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Nutraceuticals: A Review

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Abstract

The phrase "nutraceutical" refers to dietary items, either as a whole or in part, that have both therapeutic benefits and some nutraceutical value. Many metabolic and degenerative disorders, which are predominantly brought on by nutritional deficiencies, are now increasingly affecting the population. Health professionals and the public have recently given the pharmaceutical product Nutraceuticals considerable attention due to its use as nutritional supplements. Nutraceuticals are any ingredients used as food or as a component of food that have normal nutritional value and offer health advantages, such as illness prevention or health promotion. It can have a significant positive impact on health, particularly in the treatment and prevention of acute and chronic illnesses. The results of extensive research have shown that these drugs are used to treat a wide range of illnesses, including diabetes, cancer, arthritis, metabolic problems, and cancer. Ayurveda describes a lot more dietary aspects than are commonly known. Ayurveda's unique approaches include the advantages of food for medicinal purposes and the idea of nutraceuticals to enhance quality of life. This article highlights the value of nutraceuticals in Ayurveda and how to use them to treat a variety of illnesses and disorders.

Keywords

Nutraceuticals, Dietary supplements, Ayurveda, Various diseases.

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INTRODUCTION

The previous 50 years have seen a significant shift in human lifestyles as a result of urbanization, industrialization, stressful schedules, and shifting cultural norms. These influences have altered human eating patterns and forced people to consume quickly, quickly prepared meals, fast food, and junk food. The nutritional value [1] of our diet has been directly impacted by these habits, which have gradually reduced nutrient quantity and quality. Due to these modified eating patterns, immunological dysfunctions, metabolic problems, and degenerative diseases are now more common. People are becoming more aware of their health in recent years and are highly concerned with health management. Revolutions in medicine, phytomedicine, nutritional science, the food business, and health care over the past two decades have attracted a lot of public and professional attention [2].

Significant recent progress has been made in phytonutrients, food items, and nutraceuticals. Pharmaceutical businesses came up with this brilliant idea for wellness, disease prevention, and treatment. Healthy Aahar and Vihaar are directly related to the therapeutic concepts of Ayurveda. Aahar has been used as both traditional medicine and cuisine. In Ayurveda, the term Rasayana (Rejuvenation therapy) refers to a far broader idea than modern nutraceuticals.

It has been said by Hippocrates, some 2500 years ago "Let food be your medicine and medicine be your food". His framework is quite corresponding to the concept of nutraceuticals. Nutraceuticals are initially emerging as a class of natural goods [3,4] that have the potential to significantly close the gap between

food and pharmaceuticals. Combining the two categories of nutraceuticals, which are known to have originated from both plant and animal sources, presents an intriguing opportunity for the food industry to create a novel, widely favored food product in the future.

NUTRACEUTICALS

Any nontoxic food ingredient that has been utilized to promote health, including the prevention and treatment of disease, is referred to as a nutraceutical. In 1989, Stephen De Felicei combined the words nutrition and pharmaceutical to form the phrase nutraceutical. He defines a nutraceutical as a food or component of food that offers medical or health benefits, such as illness prevention and treatment. Isolated nutrients, herbal products, dietary supplements, genetically modified foods, and processed food products are all examples of nutraceuticals. Vitamins, lipids, proteins, carbs, minerals, and other essential nutrients are typically found in nutraceuticals [5]. These are sold as separate compounds or in combination in the concentrated form of pills, capsules, powders, and extracts.

The father of medicine, Hippocrates, acknowledged that food can act as medicine. The greatest medicine is food, according to Ayurvedaii. The separate or blended nutrients included in vitamin and mineral supplements. The substances included in nutraceutical supplements are really taken from entire meals. They are condensed and made into pills or capsules after extraction.

In order to facilitate comprehension and use, nutraceuticals can be arranged in a variety of ways, such as for dietary recommendations, clinical trial design, or academic instruction [6]. Nutraceuticals can be categorized in a variety of ways, such as according to their dietary origins, mode of action, chemical makeup, etc. All-natural food sources are used to create nutraceuticals.

In addition to the basic nutritional content inherent in foods, nutraceuticals are products made from food sources that claim to offer additional health advantages [7]. Products may make claims to prevent chronic diseases, enhance health, slow down the aging process, lengthen life expectancy, or support the structure or function of the body, depending on the applicable laws.

