

Phcog Rev.: Short Review Importance of Nutraceuticals in Health Management

Maddi V.S.¹, Aragade P.D.^{1*}, Digge V.G.¹ and Nitalikar M.N.².

¹Department of Pharmaceutical Chemistry, KLES' College of Pharmacy, Hubli, Karnataka, India

²Department of Pharmaceutics. SVEIR'S College of Pharmacy, Pandharpur, Solapur, Maharashtra, India.

Author for correspondence*: prashant_pharma123@rediffmail.com

ABSTRACT

'Nutraceutical' is a term proposed to be used to classify foods that 'provide medical or health benefits'. Nutraceutical is any food or food ingredient considered to provide medical or health benefits including the prevention and treatment of disease. Dr Stephen DeFelice coined the term "Nutraceutical" from "Nutrition" and "Pharmaceutical" in 1989. The term nutraceutical is being commonly used in marketing but has no regulatory definition. Nutraceuticals and functional foods are assuming a middle ground between food and drugs due to growing body of evidence that supports their role in maintaining health and contributing to treatment of disease.

"Traditional nutrient" refer to vitamins and minerals considered essential to the diet and / or to correct a classical nutritional deficiency disease, whereas "functional foods" may provide specific health benefits beyond basic nutrition when consumed a part of varied diet. Nutrient, herbals and dietary supplements are major constituents of nutraceuticals, which make them instrumental in maintaining health against various disease conditions and thus promote the quality of life. The focus of this article is to give a brief overview on Nutraceutical.

KEY WORDS: - Dietary supplement, Functional food, Medical food, Nutraceuticals.

INTRODUCTION

Drug and food from natural origin play a significant role in the public health care system of any nation. The search for specific constituents of plant, animals, minerals and microbial origin which are beneficial to our mental and physical health has caused coining of terminologies such as Nutraceuticals, Cosmeceuticals, Dermaceuticals, Phytochemicals, Phytonutrient, Phytofoods, Functional foods (1).

Nutraceutical word-with "nutra" derived from nutrition and "ceutical" from pharmaceutical refers to substances that may be considered a food or part of a food and may provide medical and health benefits (2).

'A nutraceutical is any substance that is a food or a part of a food and provides medical or health benefits, including the prevention and treatment of disease. Such products may range from isolated nutrients, dietary supplements and specific diets to genetically engineered designer foods, herbal products, and processed foods such as cereals, soups and beverages. It is important to note that this definition applies to all categories of food and parts of food, ranging from dietary supplements such as folic acid, used for the prevention of spina bifida, to chicken soup, taken to lessen the discomfort of the common cold. This definition also includes a bio-engineered designer vegetable food, rich in antioxidant ingredients, and a stimulant functional food or pharmafood.'

Since the term was coined, its meaning has been modified. Health Canada defines *nutraceutical* as: 'a product isolated or purified from foods, and generally sold in medicinal forms not usually associated with food and demonstrated to have a physiological benefit or provide protection against chronic disease' (3)

Examples: beta-carotene, lycopene

Nutraceuticals can be of different types

Functional foods are foods that may provide health benefits beyond their basic nutritional value. The benefits may come from naturally occurring parts of the foods themselves or from the manufacturing process. It is a food engineered or supplemented to give improved nutritional value. It exists at the interface between food and drugs. When functional food aids in the prevention and/or treatment of disease and/or disorders other than anemia, it is called a nutraceuticals. e.g. transgenic canola oil engineered for improved trans fatty acids content (4).

A dietary supplement is a product that is intended to supplement the diet that bears or contains one or more of the following dietary ingredients: a vitamin, a mineral, and a herb that gives health benefits (5).

The use of nutraceuticals, as an attempt to accomplish desirable therapeutic outcomes with other therapeutic agents has met with great monetary success (6-7). Nutraceutical have been found to be associated with the prevention and/or treatment of many chronic disease and ailments such as cancer, diabetes, heart disease, hypertension, arthritis, osteoporosis etc. Nutraceuticals and functional foods hold promise in clinical therapy as they have the potential to significantly reduce the risk of side effects associated with chemotherapy along with reducing the global health-care cost. 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" (7-8).

Types of Nutraceuticals

Nutraceutical are broadly categorized as follows.

- Substances with established nutritional function such as vitamins, minerals, amino acid and fatty acids nutrients.

