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Milk Fortification

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ARTICLE ID: 001

Abstract

Fortification may be defined as the addition of one or more essential nutrients to food product (milk) which are not present in them naturally to overcome deficiency and related disorders. Milk fortification is basically done with elements such as zinc, iron, folic acid, etc. In the US, milk is mainly fortified with vitamin A & vitamin D. Milk fortified with vitamin D helps in calcium absorption in body thus helps in bone building and strengthening. Milk is chosen as a carrier for fortification because it is widely available and consumed across the country.

Introduction

Milk is a very important food product in our daily diet and is a rich source of nutrition. It is rich in protein, calcium, vitamin A and vitamin D. As vitamin A and vitamin D are very important for human body as they play an important role in metabolic activities and also helps in maintaining good health. When there is processing of milk certain fat-soluble vitamins gets depleted. A survey of National Nutrition Monitoring Bureau (NNMB) in 2012 with council of medical research reported that a large number of population is suffering from the deficiency of vitamin A and vitamin D (in youths as well as adults).

Milk is one of the most widely consumed food article, therefore the fortification of milk and milk-products could provide vital nutrition to a large proportion of the country's population and can help fighting with the problem of micronutrient malnutrition. Milk itself is a natural highly nutritious food that contains all ten essential amino acids, as well as fats, and important minerals and vitamins. Milk lacks some important micronutrients such as iron which is added during fortification. Increasing the quantity of some of these micronutrients could improve

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dietary balance and health in malnourished population. An average glass of milk contains calcium, vitamins and potassium.

History of milk fortification

Milk fortification was started in the year 1932-33 with vitamin D, to overcome the high prevailing deficiency disorder called as rickets and lack of calcium and phosphorus due to improper absorption. Rickets causes softening and weakening of bones in children, usually caused due to insufficient amount of vitamin D in our body.

Similarly, vitamin A deficiency causes visual impairment, blindness and increased risk of infection and mortality. Although whole milk is an excellent source of vitamin A, skimmed and semi-skimmed milk contain low concentrations of the fat soluble nutrient. Therefore fortification of these products was introduced in the 1940s. Since then, the dairy fortification industry has grown at a rapid speed. The fortification trend started with different nutrients varying according to the nutritional requirements of the population. This is affected by changes in diet, lifestyle and population demographics. For example, ageing populations have different requirement to younger populations or higher consumers of 'fast foods'.

There are mainly four important principles for fortification

1. The demand for the food should not be affected by fortification and should remain constant.
2. Fortification should not adversely affect the food properties like odour, texture, taste or appearance.
3. The nutrients that are added should be easily absorbed by the body resulting in an increase in bioavailability.
4. There should be a demonstrable positive effect on the consumer's health of adding the nutrient.

Fortification in milk and milk products

The following micronutrients are commonly used in the fortification of milk

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- Vitamin A
- Vitamin D
- Phosphorus
- Calcium
- Iron
- Zinc

Recommendation

- Fortification of dairy products must be carefully controlled so as to ensure the desired level of fortificants in the final products and to avoid toxicity. As mineral deficiencies can cause complications, similarly, excessive mineral intake also has side effects. For example, too much calcium can cause renal disease.
- Vitamin A and vitamin D are considered to be toxic if consumed in access amount. These are fat soluble vitamins which gets deposited in the tissues and these are not easily eliminated from the body. Based on the adverse effects with some reasonable margins of safety, levels of consideration for public health has been determined. "Vitamin A above 6000 IU per quart and vitamin D above 800 IU per quart should be considered harmful. Fluid milk products with levels of vitamin A or D above these values may create the potential for a public health threat and further distribution should be prohibited."

Conclusion

Fortification of milk is a safest method by which nutrition may be obtained. Milk is inexpensive and consumed in large amounts and is a carrier for important micronutrients in human body. Milk is, therefore, fortified with minerals such as Ca, Fe, Zn, Se and is an effective source of complimentary nutrition for all (infants to adults) when consumed in proper amount in daily diet.