Classification of Nutraceuticals

1. Dietary supplement [8-13]

A product that comprises dietary elements produced from food items is referred to as a dietary supplement and is meant to increase the diet's nutritional value. Dietary supplements, like the vitamin B supplement pictured above, are frequently offered for sale as pills. A product that is consumed orally and contains a "dietary ingredient" meant to supplement food is referred to as a dietary supplement. Vitamins, minerals, herbs or other botanicals, amino acids, as well as compounds like enzymes, organ tissues, glandular, and metabolites, may all be considered "dietary ingredients" in these products. Dietary supplements come in a variety of forms, including tablets, capsules, soft gels, gelcaps, liquids, and powders [8]. They can also be extracts or concentrates.

a) Nutrients:

Dietary elements include things like vitamins, minerals, amino acids, fatty acids, and antioxidants. Vitamins are crucial for the functioning of enzyme systems and metabolism. Minerals are essential for growth, reproduction, and immunity. Healthy cell membranes, skin, and hair as well as the appropriate operation of the neurological system, immune system, and hormones are all due to fatty acids. Antioxidants shield cells from deterioration and age.

b) Herbals:

With the aid of herbal remedies, nutraceuticals show considerable promise for enhancing health and preventing chronic diseases. Omega-3 fatty acids, for instance, are found in flax seed oil and powder, which have anti-inflammatory, analgesic, antipyretic, and astringent properties.

c) Phytochemicals:

Phytochemicals are nutraceuticals as well as secondary metabolites. These are compounds found in non-nutritive plants that are either defensive or disease-protective in nature. Phytoestrogens, polyphenols, isoflavonoids, anthocyanidins, terpenoids, carotenoids, limonoids, phytosterols, glucosinolates, and polysaccharides are the main phytochemicals. By preventing chronic degenerative diseases like cancer, coronary heart disease, diabetes, high blood pressure, inflammation, microbial, viral, and parasitic infections, psychotic illnesses, spasmodic conditions, ulcers, osteoporosis, and related disorders, dietary intake of phytochemicals may benefit health. Phytonutrients are present in the majority of foods, including whole grains, legumes, fruits, vegetables, and herbs.

d) Probiotics:

These are live microbial feed supplements that will balance the bacteria in the animal's intestines. Certain probiotics are used to treat lactose intolerance, severe diarrhea, and gastrointestinal adverse effects brought on by antibiotics. They aid in the ß-galactosidase enzyme's synthesis, which hydrolyzes the problematic lactose into its

constituent sugars. The most crucial probiotics are bifidobacterial and lactobacillus bacteria.

e) Prebiotics:

Prebiotics are dietary supplements that help probiotics grow and thrive. These are the food components that modify the makeup or metabolism of the gut flora in a targeted manner to influence the host. These are special short-chain fructo-oligosaccharides that cannot be metabolized by people due to their unusual chemical configurations. Consuming prebiotics typically encourages the growth of lactobacillus and other beneficial bacteria in the gut, which aids in metabolism. It helps with detoxification, dyslipidemia, constipation alleviation, and certain tumors. It also benefits lactose tolerance. Prebiotic inulin has been utilized extensively in processed foods. Prebiotics are produced enzymatically or through the breakdown of polysaccharides derived from dietary fibers or starch and commercially isolated and concentrated from fruits and vegetables. Prebiotics can be found, among other things, in chicory roots, onion, garlic, bananas, tomatoes, and alliums.

e) Nutraceutical Enzymes:

Enzymes are vital components of the body that carry out several biological processes. Numerous symptoms of hypoglycemia, hyperglycemia, digestive issues, and obesity are eliminated by adding enzyme supplements to the diet.

f) Dietary Fibers:

Dietary fibers are edible plant material that is processed by gut bacteria rather than digestive enzymes in the digestive tract. Non-starchy polysaccharides like cellulose, hemicelluloses, gum and pectin, lignin, and resistant dextrins are examples of dietary fiber. Dietary fibers' soluble parts have the ability to produce viscosity and bulk, which delays the stomach's gastric emptying. This has an impact on the rate of digestion, nutritional absorption, and fullness sensation. It improves glucose tolerance and decreases LDL.

Dietary fiber is any meal or, more specifically, any plant material, that is not degraded by digestive tract enzymes but rather is digested by gut bacteria. Non-starch polysaccharides (NSP) such cellulose, hemicellulose, gums and pectins, lignin,

2. Functional food/Fortified nutraceutical:

Functional food is regular food that has additional components or ingredients for a specific medical or physiological benefit in addition to its purely nutritional function. Japan was the country to first develop the idea of functional food in 1991. Nutraceuticals are functional foods that assist in the treatment or prevention of diseases other than anemia. It is a food that has been fortified with additional nutrients or substances. Examples include vitamin D-fortified milk, calcium-fortified orange juice, and folic acid and fiber added to cereal grain. Functional foods are processed to be fortified or enriched, then sold as having some advantage for customers. In some cases, complimentary extra nutrients are given, like vitamin D to milk.