Table 01: Source and potential benefits of Nutraceuticals and Functional Foods

Name	Botanical name	Family	Parts used	Chemical constituents	Therapeutic uses
Ginkgo	Ginkgo biloba	Ginkgoaceae	Leaves	Ginkgolide-B	Antiasthmatic, bronchodilator, used to improve peripheral and cerebral circulation
Tea	Thea sinensis	Theaceae	Leaves	Caffeine	Diuretic, CNS stimulant
Flax seeds	Linum usitatissimum	Linaceae	Seeds	α -linolenic acid (ALA)	Cancer preventive, reducing coronary heart disease risk.
Spirulina	Spirulina maxima	Oscillatoriaceae	Blue green algae	γ -linolenic, oleic acid, Vit-B, Vit-C, Vit-E,	Immunostimulant, antiviral, antioxidant
Citrus	Citrus limonis	Rutaceae	Fruits	limonoids, limonene	Anticancer
Tomato	Tomato lycopers	Solanaceae	Fruits	Lycopene	Lowers risk of prostate cancer
Black cohosh	Cimicifuga racemosa	Ranunculaceae	Roots and rhizome	N-methyl cystine acetate	Antirheumatic, antitussive, sedative
Inulin	Dahlia variabilis,	Compositae	Tubers	Chain of 35-50 1,2 linked fructo furanose	Prebiotics
Ginger	Zingiber officinale	Zingiberaceae	Rhizome	Zingiberene, gingerol shogaol	Carminative, antiemetic cholagogue, positive inotropic, treatment of dizziness
Garlic	Allium sativum	Liliaceae	Bulbs	Allicin, alliin	Antibacterial, antifungal, antithrombotic, hypotensive, fibrinolytic, Hypolipidemic anti inflammatory
Pepper	Piper nigrum	Piperaceae	Fruits, roots	Piperine	Febrifuge, tonic, aromatic, stomachic, analgesic
Turmeric	Curcuma longa	Zingiberaceae	Rhizomes	curcumin	Antimutagenic, hepato protective, antihypertensive, antifertility, Anti inflammatory
St. John's Wort	Hypericum perforatum	Guttiferae (hypericaceae)	Aerial parts and flower rings	Hypericin, hyperforins	Anxiolytic, antiinflammatory, antidepressant, monoamino oxidase inhibitor
Karela	Momordia chrantia	Cucurbitaceae	Fruits	Momordicin	Antidiabetic
Soyabean	Glycine max	Leguminosae	Seeds	Stigmasterol, sitosterol, Iso flavones	Anti cancer, Hypolipidemic prevention of osteoporosis
Onion	Allium cepa	Liliaceae	Bulbs	Diallyl disulphide oxide, allyl propyl disulphide	Anti diabetic, antibiotic, hypocholesteolaemic, fibrinolytic
Betal leaf	Piper betel	Piperaceae	Leaves	Volatile oils	Antimutagenic
Mustard	Brassica junni	Cruciferae	Seeds	Synigrin	Carminative, antidiabetic
Nutmeg	Myristica fragrance	Myristicaceae	Kernels of the seeds	Myristicin, elimicin	Hypolipidemic
Fenugreek seeds	Trigonella foenum graecum	Leguminosae	Seeds	Diosgenin	Hypolipidemic
Echinacea	Echinacea purpurea	Compositae	Roots	Isobutyl amide	Imunostimulant, treatment of cold and flu symptoms
Ginseng	Panax ginseng	Araliaceae	Roots	Ginsenosides Rg 1	Adaptogen

- Herbs or botanical products as concentrates and extract herbals.
- Reagents derived from other sources (eg. Pyruvate, chondroitin Sulphate, steroid hormone precursors) used

for specific functions such as sports nutrition, weight loss supplement and meal replacement dietary supplements.

Nutraceuticals are available in the form of

- Dietary supplements and vitamin products.

- Herbal and botanical products.
- Foods for vitality, functional food, medical food.
- Health food, organic food, dietetic food.
- Sport and energy products.
- Natural medicinal products with specific health benefits.

The nutraceuticals obtained from plants are elaborated in the table 1 along with botanical source: (10-11)

Commercial Available Nutraceuticals

- Policosanols, Black tea extracts, Krill oil, Novel soy protein fractions, Poly Methoxylated Flavones (PMFs), Avocado Soy Unsaponifiables (ASU), Tocotrienols, Resveratrol: - Cholesterol-Lowering Nutraceuticals.
- Sesamin: - Lowering Blood Pressure.
- Dehydroepiandrosterone (DHEA): - Upregulate endothelial nitric oxide synthase enzyme.
- Boswellic acids, Silymarin: - Anti-inflammatory Nutraceuticals.
- Conjugated Linoleic acid: - Body weight and fat management.
- Diindolylmethane (DIM), Baicalin, Quercetin: - Anti-proliferative agents.
- Lingzhi and Shiitake: - Improve digestion.
- Odorex: - Eliminate body odour, bad breath and faecal smell.
- Glucuronoxylomannan: - Prevent Diabetes.
- Statins: - Prevent atherosclerosis.

