

## FOCUS ON NUTRACEUTICAL (2020)-A REVIEW

Mahaeswari Sivaraman,

Final year B.Sc Student, Dept. of food science and nutrition,

The American College, Affiliated to Madurai Kamaraj University, Madurai, India

[siva9842raman@gmail.com](mailto:siva9842raman@gmail.com)

### ABSTRACT

Another term of functional food is known as Nutraceutical. Nutraceutical is based on food availability like traditional nutraceutical which consist of chemical constituents, Probiotic microorganisms, and nutraceutical enzymes. Nutraceutical is used as medicine which has physiological benefits. The main aim of nutraceutical product is to prevent and treat disease [prevention and treatment of disease] (DeFelice, 1994). And, also nutraceutical product is a food or fortified food product that not only supplements the diet but also plays a role to treat or prevent disease. Nutraceutical, the field is now a day's improving more and more. The main concept is in future nutraceutical requirement will be more, and development also will be more so the nutraceutical name has a key point that "The future of intelligent food". Role of vitamins, minerals and Herbs, categories of Nutraceuticals, Commercially nutraceuticals etc are discussed in detail in this review.

**Keyword:** Nutraceutical, vitamins, Herbs

### Registering

### INTRODUCTION

The word nutrition and pharmaceuticals combined the word known as nutraceutical. Nutraceutical may be used to improve health, delay the aging process, prevent chronic diseases, increase life expectancy, or support the structure of function of the body. The term "Nutraceutical" was coined in 1989 by Stephen De Felice, founder and chairman of the foundation for innovation of medicine. Stephen De Felice fused the term nutrition and pharmaceuticals to derive the new term nutraceutical. According to Stephen De Felice "FOODS OR PARTS OF FOOD THAT PROVIDE MEDICAL OR HEALTH BENEFITS, INCLUDING THE PREVENTION AND TREATMENT OF DISEASE. are called Nutraceutical. A nutraceutical may be naturally rich or medically active food, such as omega-3 fish oil that can be derived from salmon and other cold-water fish.

#### Prevention of disease (Nutraceuticals):

✚ Nutraceuticals are non specific biological therapies used to promote

wellness, prevent malignant processes and control symptoms.

✚ Polyunsaturated acids, antioxidants, phytochemicals involve in prevention of disease.

Table 1

Disease prevention compound	Available in	Helps to prevent from
Antioxidant	Vegetable oils example: soybean oil, canola oil, corn oil, oat oil, wheat germ oil, palm oil	Helps to prevent from chronic diseases, like neurodegenerative diseases such as Alzheimer's disease, Parkinson's disease and Huntington's disease.
Phytochemicals	Whole grains, beans, fruits,	Helps to prevent from cancer, coronary heart

	vegetable and herbs	disease, diabetes, high blood pressure, inflammation, microbial, viral, parasitic infections, psychotic diseases, spasmodic conditions, ulcers, osteoporosis and associated disorder (prakash et al, 2012)
Polyunsaturated fatty acids (which include the omega-3 and omega-6 fatty acids)	Fish oil, fish such as salmon, vegetable oil and in some nuts.	Prevention and treatment of coronary heart disease, hypertension, diabetes, arthritis and other inflammation, auto immune disorder, mental health and neural function disease such as depression and schizophrenia, and cancer. Especially essential for the brain and retina (shahidi, 2012).

Table-2

**Role of vitamins and minerals in prevention of disease:**

Name of the vitamins	Found in	Health benefits
Vitamin C	Fruits and vegetables	Antioxidant, for healthy bones, gums, teeth and skin, in wound healing, prevent from

		common cold, lowers the blood pressure and prevent from cardiovascular effects.
Vitamin D	Soy milk, fish oil, cod liver, salmon, sword fish, tuna, milk, orange juice fortified.	Cardiovascular disease, anti inflammation, anti mitotic activities.
Vitamin E	Wheat germ oil, sunflower, safflower, soy bean oil, sunflower seeds, almonds, pumpkin, peanut, asparagus	Helps to prevent from cardiovascular disease, antioxidant, helps to form blood cells, boost the immune system
Vitamin A	Dairy products, liver, fish, carrot, fortified cereals, broccoli, squash.	Antioxidant, essential for growth and development and in the treatment of skin disorders.
Vitamin K	Green leafy vegetables such as kale, spinach, mustard greens. Vegetables such as broccoli, cauliflower, cabbage	Essential for blood clotting
Vitamin B <sub>1</sub>	Outer layer and germ of cereals, yeast, beef, pork, nuts, whole grains and pulses. Fruits and vegetables like	Helps to convert food in to energy, essential in neurological functions.

