

Nutraceutical: - In treatment of various disease and health benefits

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ABSTRACT :-

Nutraceuticals, also known as functional foods or dietary supplements, are products that provide health benefits beyond basic nutrition. They are derived from natural sources and can be consumed in various forms, such as capsules, tablets, or powders. Nutraceuticals have gained popularity due to their potential to support overall wellness and prevent or manage certain health conditions. They contain bioactive compounds, such as vitamins, minerals, antioxidants, and phytochemicals, which have been shown to have positive effects on the body. These products are often used to complement traditional medical treatments and promote a holistic approach to health. They are believed to have various health benefits, including boosting the immune system, improving cognitive function, supporting heart health, and reducing inflammation. The use of nutraceuticals in the treatment of specific health conditions is an area of ongoing research. Studies have suggested their potential in managing conditions such as arthritis, diabetes, obesity, and cardiovascular diseases. However, it is important to note that nutraceuticals should not replace prescribed medications or medical advice. The market for nutraceuticals is continuously expanding, with new products and formulations being introduced regularly. It is essential to choose reputable brands and consult with healthcare professionals before incorporating nutraceuticals into your routine, especially if you have existing health conditions or are taking medications. In summary, nutraceuticals offer a promising avenue for promoting overall well-being and supporting specific health goals. However, it is crucial to approach their use with caution, considering individual needs and seeking guidance from healthcare professionals.

KEYWORDS: -Nutraceutical, Nutrition, immune system, dietary supplements, functional foods.

I. INTRODUCTION: -

The term “nutraceutical” is a combination of the words “nutrition” and “pharmaceutical.” This term reflects the dual nature of these products, as they provide nutritional value while also offering potential therapeutic benefits [1]. Nutraceuticals can be consumed in various forms, including capsules, tablets, powders, or beverages, making them easily accessible and convenient for individuals seeking to enhance their well-being [2]. What sets nutraceuticals apart from regular food and dietary supplements is their focus on delivering specific health benefits beyond basic nourishment. These products are formulated to target health concerns or support overall wellness. They contain a wide range of bioactive compounds, such as vitamins, minerals, antioxidants, probiotics, prebiotics, fatty acids, and phytochemicals, which have been extensively studied for their potential health-promoting properties. One of the main advantages of nutraceuticals is their potential to bridge the gap between nutrition and medicine [3]. While traditional pharmaceuticals are commonly used to treat or manage specific health conditions, nutraceuticals offer a more holistic approach to health and well-being. They aim to support overall wellness, prevent disease, and promote optimal health. Nutraceuticals have been studied for their potential in various areas of health. They have been recognized for their ability to boost the immune system, support cardiovascular health, improve cognitive function, enhance digestive health, reduce inflammation, and even aid in weight management. Some nutraceuticals have shown promise in managing conditions such as arthritis, diabetes, metabolic syndrome, and age-related macular degeneration [4]. It is important to note that nutraceuticals should not replace traditional medical treatments or prescribed medications. They should be used as a complementary approach to support overall health and well-being. Before incorporating nutraceuticals into your routine, it is

crucial to consult with healthcare professionals, especially if you have pre-existing health conditions or are taking medications. They can provide personalized guidance and ensure that the products are safe and suitable for your specific needs. The nutraceutical market continues to expand rapidly, Nutraceuticals are gaining popularity because they offer potential health benefits beyond basic nutrition. They contain bioactive compounds from natural sources and come in different forms like capsules and powders. Nutraceuticals can support immune health, cardiovascular health, cognitive function, and more [5]. It's important to remember they should complement, not replace, traditional medical treatments. Consulting healthcare professionals is crucial for personalized guidance.

CLASSIFICATION BASED ON TRADITIONAL: -

Dietary Supplements: These are products that contain one or more dietary ingredients, such as vitamins, minerals, amino acids, herbs, or other botanicals. They are intended to supplement the diet and come in various forms like capsules, tablets, powders, or liquids.

Functional Foods: These are foods that have been enhanced with additional nutrients or bioactive compounds to provide specific health benefits beyond basic nutrition. Examples include fortified cereals, probiotic yogurt, or omega-3 enriched eggs.

