

Nutraceuticals -A Boon of Human Health

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SUMMARY

Nutraceuticals are substances containing food products and have useful properties for treatment or prevention of disease in human beings. Nutraceuticals help us to maintain health or healthy life style of human being. Nutraceuticals contain nutritious extract from food stuff which has a medicinal effect on health. These are taken in various form like tablet, capsule, powder, liquid or semi-solid form. The ingredients of nutraceuticals include trace elements, minerals, vitamins, proteins, carbohydrate, amino-acid etc. These substances are essential for proper functioning of our body. Although nutraceuticals can provide treatment or prevention against disease, these cannot be substituted to medicines. Nutraceuticals also differ from pharmaceutical preparation from being subjected to different regulatory aspects and are not subject to parameters like animal studies, clinical studies and toxicity studies. A major advantage of nutraceutical over traditional food product is that these provide the balanced nutritional value from a very small quantity which is sometimes lacking in traditional food product. Sometimes these nutraceuticals even provide much higher nutritional value which is sometimes cannot be obtained from food products.

INTRODUCTION

Functional foods are defined as products that resemble traditional foods but possess demonstrated physiological benefits. However, nutraceuticals are commodities derived from foods, but are used in the medicinal form of pills, capsules or liquids and render demonstrated physiological benefits. In Canada, the latter group has now been integrated under a new category as natural health products that promote health. This category includes both herbal as well as other natural products. In some countries, however, functional foods and nutraceuticals are used interchangeably. Regardless, the main focus of such products is to improve health and reduce disease risk through prevention. The main difference of this category with pharmaceuticals is that they are multi-targeted mixtures and present at low concentration while pharmaceuticals are uni-targeted pure compounds with high dose. There are many functional foods and nutraceuticals that are becoming increasingly available in the marketplace, but there is a challenge for the functional food producers because such products should address the issue of sensory acceptability which is not necessary for the nutraceutical or pharmaceutical products. The commodities that have so far reached the market are mainly those belonging to the antioxidants and also omega-3 oils, as well as probiotics, among others. The antioxidant category is primarily composed of phenolic/polyphenolic compounds, but carotenoids as well as phytates, certain vitamins, uric acid and minerals are also included. In addition, phytosterols or plant sterols have found their way to the market, first in Finland over a decade ago and now in many other countries. In more recent work, conjugation of different groups of bioactives or their physical mixtures have been studied in order to examine their additive or possible synergistic as well as unusual effects. The following sections of this overview provides examples to demonstrate the benefits of nutraceuticals and functional foods in health promotion and in reducing the risk of chronic diseases.



Classification of Nutraceuticals:

The food sources used as nutraceuticals are all natural and can be categorized as

1. Dietary Fiber
2. Probiotics
3. Prebiotics
4. Polyunsaturated fatty acids
5. Antioxidant
6. Polyphenols
7. Spice

Ingredients of Nutraceuticals:

The ingredients of nutraceuticals include trace elements, minerals, vitamins, proteins, carbohydrates, amino acids etc. Many diseases are believed to have a close relation with nutrients and food supplements. Proteins are essential in building body and they are required in building muscles of body. Most of the vitamins were discovered based on their correlation to diseases. Vitamin A is associated with xerophthalmia and keratomalacia. Other common examples are Vitamin C (scurvy) Vitamin D (rickets and osteomalacia) Niacin (pellagra), Vitamin E (creatinurea and haemolysis of RBC), Vitamin B₆ (peripheral neuropathy and lymphopenia) and Vitamin B₁₂ and Folic Acid (megaloblastic anemia). Certain minerals and trace elements like calcium, magnesium, iron, iodine, copper, zinc, phosphorous, manganese etc. are believed to be essential for the vital function of human body. A large number of herbal/plant products are also used as part of the complementary medicine. One of the common characteristics of all of them is that they are naturally occurring. With our increasing understanding of the nutritive value of various food items, and the basic biochemical roles that they play, we are getting to appreciate the values of the menu that various societies have adopted around the world. Nutritionists in the West now believe that the diet that offers the best value to bodily health is the Mediterranean cuisine like fish, whole wheat bread, olive oil, tomato and greens in the salad, garlic and onion, red wine and fruits. A high fiber intake does a lot of good to the body. It helps in lowering cholesterol levels in the blood and leads to less plaque formation. Fiber intake also prevents the blocking of blood vessels and thereby reduces the risk of hypertension and stroke. It helps in enhancing weight control, and for better control of blood sugar (useful for diabetics). High fibre diets also help in reducing the risk of certain forms of cancer, improving gastro-intestinal function and so on.