Current status of Nutraceuticals

The growing importance of “healthy foods” in today’s society has resulted in a growth of regulations governing foods, functional foods and dietary supplements. These rules vary substantially amongst different countries of the world. In 1992, the Food and Drug Administration published a policy explaining how existing legal requirements for food safety apply to products developed using the tools of biotechnology. Over the last five years, companies have used the consultation process more than 40 times as they moved to introduce genetically altered plants into the U.S. market. Although the agency has no evidence that the policy and procedure do not adequately protect the public health, there have been concerns voiced regarding FDA’s policy on these foods.

FIM, The Foundation for Innovation in Medicine, maintains that the nutraceutical industry is on the verge of a fundamental change, from a market-driven enterprise to a business that will be driven by the results of clinical research. Clinical studies of nutraceuticals will power the next phase of development. The American public has recently embraced the promise of nutraceuticals-wholeheartedly and justifiably. According to a survey conducted for FIM, 74% of Americans

say that they take nutraceuticals. And 51% of Americans told researchers that they take nutraceuticals at least once a day.

Nutraceuticals Need of hour

The need of the hour is that the regulatory bodies recognize the potentials of this field and set parameters regarding their production, research, marketing and pricing; not with the intention of clipping the wings, but to standardize the sector. The key players should also maintain ethical obligations and not to focus their products only on the creme - de - le - crème of the society. Developing countries like India, where malnutrition is omnipresent even in the 21st century and these nutritionally enhanced foods will act as a born for our future generations. In the post-GATT scenario, nutraceuticals portend fascinating implications for the pharmaceutical companies and hence the need of the hour is to develop core competency in this emerging arena (12-13).

CONCLUSION

To conclude, nutraceuticals have a positive impact on an individual’s health, physical performance or state of mind in addition to its nutritive value. Nutraceuticals may be beneficial to your health, but we are still learning about their benefits and possible harmful effects. If you are using or thinking about using these products, be an informed consumer and be sure to discuss them with your health care provider. Types of products that are being marketed such as Prebiotics, Probiotics and food fortified with added vitamins are discussed here. However there is lack of proper regulation for their production and marketing, which may reduce exploiting nutraceuticals. Hence there is a chance for budding industries to develop core competency in this emerging arena.

REFERENCES

1. M. Sugumaran, A.S.K. Sankar, T. Vetrichelvan. Nutraceuticals: Poised for a healthy slice of the healthcare market. *The Antiseptic*; **102**: 530-31(2005).
2. <http://en.wikipedia.org/wiki/Nutraceutical>.
3. <http://chemistry.about.com/library/glossary/blde1575.htm>.
4. D. Jadhav, D. Deshpande, C.S. Ramma, V.J. Kadam. Nutraceuticals and Functional Foods: A new era in health and disease management. *Ind. J. of Pharm. Edu. & Res.* **40**: 190-94(2006).
5. FDA/CFSAN resources page. Food and Drug Administration Web site. Dietary Supplement Health and Education Act of 1994.
6. N.J. Nelson. Purple Carrots, Margarine Laced with wood pulp: Nutraceuticals move into the supermarket. *J. Natl. Cancer. Inst.* **91**: 755-57(1999).
7. M. Whitman. Understanding the perceived need for complementary and alternative nutraceuticals: Lifestyle issues. *Clin. J. Oncol. Nurs.* **5**: 190-94(2001).
8. D.K. Heyland. In search of the magic nutraceutical: Problems with current approaches. *J. Nutr.* **131**: 2591S-595S(2001).
9. Elizabeth AC. Over-the-counter products: Nonprescription medications, nutraceuticals and herbal agents. *Clin. Obstet. Gynecol.* **45**: 89-98(2002).
10. C. K. Kokate, A. P. Purohit, S. B. Gokhale. *Pharmacognosy*. 27th ed. Pune, Nirali Prakashan; 952-960 (2005).
11. V. D. Rangari. *Pharmacognosy and Phytochemistry*. Vol-II. 1st ed. Nashik. Career Publication; 312-20 (2003).
12. www.nutraceutical.com
13. www.nutraceuticalsworld.com