Medical Foods: These are specially formulated foods that are intended for the dietary management of a specific medical condition or disease. They are usually used under medical supervision and are designed to meet specific nutritional requirements. Examples include infant formulas for babies with cow's milk allergy or specialized enteral formulas for individuals with malabsorption.

Phytochemicals: These are bioactive compounds found in plants that have potential health benefits. They are often extracted and used in various nutraceutical products. Examples include polyphenols in green tea, curcumin in turmeric, or resveratrol in red grapes.

The classification of nutraceuticals using traditional methods helps to categorize these products based on their composition and intended use. It allows for better understanding and regulation of these products in the market. It's important to note that the regulation and classification of nutraceuticals may vary from

country to country. In some places, specific guidelines and regulations have been established to ensure the safety, quality, and efficacy of these products [6].

CLASSIFICATION BASED ON NON - TRADITIONAL: -

Personalized Nutrition: This approach recognizes that everyone has unique nutritional needs based on factors like genetics, lifestyle, and health conditions. By considering these factors, personalized nutrition aims to provide tailored nutraceutical interventions to optimize health outcomes.

Nutrigenomics: This field explores the interaction between nutrients and genes. It focuses on how an individual's genetic makeup influences their response to specific nutrients, allowing for personalized recommendations. Nutrigenomics has the potential to revolutionize the way we approach nutrition and nutraceutical interventions.

Novel Delivery Systems: Non-traditional classification also includes innovative delivery systems for nutraceuticals. This involves developing new technologies or formulations that enhance the bioavailability, stability, or targeted delivery of nutraceutical compounds. Examples include nanoencapsulation, liposomal delivery, or transdermal patches.

Nutraceuticals and Digital Health: With the rise of digital health technologies, there is an increasing integration of nutraceutical interventions with digital platforms. This includes mobile apps, wearables, and personalized tracking devices that provide real-time feedback and guidance for optimizing nutrition and wellness.

Nutraceuticals and Gut Health: The role of the gut microbiome in overall health has gained significant attention. Non-traditional classification encompasses the use of nutraceuticals to support a healthy gut microbiome, such as prebiotics, probiotics, and postbiotics. These interventions aim to promote digestive health and overall well-being.

It's important to note that these non-traditional methods are still evolving and may not have the same level of regulatory guidelines as traditional classifications. However, they hold promise for personalized and targeted approaches to nutrition and wellness [7].

ADVANTAGES OF NUTRACEUTICALS: -

Nutraceuticals are basically dietary supplements or food products that provide health benefits beyond basic nutrition. They are becoming

increasingly popular as people look for ways to support their overall wellness. Nutraceuticals can come in various forms like capsules, tablets, powders, or even functional foods and beverages [8].

One advantage of nutraceuticals is that they can fill in the nutritional gaps that may exist in our diets. Sometimes, it can be challenging to obtain all the necessary nutrients from our food alone. Nutraceuticals can provide additional vitamins, minerals, antioxidants, or other beneficial compounds that our bodies need to function optimally [9].

Another advantage is that some nutraceuticals have been associated with disease prevention [10]. For example, certain antioxidants like vitamin C and vitamin E have been studied for their potential to protect against certain types of cancer. Omega-3 fatty acids found in fish oil are known for their heart health benefits and may help reduce the risk of cardiovascular disease [11].

Nutraceuticals can also play a role in supporting specific aspects of health. For instance, if you're looking to support your joint health and reduce joint pain, supplements like glucosamine and chondroitin may be beneficial. These nutraceuticals can help improve mobility and quality of life for individuals with joint-related issues like osteoarthritis [12].

Additionally, some nutraceuticals have been studied for their potential cognitive benefits. Omega-3 fatty acids, phosphatidylserine, and ginkgo biloba are among the nutraceuticals that may support memory, focus, and overall brain health [13].

It's important to note that nutraceuticals are not meant to replace a balanced diet or medical treatment. They should be used as complementary support and it's always a good idea to consult with a healthcare professional before starting any new supplement regimen, especially if you have underlying health conditions or are taking medications.