	cauliflower, oranges, potatoes, asparagus and kale. Liver, eggs.	
Vitamin B <sub>2</sub>	Eggs, organ meat such as kidney and liver, lean meat and low fat milk. Fortified cereals, bread, and grain products. Green leafy vegetables such as broccoli and spinach.	Helps in energy production and other chemical process in the body.
Vitamin B <sub>3</sub>	Yeast, meat, poultry, red fish like tuna, salmon. Cereals, legumes and seeds. Milk, green leafy vegetables. Coffee and tea	Healthy eyes, nerve function, help to convert food in to energy and maintain proper brain function.
Folic acid	Meat, fish, wheat flour, egg	Produce the genetic materials of cells, during pregnancy it helps to prevent from birth defects, RBCs formation, protects against heart disease.
Calcium	Milk, cheese and other dairy foods, green leafy vegetables such as kale, spinach. Soy drinks with	Maintaining bones and teeth, and maintaining bone strength. Important in nerve muscle and glandular

	added calcium, fish such as sardines and pilchards. Bread and anything made with fortified flour	functions.
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Table-3

### Role of herbs in prevention of disease:

Name of the herb	Botanical name	Helps to prevent from
Aloe Vera gel	Aloe Vera L.N.L.Burm.	Dilates capillaries ( also known as “broken capillaries” is a term used by estheticians to describe the superficial blood vessels that lie at the surface, or just under the surface of the epidermal skin layer), anti inflammatory, emollient( ointment or cream or a liquid that makes dry or sore skin softer or less painful), wound healing properties.
Ephedra	Ephera Sinica Stapf	Bronchodilator (are medication commonly used by people with asthma), vasoconstriction ( is the narrowing ( constriction) of blood vessels by small muscles in their walls. When

		blood vessels constrict, blood flow is slowed or blocked), reduces bronchial edema (is a condition caused by excess fluid in the lungs. The fluid collects in the numerous air sacs in the lungs, making it difficult to breathe).
Garlic	Allium Sativum L.	Anti bacterial, anti fungal, anti thrombotic (an anti thrombotic agent is a drug that reduces the formation of blood clots (thrombi). Anti thrombotic can be used therapeutically for prevention or treatment of a dangerous blood clot (acute thrombus), hypertensive, anti inflammation.
Licorice	Glycyrrhiza Glabra L.	Used in treatment of peptic ulcer, expectorant (an agent that promotes the discharge or expulsion of mucus from the respiratory tract), secretolytic (increasing the production of serous mucus in the respiratory

		tract).
Ginger	Zingiber Officiale Rosc	Carminative (expelling gas from the stomach or intestines so as to relieve flatulence or abdominal pain or distension), antiemetic (is a drug that is effective against vomiting and nausea. Antiemetic is typically used to treat motion sickness). Cholagogue (a drug or other substance that promotes the flow of bile from the gall bladder in to the duodenum, positive inotropic (an inotrope is an agent that alters the force or energy of muscular contractions. Positively inotropic agents increase the strength of muscular contraction).

**Traditional and non-traditional nutraceutical:**

- ✚ Nutraceutical fall in to two category based on:
  - ❖ Traditional foods
  - ❖ Non-traditional foods

### Traditional nutraceutical:

- ✚ Simply natural whole foods. Many fruits, vegetables, grains, fish; dairy and meat products contain several natural components that deliver benefits beyond basic nutrition.
- ✚ For example, tomatoes and salmon are two types of food. Researchers founded that, foods contain benefits beyond basic nutrition. In this case lycopene and omega 3 fatty acids are the natural compound present in tomatoes and salmon.

### Non – traditional nutraceutical:

- ✚ Non – traditional nutraceutical came from agricultural breeding, by adding nutrition's, by fortifying. For example, fortified with calcium, cereals with added vitamins and minerals and flour with added folic acid these kind of product comes under the category of non – traditional nutraceutical.
- ✚ Non – traditional nutraceutical improvement is now - a - days moved to the next step. Currently researchers being conducted to improve the nutritional quality of many other crops.

### Nutraceutical supplements:

- ✚ Nutraceutical product is a food or fortified food product that not only supplements the diet but also assists in treating or preventing disease (apart from anemia) so provides health benefits. Nutraceutical, which have also been called as medical food, design foods, phytochemicals, functional foods and nutritional supplements, including such every day product as “bio” yogurt and fortified breakfast cereals, as well as vitamins,

herbal remedies and even genetically modified foods and supplements.