Functional components of Nutraceuticals:

Class/Components	Source	Potential benefit
1.Fatty Acids	Oil; margarine; bread; pasta; milk-based drinks; chocolate; and supplemented fruit juices (those supplemented with docosahexaenoic acid & eicosapentaenoic acid)	Improve body composition, reduce cancers, to lower the concentration of blood triglycerides as well as produce hypotensive and arrhythmic
2.Dietary Fiber	Oat, brown, grits, and flour – including any products derived from them such as oatmeal, cereal, and bread	May contribute to maintenance of a healthy digestive tract, Lowers concentration of blood glucose (4 g/day of β -glucan from cereals) and cholesterol (3g of soluble dietary fiber from oats), reduces constipation symptoms
3. Natural antioxidants	Fortified breakfast cereals; milk-based drinks; margarine; and fortified pasta	the onset of cardiovascular and neurological diseases, cataracts, some types of cancer, and some non-communicable diseases
4. Probiotics and prebiotics—fructans, inulin, and resistant starch	Vegetable juices; cheeses; ice cream; frozen dessert; fermented dairy products such as yogurt; kefir; and buttermilk; fermented fruit; kombucha; and fermented meats	Probiotics can influence and regulate the immune system as well as improve immune function. They are also instrumental in the treatment of constipation, diarrhea, and the management of irritable bowel diseases such as Crohn's disease as well as irritable bowel syndrome.

Availability of Nutraceuticals in market:

Brand name	Components	Functions
Betatene	Carotenoids	Immune function
Xangold	Lutein esters	Eye health
Lipoec	<i>α-lipoic acid</i>	Potent antioxidant
Generol	Phytosterol	CHD reduction
Premium probiotics	Probiotics	Intestinal disorder
Soylife	Soyabean phytoestrogen	Bone health
Z-trim	Wheat	Zero calorie fat replacer
Fenulife	Fenugreek galactomannan	Control blood sugar

Nutraceutical market in India:

India is one among the few countries with no fixed parameters for classifying dietary supplement either as diet or medicine. Nutraceuticals involve health enhancing or disease-preventing products that are not as strictly regulated as the bulk pharmaceutical industry. The Indian pharmaceutical firms are utilizing the facility and market a variety nutraceuticals aimed at various sections of the society. The amount of products 'enriched' with vitamins and other health related items entering the market are increasing day-by-day. The preference for the discovery and production of nutraceuticals over pharmaceuticals is well seen in pharmaceutical and biotechnology companies. Nutraceuticals are gaining acceptance for their ability to address several diseases. Vitamins, Minerals and Nutrients constitute about 80% of the market while antioxidants and anti-aging products account for 10%. The other segments are occupied by herbal extracts. The global nutraceuticals market was estimated to be 120 billion US dollar in 2007. The US has been the major market for nutraceuticals, with India and China becoming the fastest growing markets. The nutraceuticals market in India was about rupees 20 billion in 2008 and was about 331 billion by the end of 2021. The use of nutraceuticals, as an attempt to accomplish desirable therapeutic outcomes with reduced side effects, met with great monetary success. However, with all of the aforementioned

positive points, nutraceuticals still need support of an extensive scientific study to prove “their effects with reduced side effects”.



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