NUTRACEUTICALS PROVIDE MANY HEALTH BENEFITS FOR INDIVIDUALS SEEKING TO SUPPORT THEIR OVERALL HEALTH AND WELL-BEING: -

Nutritional supplementation: Nutraceuticals can provide additional nutrients that may be lacking in a person's diet. They can help bridge the nutritional gap by providing essential vitamins, minerals, and other beneficial compounds.

Disease prevention: Some nutraceuticals have been associated with a reduced risk of certain diseases. For example, omega-3 fatty acids found in fish oil may help lower the risk of heart disease, while antioxidants like vitamin C and vitamin E may have a protective effect against certain cancers [11].

Joint health and mobility: Certain nutraceuticals, such as glucosamine and chondroitin, may support joint health and reduce joint pain associated with conditions like osteoarthritis. These supplements can help improve mobility and quality of life for individuals with joint-related issues.

Cognitive function: Nutraceuticals like omega-3 fatty acids, phosphatidylserine, and ginkgo biloba have been studied for their potential cognitive benefits. They may help support memory, focus, and overall brain health [13].

Digestive health: Probiotics are a type of nutraceutical that can support a healthy gut microbiome. They introduce beneficial bacteria into the digestive system, which may improve digestion, nutrient absorption, and overall gut health.

Energy and vitality: Some nutraceuticals, such as coenzyme Q10 and certain B vitamins, are involved in cellular energy production. They can help boost energy levels and combat fatigue, promoting a sense of vitality and well-being.

Skin health: Nutraceuticals like collagen peptides and antioxidants such as vitamin C and vitamin E are known for their potential benefits in promoting skin health. They may help improve skin elasticity, reduce signs of aging, and support overall skin integrity [14].

Weight management: Nutraceuticals can play a role in weight management by supporting metabolism, reducing appetite, or aiding in fat breakdown. For example, green tea extract and conjugated linoleic acid (CLA) have been studied for their potential to support weight loss efforts.

NUTRACEUTICALS AND DISEASE: -

Alzheimer's disease:

Alzheimer disease is characterized by memory loss as the major clinical symptoms. There are 26.6 million sufferers world wide from this disease[15] Nutraceuticals used in Alzheimer disease such as lutein, lycopene, turmeric, antioxidant.

AD) is characterized by progressive.

Dementia with memory loss is the major clinical symptom.

Alzheimer’s is the most common form of dementia. The various Nutraceuticals, which are used to cure Alzheimer’s disease are.

Antioxidants: antioxidants like vitamin E and vitamin C.

a) Ginkgo biloba: Ginkgo biloba is perhaps the most studied Herbs with reference to memory, cognition, overall brain Performance, and certainly AD.

a) Huperzine alpha: Huperzine alpha or Huperzine A is a

Very appealing plant compound that is extracted from the club.

They reduced damage by minimizing oxidative stress.

Folic acid and B-12 also reduce homocysteine amino acid level which.

Helps in the progress of disease.

Table No: - 1 [Alzheimer’s disease]

Disease	Source	Chemical constituents
1. Alzheimer’s disease	1. Acts on memory cognition to overall brain	Ginkgo biloba
	2. reduced damage oxidative stress	Huperin alpha
	3 Also helps in reduced homocysteine level of acid	Folic acid B - 12

Cancer:

Cancer has emerged as a major public health problem in developing countries. A high risk of cancer is associated with chronic inflammation risk like immune suppression which acts as risk factors for cancer . At the molecular level, free radicals and aldehydes produced during chronic inflammation can induced deleterious gene mutation and posttranslational modifications of key cancer-related proteins. In year 2000, malignant tumors were responsible for 12 per cent of the nearly 56 million deaths worldwide from all causes. According to the World Cancer Report the cancer rates there would be 15 million new cases in the year 2020 .Phytochemicals derived from herbs and

spices also have potential ant carcinogenic and anti-mutagenic activities, A broad range of “phytoestrogens” with a claimed hormonal activity, is recommended for prevention of prostate breast cancer : Beta Carotene and Sulphur Compounds are strong antioxidants that scavenge free radicals and thus oppose the enzymes that encourage tumor growth (Sabita and Trygve) curcumin(diferuloylmethane) which is a polyphenol of turmeric possesses anticarcinogenic, antioxidative and anti-inflammatory properties. Pectin (apples) prevents prostate cancer by inhibiting cancer cells from adhering to other body cells [16].

