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Review paper

Unraveling the Impact of Neutraceuticals in Current Era

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Abstract:
Nutraceuticals is combination of nutrients and Pharmaceuticals. Use of food products to promote health and cure disease is prominent. Currently, most of the drug molecules available in the formulations were anciently used in their crude form. A nutraceutical may be defined as a substance, which has physiological benefit or provides protection against chronic disease. It may be used to promote health, delay the aging process, increase life expectancy, or support the structure and function of the body. Currently nutraceuticals have received considerable interest due to potential nutritional, safety, and therapeutic effects. Indian nutraceutical industry has great expectations. Over the last decade a wide range of products have been available, giving an insight into the tremendous growth.

Keywords: *Cardiovascular diseases, Health, Herbs, Nutraceuticals, Safety.*

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I. Introduction:

In recent years, due to adoption of modern lifestyle and change in diet we are facing many health issues like Obesity, Cardiovascular diseases, Diabetes.

As Hippocrates once said***, "let food be thy medicine and let medicine be thy food.***

Nutraceuticals, A hybrid between nutrition and pharmaceuticals are the emerging class of Natural products that make the line between food and drugs to fade. The term "nutraceutical" was coined from "nutrition" and "pharmaceutical" by Stephen De Felice. According to De Felice, nutraceutical can be defined as, "a food (or a part of food) that provides medical or health benefits, including the prevention and/ or treatment of a disease".[1]

Neutraceuticals are food or part of food playing a significant role in modifying and maintaining normal physiological functions of body. Nutraceuticals help in combating major health concerns like obesity, cardiovascular diseases etc.[2,3]

The food products used as nutraceutical are categorized as [4]

- Probiotic
- Dietary fibre
- Omega 3 fatty acid
- Antioxidant
- Polyphenols
- Spices

Table No.1. Nutraceuticals and their functional components

Class/ Components	Source	Potential Benefits
1.Polyphenols		
Anthocyanidine	Fruits	Neutralize free radicals, reduce risk of cancer
Proanthocyanidine	Cocoa, chocolate, tea	Reduce CVD (cardiovascular disease)
Saponins		
Saponins	Soyabeans	Lower cholesterol, anti-cancer
Prebiotics/ Probiotics		
Lactobacillus	Curd, yoghurt	Improve GIT

2.Phytoestrogen		
Zenistein	Soyabean, maize	Reduce menopause symptoms
Carotenoids		
b-caroteine	Oat, carrots, vegetables ,fruits	Neutralize free radicals
Luteine	Vegetables	Healthy vision
Lycopene	Tomatoes	Reduce prostate cancer
3.Dietary fibers		
Insoluble fiber	Wheat bran	Reduce breast, colon cancer
b- glucan	Oats	Reduce CVD

Table No.2. Herbs as Neutraceuticals:

Herbs	**Uses**
1)Aloe vera	Anti- inflammatory, emollient, wound healing
2)Evening primrose oil	Dietary supplement of linolic acid, treatment of atopic eczema
3)Garlic	Antibacterial, antifungal, antithrombotic, anti-inflammatory
5)Green tea	Antioxidant, reduce risk of CVD, enhance humoral and cell mediated immunity
6) Emblica officinalis (Amla)	Antimicrobial, antipyretic, antioxidant, cardio- and hepatoprotective, anticancer, anti-diabetic, analgesic, immunomodulatory effects
7)Withania somnifera (Ashwagandha)	Used for maintaining vitality and longevity, lack of libido, chronic illnesses including mental illness and fatigue. Possesses anti-microbial, antioxidant, immunomodulatory, cardiovascular, and hepatic protection and anti-aging effects
8)Bacopa monnieri (Bramhi)	Nervous system and a memory enhancer neuroprotective, immune-stimulatory, and antifertility effects.
9)Tinospora cordifolia (Guduchi)	Rich in Vitamin C and trace elements with antibacterial and immune-boosting effects. Known to generate immune resistance, boosting memory, digestive health.
10)Ocimum Sanctum (Tulsi)	Eugenol is the major component of Tulsi's essential oil and has wide importance as a nutraceutical. Secondary metabolites of Tulsi have antioxidant, anti-cancer, anti-inflammatory, anti-microbial, anti-stress, immunomodulatory and radiation protective activities.

Table No. 3. Neutraceuticals and uses

Neutraceutical examples	**Uses**	**Curable disease**
Turmeric{curcuma} (it contains main component curcuminoids)	Anti-ageging property and natural antibiotic	Used as antiseptic, and cough suppressant.
Milk (it contain calcium and lactic acid)	pediatric for bone growth	Used in treatment of bones and joints as well as chronic disease.
Asafoetida (sulfur containing compound-butyl propyl di –sulfide)	carminative, nervine tonic	Intestinal antiseptic
Indian colchicum (it contain colchicoresin)	It used in horticulture	Used to treat malignant tumor, gout and rheumatism

Table No.4.Marketed Products

Brand name	Components	Function
z-trim	Wheat	Zero calorie fat replacer
Fenulife	Fenugreek galactomannan	Control blood sugar
Teamax	Green tea extract	Potent antioxidant
Cholestaid	Saponin	Reduce cholesterol
Betatene	Carotenoids	Immune function
Xangold	Lutein esters	Eye health

Advantages of Neutraceuticals:

- Daily dose of vitamins and minerals.
- Improved muscular strength.
- Complementary or alternative treatment for some ailments.
- Helps in preventing various diseases.

