



Fortification of milk and dairy products with minerals and vitamins

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ABSTRACT

Vitamins and minerals are essential in assuring human health at all stages of life. Iodine, iron, vitamin A, and zinc are identified as some of the most common nutrient deficiencies in the world. To overcome this problem, fortification of foods that are consumed on a daily basis are strongly advisable. In practice, the choice of any combination of food vehicle and fortificant is most important. Common food vehicles that can be fortified with vitamins and minerals include wheat and wheat products, corn, rice, milk and dairy products, vegetable oils, salt, sugar, breakfast cereals, and condiments. Milk and dairy products are good sources of high-quality protein and calcium. Nutritionists recommend milk consumption in all societies and for all age groups, especially children and the elderly, therefore they can serve as good vehicles in fortification program.

Liquid milk and dairy products are systematically, either mandatorily or voluntarily, fortified with Vitamins (especially D) and minerals (calcium and iron are more common) in some countries but their overall contribution to micronutrient intake is not fully understood. The selection of proper nutrient compound, technical issues, impact of industrial processing and storage, and cross effect of different micronutrient (when adding two or more) with each other and with dairy compound, must be considered when milk and dairy products are fortified. Moreover, some micronutrient compound such as iron showed undesirable effects on the vehicle sensory properties (including, taste, odor, and color) and lipid oxidation. Therefore, microencapsulation of nutrient compounds is a promising method to overcome mentioned problems. For example impaired taste and oxidative potential of many iron salts can be reduced by means of microencapsulation. In general, in the case of food fortification with vitamins, their solubility in food vehicle and their stability in presence of heat, humidity and oxygen are most challenging issues while, when dairy products are fortified with minerals, the challenging aspects are the effect of minerals on sensory and physicochemical properties of fortified food and the bioavailability of mineral compound. Therefore guidelines and code of practices have to be designed to help the manufacturers concerning proper fortification of fluid milk and dairy products with vitamins and minerals. It must be considered that to ensure proper fortification of dairy products, the enforcement of product monitoring, high tech equipment, and laboratory testing are needed.

Keywords: Fortification, Milk, Dairy products, Minerals, Vitamins

1. Introduction

Malnutrition is a global health concern affecting almost every individual, irrespective of age, gender, race, social status, and geographical boundaries. Malnutrition is defined as an imbalance of energy and nutrient intake that may alter the body measurements, compositions and