the name of the fortificants and the symbol (+F) on their food packages. Foods fortified with iron should have printed the following lines- "not recommended for people with thalassemia and people on a low iron diet".

According to FSSAI regulations, 2018, the following food is popularly fortified in India

FOOD	MICRONUTRIENT
Wheat flour	iron, folic acid, vitamin B-12
Rice	iron, folic acid, vitamin B-12
Double fortified salt	Iron, iodine
Edible oil	vitamin-A, vitamin-D
Milk	vitamin A, Vitamin- D

History of food fortification

Food fortification, though not popular in the earlier times, is not a new concept. Back in the time before World War-2, US used iodised salt. In 1938, this method gained prominence in the USA when Niacin was added to bread. In the early 50s, vitamin-D was added to Margarine in Denmark. Later, it entered India in 1953 with the addition of vitamin-A and vitamin-D in Vanaspati, followed by iodised salt in 1962. In the mid-1960s, folic acid was added to bread to prevent neural tube defects in infants. Over the last three decades, fortification of food became a public health measure for preventing deficiencies of vitamin-A, iron, folic acid and iodine.

Need for Food Fortification



About 70 % of people in India do not consume enough micronutrients. This serves as a gateway to several health risks like Anaemia, Neural tube defects (NTDs) and Blindness which affect over 2 billion people worldwide. Children and women of reproductive age specifically require adequate iron, folic acid, Vitamin A and zinc. Women of reproductive age and children less than two years specifically need iron, folic acid, vitamin A and zinc. These nutrient deficiencies can lead to increased mortality among mothers and children. Hence, micronutrients are crucial for human development and food fortification serves to a greater extent to reduce the deficiency.

Food Fortification in India

Multiple micronutrient deficiencies are widespread in the Indian subcontinent. This serves to be a major setback for the Indian economy as it adversely impacts the health and productivity of the population. ICMR (2012) report briefs that vitamin A and D deficiencies are most prevalent amongst both young children and adults in India. According to the National Family Health Survey (NFHS-5), 68.4% of children (6-59 months) are anaemic, 54.2% of women in the reproductive age group are anaemic and 32.8% of children under five years age are underweight. This shows the need for healthy and nutritious food. National Nutritional Strategy-2017 identified food fortification as a key to address anaemia, vitamin A and iodine deficiency.

In India, food fortification is promoted widely through the Integrated Child Development Scheme (ICDS), Mid-day meal scheme (MDMS) and Public Distribution System (PDS). The Union ministries of women and child development, Human Resource Development and Consumer Affairs, Food and Public Distribution have mandated the distribution of fortified food (wheat flour, rice, oil and double fortified salt) through the above schemes. This would help to reduce various disorders caused by micronutrient deficiency among the vulnerable community.

Advantages and Limitations of Food Fortification

Food fortification is a sustainable approach and has several advantages as the nutrients added are under Recommended Daily Allowance (RDA) and the process is well regulated and safe, it is cost-effective, keeps the whole community healthy by providing micronutrients through



staple food and does not require any changes in eating patterns or food habits. Fortified food does not alter the characteristics of the food and can be introduced quickly through nutrient spreads, tablets and powders. It helps to curb various micronutrient deficient disorders like anaemia, night blindness and reduce the mortality rate in children and reproductive-age women.

Contrary to this, there are few limitations too. Fortified foods, not alone can curb the malnutrition especially for the population groups consuming less amount of food like children, infants or elderly population. fortified food also fails to address the problem of multiple deficiencies seen especially in low-income strata and becomes difficult for the poor to access it.

Besides, most nutrients are lost in processed food due to temperature or storage conditions. Some reports say that prolonged cooking of fortified foods leads to 90 % loss of Vitamin C. The process is challenging as it needs regular quality control. So, fortified food is not the sole solution to depend on.

Conclusion

Fortification is a globally proven method to address micronutrient deficiencies particularly among low-income population groups in a short time. With its impeccable properties and vigilance by the food authorities, it appears as the best option to reduce the nutrient deficiencies. But, it alone cannot combat this universal plight.

Food fortification is not a long term solution. It is only a step towards reducing the prevalence of these deficiencies and their associated health conditions. For long term results, dietary diversity is essential to reduce micronutrient malnutrition. Legislations should work to bridge the gaps to curb malnutrition by formulating strategies, implanting the policies and regular feasibility tests.