Table No: - 2[Cancer disease]

Disease	Source	Chemical constituents
1.Cancer	1. prevention prostate breast cancer	Beta carotene sulphur
	2. possesses anticarcinogenic, antioxidative, anti-inflammatory properties	Curcumin
	3. Inhibition of cancer cells	Pectin

Cardiovascular disease:

Cardiovascular diseases (CVD) are a chronic disease by means of disorders of the heart and blood vessels which generally including hypertension (high blood pressure), coronary heart disease (heart attack), cerebro-vascular disease (stroke), heart failure, peripheral vascular disease polyphenols (in grape) prevent and control arterial

diseases. Flavonoids (in onion, vegetables, grapes, red wine, apples, cherries

Block the ACE and strengthen the tiny capillaries that carry oxygen unhealthy diet considered as one part of culprit for cardiovascular risk. Omega -3, omega-6, omega -9 and folic acid [17]

Table No: -3 [cardiovascular disease]

Disease	Source	Chemical constituents
1. cardiovascular disease	1. Prevent and control arterial disease	Grapes
	2. Helps to block ACE and strengthen tiny capillaries	Flavonoids (onion, vegetable, grapes, red wine, apple)

Diabetes:

Diabetes mellitus is a disease caused due to abnormally high levels of blood glucose, either due to insufficient insulin production, or due to its ineffectiveness. There are two types of diabetes mellitus: type 1 diabetes (5%), an autoimmune disorder, and type 2 diabetes (95%), which is associated with obesity. Docosahexaenoic acid modulates insulin resistance and is also vital for neurovascular development. Dietary fibers from psyllium have been used for glucose control in diabetic patients and to reduce lipid [18].

Immune system:

Nutraceuticals have been shown to play crucial roles in immune status and

susceptibility to some disease conditions. Nutraceuticals that belong to the category of immune boosters are useful to improve.

Immune function. The Astragalus genus are also effective immune boosters. Astragalus stimulates development and transformation of stem cells in the marrow and lymph tissue to activate immune cells. Phytoestrogens mostly are recommended for prevention of various diseases related to hormonal imbalance. There is a special interest in soy isoflavones as potential superior alternatives to the synthetic selective estrogen receptor modulators, which are currently applied in hormone replacement therapy [19]

Table No: -4 [Immune system]

Disease	Source	Chemical constituents
Immune system	1. plays peculiar role in homeostatic maintenance	Vitamin A (Retinoic acid)
	2. Improve adaptive immunity	Vitamin C
	3. regulation of immune system	Vitamin B complex
	4. antioxidant properties	Riboflavin (vitamin B2)

Inflammation:

Inflammation is characterized by swelling, pain, redness and warmth and is a response of body tissues to irritation or injury. Nutrients that have been tested for osteoarthritis are ginger, soy, unspecified, glucosamine, chondroitin, S-adenosylmethionine. Although they are safe and well tolerated, the heterogeneity and inconsistent results of the studies hinder the results [20].

Diarrhea: -

In the treatment of diarrhea, certain nutraceuticals can help by providing nutrients, such as electrolytes and probiotics, which support a healthy digestive system. For example, probiotics are beneficial bacteria that can help restore the balance of gut flora and alleviate symptoms of diarrhea. Additionally, certain herbs and plant extracts, like ginger and peppermint, may have anti-inflammatory and soothing properties that can help ease digestive discomfort [21].

Table No: -5 [Diarrhea]

Disease	Source	Chemical constituents
Diarrhea	1. helps to provide nutrients	Electrolyte
	2. supports healthy digestive system	Probiotics
	2. Anti-inflammatory properties	Ginger and peppermint

II. CONCLUSION:

Nutraceuticals might be defined as substances that have physiological benefits or provide protection against chronic diseases.