Disadvantages of Nutraceuticals:

- Cost for supplements is comparatively higher than normal meals.
- Excess of vitamin supplements may be harmful.
- Mixing certain vitamins with others may interfere with absorption.

- Supplements are less healthy than food

Nutraceuticals in prevention of Disease:

1. Nutraceuticals for Cardiovascular Diseases

Leading cause of death globally is cardiovascular disease (CVD). Nutraceuticals can significantly reduce the risk of side effects associated with chemotherapy along with reducing the global health care cost. CVD can be prevented by lifestyle changes, including diet. Nutraceuticals tend to reduce circulating levels of LDL-cholesterol by modulating cholesterol production in the liver (i.e., monacolin, policosanol, red yeast, rice etc.), binding cholesterol within the intestines and/or increasing LDL-c receptor uptake in the liver (i.e., berberina, phitosterols etc.). Polyphenols found in grapes and grape derivatives, cocoa and tea are of interest in the prevention of CVD. Phenolic compounds are found in grapes, and these include anthocyanins, flavanols, stilbenes and phenolic acids. Antioxidants, Dietary fibres, Omega-3 poly unsaturated fatty acids, Vitamins, minerals for prevention and treatment of CVD. [5,6]

2. Nutraceuticals against Alzheimer's disease (AD)

Alzheimer's disease is the most common and feared form of dementia. Advanced age is often characterized by a decline in a large spectrum of cognitive abilities including reasoning, memory, perceptual speed, and language. Botanical extracts with anti-amyloidogenic activity, including green tea catechins, turmeric, Salvia miltiorrhiza, berry anthocyanins, and Panax ginseng have demonstrated significant efficacy in Alzheimer’s diseases.[7,8]

Bacopa monniera has been demonstrated as an Ayurvedic nerve tonic, indicating a potential role in helping prevent dementia and serving as a novel memory enhancer. Also, astaxanthin-rich algal biomass, fish oil including omega-3 fatty acids (PUFAs) have demonstrated a potential role in preserving memory, sustaining cognitive functions. [9]

3. Nutraceuticals for Diabetes

Isoflavones are phytoestrogens have a structural/functional similarity to human estrogen and have been consumed by humans worldwide. Cinnamon tea and green tea can help people suffering with diabetes. Dietary fibres from psyllium have been used for glucose control in diabetic patients and to reduce lipid levels in hyperlipidemia. Omega-3 fatty acids supplementation in type 2 diabetes has a favourable impact in lowering triglycerides and VLDL-cholesterol and reducing blood pressure and inflammatory markers.[10]

4.Nutraceuticals in Parkinson's disease

Nutraceuticals like vitamins C, D, E, coenzyme Q10, creatine, unsaturated fatty acids, sulfur-containing compounds, polyphenols, stilbenes, and phytoestrogens. Researchers found that curcumin the generation of reactive oxygen species (ROS), which are found to be involved in the programmed cell death. It also increases neuronal survival in the substantia nigra that is present in the midbrain and have a function in movement. It has found that zingerone inhibits the dopamine reduction in mouse model. [11,12]

5.Nutraceuticals in Hypertension

Melatonin, Hesperidin, pomegranate juice and grape seed extract have shown reduction in blood pressure. [13]

6.Nutraceuticals with Anti-inflammatory activities

Studies were conducted by many researchers on fish oil, primrose oil, curcumin, fenugreek, liquorice, coriander, tomato, carrot, sweet potato, broccoli, green tea, rosemary, hazelnut, walnut, wheat germ, beet roots, cucumber fruits, spinach leaves and date for anti-inflammatory properties. [14,15,16]

7.Nutraceuticals in Obesity

Herbals such as ephedrine, caffeine, ma huang-guarana, chitosan and green tea help in body weight loss.Capsaicin, found in red chili peppers leads to alteration of lipid metabolism-related proteins in white adipose tissue and skeletal muscle. Thereby it induces thermogenesis and fat oxidation.[17]

II. Conclusion:

Though nutraceuticals are proving to be beneficial to health a lot of research in this field needs to be done to explore their benefits and side effects. Health professionals in collaboration with Nutritionist and regulatory toxicologist should work strategically to plan a healthy regime for the benefit of mankind. In recent years, there has been an increasing interest in dietary supplements that provide health benefits and are alternatives to modern medicine. Nutrients, herbs, and dietary supplements are important building blocks of neutraceuticals helping to maintain good health and combat various disease conditions, thereby improving quality of life.

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