- ✚ “A dietary supplement is a product taken by mouth that contains a “dietary ingredient” intended to the diet”. The “dietary ingredients” in these products may include: vitamins, minerals, herbs or other botanical, amino acids and substances such as enzymes, organ tissues, glandular, and metabolites. Dietary supplements can also be extracts or concentrates, and may be found in many forms such as tablets, capsules, soft gels, gel caps, liquids or powders.
- ✚ Nutraceutical can be classified on the basis of their natural sources, as well as chemical constitution of the products. Most often they are grouped in the following categories: dietary supplements, functional food, medicinal food, farmaceutical. A dietary supplement represents products that contain nutrients derived from food products, and is often concentration in liquid, capsule, powder or pill form.
- ✚ Nutraceutical supplements are designed to “supplement” the diet. They are marketed in pre- dose forms. They have nutrition or physiological effects. They are taken in small measured quantities. They are not to be presented as ordinary or conventional foods.

### Commercially available nutraceuticals:

Table 4

Name of the nutraceutical product	Act as
Policosanols, black tea extracts, krill oil, novel soy protein fractions, poly methoxylated flavones (PMFs), avacado soy unsaponifiables (ASU), tocotrienols, reveratrol.	Cholesterol lowering
sasamin	Lowering blood

	pressure
Dehydroepiandrosterone (DHEA)	U pregulate endothelial nitric oxide synthesis enzyme
Bowellic acids, silymarin	Anti inflammatory
Conjugated linoleic acid	Body weight and fat management.
Di indolylmethane (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

**Table: 5**

**Classification of Nutraceuticals based on food sources.**

Food source	Example
Dietary fibers	Fruits, barley, oats, lignin, cellulose, pectin etc.
Probiotics	Lactobacilli, bifidobacteria etc.
Prebiotics	Chicory roots, banana, tomato and alliums, beans etc.
Poly unsaturated fatty acids	Fatty fish, flax seed, soy bean.
Anti oxidant vitamins	Fruits and vegetables
Poly phenols	Legumes, tea and soybean etc.
Spices	Most of the components of spices are terpenes and other constituent of essential oil.

**Nutraceutical are used in:**

- ❖ Cosmetics
- ❖ Nutraceutical for pets
- ❖ Cannabis industry
- ❖ Reusing packaging material (against plastic packaging)
- ❖ Sports nutrition

**Nutraceutical product in therapeutic areas:**

- ❖ Anti- arthritic
- ❖ Cold and cough
- ❖ Sleeping disorders
- ❖ Digestion and prevention of certain cancers
- ❖ Osteoporosis
- ❖ Blood pressure
- ❖ Cholesterol control
- ❖ Pain killers
- ❖ Depression and diabetes

**Prescription pattern of nutraceutical:**

Nutraceutical are increasingly becoming a part of diet in a health conscious society. Nutraceutical are increasingly perceived as beneficial to health and are being continuously used in the treatment of various diseases. It's important that a doctor educates the public and creates awareness of the required amount of nutraceutical that can be safely used. More studies need to be taken up on prescription of nutraceutical in healthcare.

**Nutraceutical product consists of microorganism:**

- ✚ “Friendly bacteria” are beneficial for humans similarly there are large number of soil bacterial which act as probiotics for plants. Bacteria such as *lactic acid bacteria* are used all over the world in a large variety of industrial food fermentations. Some of the starter bacteria used in dairy fermentation are the yoghurt bacterium *streptococcus thermophilus* and the cheese and butter (milk) bacterium *lactococcus lactis*.
- ✚ Large number of benefits using probiotics in nutraceutical: some of the benefits include:
  - ❖ Enhancing bowel function
  - ❖ Prevention of colon cancer
  - ❖ Lowering cholesterol
  - ❖ Lowering of blood pressure

- ❖ Improving immune function
- ❖ Reducing infections
- ❖ Reducing inflammation
- ❖ Improving mineral absorption
- ❖ Preventing of growth of harmful bacteria
- ❖ Fighting off disease like Candida and eczema.

### Development of nutraceutical product in future:

Scientific knowledge about nutraceutical, public should be educated where recommended daily doses of these nutraceutical should be known by consumer. The present accumulated knowledge about nutraceutical represents undoubtedly a great challenge for nutritionist, physicians, food technologists and food chemists. Nutraceuticals are destined to play an important role in future therapeutic developments but their success will be governed by control of purity, safety and efficacy without inhibiting innovation.