Nutraceuticals can be used to support the body's structure and function, prevent chronic diseases, promote health, and slow down the aging process. They can also lengthen life expectancy. These days,

there is a lot of interest in nutraceuticals because of their possible benefits in terms of nutrition, safety, and therapy. Promising outcomes in a range of problems have been observed with these drugs in recent investigations. Much work has gone into providing oxidative stress-modifying indications for a number of diseases, including obesity, allergies, Alzheimer's, cardiovascular, cancer, diabetes, immunological, inflammatory, and Parkinson's disorders.

REFERENCES: -

- [1]. Nutraceuticals in Health and Disease Prevention" edited by Klaus Kramer and Peter R. Hollman.
- [2]. Nutraceuticals and Human Health: Scientific Evidence and Applications" edited by Debasis Bagchi and Harry G. Preuss.
- [3]. Nutraceuticals: A Complete Guide" by Preston Mason
- [4]. Nutraceuticals in Health and Disease Prevention" edited by Klaus Kramer and Peter R. Hollman.
- [5]. Galland L. Magnesium and immune function: an overview. *Magnesium*. 1988; 7:290-299. [PubMed] [Google Scholar]
- [6]. Traditional foods, functional foods and nutraceuticals K Bhaskarachary, SUDERSHAN R Vemula, SRM Gavaravarapu, APURVA KUMAR R Joshi Proceedings of the Indian National Science Academy 82 (5), 1565-1577, 2016
- [7]. Nutraceuticals: A review S Lakshmana Prabu, TNK SuriyaPrakash, C Dinesh Kumar, S SureshKumar, T Ragavendran *Elixir Pharm* 46, 8372-8377, 2012
- [8]. Nutraceutical-definition and introduction Ekta K Kalra *Aaps Pharmsci* 5(3), 25, 2003
- [9]. Antioxidant use in nutraceuticals U Cornelli – *Clinics in dermatology*, 2009 – Elsevier
- [10]. Role of nutraceuticals in health and disease prevention: a review K Kumar, S Kumar – *South Asian J Food Technol Environ*, 2015 – academia.edu
- [11]. Nutraceuticals: Reviewing their role in chronic disease prevention and management A Bergamin, E Mantzioris, G Cross, P Deo... -*Pharmaceutical* ..., 2019 – Springer
- [12]. Nutraceuticals in the management of osteoarthritis: a critical review RL Ragle, AD Sawitzke – *Drugs & aging*, 2012 – Springer
- [13]. Role of nutraceuticals in cognition during aging and related disorders P Singh, TM Sivanandam, A Konar... - *Neurochemistry* ..., 2021 – Elsevier
- [14]. Nutraceuticals for healthy skin aging ECFA Machado, L Ambrosano, R Lage... - ... foods for healthy aging, 2017 – Elsevier
- [15]. Nutraceuticals in cognitive impairment and Alzheimer's disease P Mecocci, C Tinarelli, RJ Schulz... - *Frontiers in* ..., 2014 – frontiersin.org
- [16]. Role of nutraceuticals in cancer K Dahiya, R Dhankhar – *Complementary and Alternative Medicine* ..., 2019 – igi-global.com
- [17]. Role of nutraceuticals in the prevention and treatment of hypertension and cardiovascular diseases QL Alves, SB Camargo, DF Silva – *J Hypertens Manag*, 2019 – pdfs.semanticscholar.org
- [18]. Nutraceuticals in the management of diabetes mellitus S Nimesh, VD Ashwlayan – *Pharm Pharmacol Int J*, 2018 – researchgate.net
- [19]. Immunity boosting nutraceuticals: Current trends and challenges S Basak, J Gokhale – *Journal of food biochemistry*, 2022 – Wiley Online Library
- [20]. Nutrition, Nutraceuticals and Bioactive Compounds in the Prevention and Fight against Inflammation S Surma, A Sahebkar, M Banach – *Nutrients*, 2023 – mdpi.com
- [21]. Probiotics and nutraceuticals: non-medicinal treatments of gastrointestinal diseases R Penner, RN Fedorak, KL Madsen – *Current opinion in pharmacology*, 2005 – Elsevier