



HERBAL BIOACTIVES AND FOOD FORTIFICATION

Dr.D.Suresh Kumar

Head (R&D) CARE Keralam Ltd, KINFRA Park P.O. Koratty-680 309, Kerala, India

D. Suresh Kumar Ph.D.
Head (R&D)
CARE Keralam Ltd
KINFRA Park P.O.
Koratty-680 309,
Kerala, India.

The lifestyles of people worldwide have changed in the last century due to a rise in income, increased leisure time, and reduced physical activity. These new lifestyles have a considerable impact on health. Consequently, there is a global rise in the incidence of diseases such as obesity, cardiovascular diseases, diabetes mellitus, and rheumatoid arthritis. The medical world is therefore looking for better strategies to contain this trend. As a parallel development, there is a worldwide increase in health awareness and interest in herbal alternatives. Nowadays, elderly people worldwide are more concerned about the quality of the food and beverages that they consume. Functional foods have therefore emerged as an effective means for the prevention of diseases. This change in consumer outlook has encouraged the food and beverage industry to apply modern manufacturing technology in food fortification. A reduction in weight, a reduction of cholesterol, the promotion of bone health, an increase in energy, the enhancement of disease resistance through the immune system, and the improvement of digestive functions are the major health concerns that influence the purchase of functional foods.

Up to 1970, food fortification was mostly focused on the identification of vitamin and mineral deficiencies in human health. Since 1990, attention has been paid to substances other than vitamins, minerals, or trace elements that can exert beneficial effects on the body. These substances are collectively called nutraceuticals.

Fortification is achieved by adding a nutrient (fortificant or additive) to the food in question, which serves as a vehicle for carrying this nutrient. The fortification of foods is now achieved using numerous beneficial compounds derived from natural products.

The functional nature of fortified foods needs to be proved on the basis of objective parameters. This can be achieved by studying the ability of the functional food to modulate target functions in the body, as these target functions are directly related to an improved state of health or a reduced risk of developing a disease. Well-defined biochemical, physiological, or behavioral markers are used in the assessment of the modulatory effect.

Several problems need to be addressed to achieve the successful fortification of foods. Physicochemical properties such as pH, water or oil content, proteins, and fibers can influence the stability of the nutrient added. Fortification can alter the sensory characteristics of the food and some fortificants can change the color and flavor of the product. At times, the ingredients of fortified food can interact with each other. The processes used in the manufacture of fortified food should be designed in such a way that they do not cause denaturation or loss of nutrients. The packaging of the fortified food can affect the stability of the nutrients. The color of the product may change, haziness or sedimentation can develop in liquid preparations, or ingredients such as vitamin C or β -carotene may undergo oxidation.

Fortified food can be made more palatable to the consumer by using sweeteners such as aspartame or saccharin to overcome the intensity of off-flavors. Similarly, food acids such as DL-malic acid or citric acid can be used to reduce bitterness and to counter off-flavors. The taste of the food can be further improved by protecting sulfur groups of amino acids such as cysteine and methionine or by employing bitterness inhibitors. The release of the nutrient into the food matrix can be slowed by coating it with an inert layer. Bitter substances can be encapsulated in wax or fat.

In this context it will not be out of place to mention a recent contribution to the field of food fortification. CRC Press, Florida has published my book *Herbal Bioactives and Food Fortification*. The book begins with a brief survey of the use of herbs in different civilizations and traces the evolution of herbal medicine, including the emergence of nutraceuticals from the discipline of ethno pharmacology and the Alma Ata Declaration of 1978. It moves on to describe various aspects of the extraction process, including selection of plant species, quality control of raw materials, the comminution of herbs, and the selection of solvents. It also describes the optimization of extraction in relation to response surface methodology before describing uses of herbal extracts in food supplements and fortified foods.

With special attention paid to stability analysis and the masking of tastes, the book also describes the benefits of foods fortified with herbal extracts such as soups, yogurt, sauces, mayonnaise, pickles, chutneys, jams, jellies, marmalades, cheese, margarine, sausages, bread, and biscuits, as well as some beverages. *Herbal Bioactives and Food Fortification* covers the fundamental steps in herbal extraction and processing in a single volume. It explains how to choose, optimize, analyze, and use extracts for fortification, making it an excellent source for nutraceutical researchers and practitioners in science and industry. This book is hoped to advance the progress of food fortification.



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Email: dvenu21@yahoo.com

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