### Nutraceutical in disease prevention and treatment:

**Table: 6**

Name of the disease	Nutraceutical product in the form of
Cardiovascular disease (CVD)	Antioxidants, dietary fibers, omega-3 poly unsaturated fatty acids (n-3 PUFAs) vitamins and minerals [are recommended together with physical exercise for prevention and treatment of CVD].
Obesity	Conjugated linoleic acid (CLA), Capsaicin, momordica charantia (MC) and psyllium fiber.
Diabetes	Omega-3 fatty acids, ethyl esters of n-3 fatty acids, docosahexaenoic acid, lipoic acid, dietary fibers

	from psyllium.
Cancer	Antioxidant, phytochemicals, vitamins like D and E.
Immune booster	Omega-3 and omega-6, phytochemicals( cats claw), vitamin C and D
Anti inflammation	Herbal nutraceutical, phyto constituent gentianine present in gentian root.
Osteoarthritis	Glucosamine ( GLN) and chondroitin sulfate (CS)
Allergy	Group of poly phenolic substances like quercetin (QR) known as flavonoids

### Nutraceutical in degenerative disease prevention and protection:

**Table:7**

Name of the degenerative disease	Nutraceutical product in the form of
Macular degeneration	Herbal extracts such as garlic, green tea, bio flavonoids, and poly phenolic flavonoids.
Vision improving agents	Lutein dipalmitate is found in the plant Helenium autumnale. Lutein or Helenien, Zeaxanthin (traditional Chinese medicine)
Alzheimer's disease	Antioxidants like beta carotene, curcumin, Lutein, lycopene, turmerin etc.
Parkinson's disease	Vitamin-E in food may be protective against Parkinson's disease

### Conclusion:

Nutraceutical supplement helps to prevent from disease. Response of nutraceutical varies from person to person. The role of nutraceutical in clinical practice is emerging but important pharmaceutical and clinical issues needed to be answered. Many industries

manufacture and market the nutraceutical, where the effect side effect (especially consumed in large quantities) of these nutraceutical not reported or often unproven. In order to have scientific knowledge about the nutraceutical, publics should be educated, where recommended daily doses of these nutraceutical should be known by each consumer.

#### Reference:

1. ACME- Hardesty: (2019), your guide to nutraceuticals
2. Carol Dersarkissian(2020): top foods for calcium and vitamin-D
3. Dahiya K: (2013), Nutraceutical and their impact on human health. J plant Biochem physiol 1: e111.
4. David zieve, MD, MHA, medical director, Brenda conaway (2019): vitamin-K.
5. Hamid Nasri, Azar Baradaran, Hedayatollah Shirzad, Mahmoud Rafieian- Kopaei (2014): New concepts in Nutraceuticals as Alternative for pharmaceuticals.
6. Harish Dureja, Deepak Kaushik (2014): Development in nutraceutical in Indian journal of pharmacology, page: 363-372.
7. HARVARD T.H. CHAN school of public health: The Nutrition source: vitamin E
8. IBM Watson Micromedex, cerner Multum™ (2020): what are nutraceutical products?
9. Krishan Kumar, sarvesh Kumar (2016): Role of nutraceuticals in health and disease prevention: A review. Page: 116- 121.
10. Lipi Das, Eshani Bhaumik, Utpal Raychaudhuri, and Runa Chakraborty (2011): Role of nutraceuticals in human health. Page: 173-183.
11. Maddi V.S., Aragade P.D., Didde V.G. and Nitalikar M.N. (2007): Importance Oh Nutraceuticals In Health Management. Page: 377- 379.
12. NIH (2020): vitamin A- fact sheet for health professionals.
13. NIH (2019): Riboflavin- Fact sheet for consumers.
14. NHS: (2020): B vitamins and folic acid.
15. DR. Peter engal reviewed by Giorgio L Fata (2017): sources of vitamin B<sub>3</sub>.
16. A. Rajasekran, G Sivagnanam, R Xavier (2008): Nutraceuticals as Therapeutic Agent: A Review.
17. ReCHaN (2018): Resource Centre For Supplements and Nutraceuticals.
18. Sakthivel Lakshmana Prabu, Timmkondu Narasimman Kuppusami Suriya Prakash, Chellappan Dinesh Kumar, Subramaniam Suresh Kumar (2012): Nutraceuticals and their medicinal importance, review article. Page: 47-53.
19. Siddharth Gosavi, Mangala Subramanian, Rajendra Reddy, and Bharath L.Shet (2016): A Study Of Prescription Pattern Of Nutraceuticals, Knowledge Of The Patients And Cost In a Teritary Care Hospital.
20. Sowjanya Pulipati (2016): A Modern Approach to Boost Health: Nutraceutical. Page: 21-20.
21. Tomilav Mestrovic, MD, Ph.d.,(2018): what are Nutraceuticals