3.Farmaceuticals / Recombinant nutraceuticals:

Farm and pharmaceuticals combine to form the word "farmaceuticals." In agricultural circles, the word "farmaceuticals" is more usually connected with the medical uses of genetically modified plants or animals. Biotechnology is used to generate foods that provide energy, including bread, wine, fermented starch, yogurt, cheese, and vinegar, among others. Biotechnology enables the creation of probiotics, the enzyme/fermentation-based extraction of bioactive components, and genetic engineering technology.

4. Medical food:

The medical foods are designed for internal administration or ingestion under the guidance of a physician and are intended for the specific dietary management of a specific disease or conditions for which specific nutritional requirements, based on accepted scientific principles, are established by the medical evaluation. The FDA regulates medical foods, which are either prescribed or under medical supervision.

Nutraceuticals as Therapeutic Agents [14-18]

The majority of the nutraceuticals do possess multiple therapeutic benefits and have been claimed to have physiological benefits or provide protection against various diseases as the following products: Cardiovascular agents anti-obese agents, anti-diabetic agents, anti-cancer agents, immune boosters, substances that manage chronic inflammatory, disorders and formulations to cure degenerative diseases.

Flavonoids As Nutraceutical Ingredients

The major active nutraceutical ingredients in plants are flavonoids. As is typical for phenolic compounds, they have antioxidant, antimicrobial, antibacterial, antiviral, and antifungal, anti-ulcer, hepatoprotective, anti-inflammatory, anti-diabetic, vasorelaxant, antiatherosclerosis, anti-thrombogenic, cardioprotective and anti-neoplastic activities in addition to their profound effects on the central nervous system.

Nutraceuticals and Medicinal Importance Available From

Traditional and Non- Traditional nutraceuticals Wide variety of nutraceutical foods are available in the market which falls in the category of traditional foods and nontraditional foods.

a) Traditional Nutraceuticals

Traditional nutraceuticals include foods that have not been altered in any way; they are just natural, whole foods with updated knowledge of their potential health benefits. Other than how they are perceived by consumers, the foods themselves have not changed. In addition to providing basic nourishment, many fruits, vegetables, grains, fish, dairy, and meat products also contain a number of natural ingredients, such as lycopene in tomatoes, omega-3 fatty acids in salmon, or saponins in soy. Some studies have found that even chocolate and tea have health-promoting properties. Salmon and tomatoes are two food items that have been identified by researchers to have advantages over standard nutrition; these advantages come from lycopene and omega-3 fatty acids, respectively.

b) Nontraditional Nutraceuticals-

They are the outcome from agricultural breeding or added nutrients and/or ingredients such as orange juice fortified with calcium, cereals with added vitamins or minerals and flour with added folic acid are nontraditional nutraceutical. Agricultural scientists have successfully come up with techniques to boost the nutritional content of certain crops.

Nutraceuticals and Various Diseases

Nutraceuticals against Alzheimer's disease (AD) Alzheimer's disease (AD), also called senile dementia of the Alzheimer type (SDAT), primary degenerative dementia of the Alzheimer's type (PDDAT), or simply Alzheimer's, is the most common form of dementia. The various nutraceuticals which are used to cure Alzheimer's disease are as follows: - Antioxidants are essential in the treatment of almost all diseases because most chronic diseases carry with them a great pact of oxidative stress. Oxidative stress plays a chief job in neurodegenerative diseases such as Alzheimer's disease (AD)

The aging process accelerates oxidative stress, as does a diet deficient in antioxidants. Numerous studies have linked a high intake of dietary antioxidants with a reduced risk of AD, which is crucial because preventing disease is far simpler than treating it. Therefore, prevention is essential, and studies indicate that avoiding AD is actually not that difficult. Antioxidant therapy offers a potential solution for delaying the onset of disease. You consume an abundance of antioxidants through food, including flavonoids and well-known antioxidants like vitamin E and vitamin C.

Obesity is a complicated disorder that affects almost all ages and socioeconomic groups and has major social and psychological implications. It has been suggested that weight loss programs concentrate on obtaining a modest loss of weight of 7–10% of the starting weight. An energy imbalance occurs when energy intake exceeds energy expenditure, and the result is obesity. Modifying one or both of the components of energy balance is necessary to combat obesity, whether through prevention or treatment. diet intake, energy expenditure, and energy storage are thus three different areas of the energy balance systems that can be targeted by weight control strategies (including a functional diet strategy).

Osteoarthritis (OA), a debilitating joint disorder, is the most common form of arthritis in the United States, where it affects an estimated 21 million people. In 2004, the direct and indirect health care costs associated with all forms of arthritis were approximately 86 billion dollars. Joint discomfort from OA and other joint disorders may reduce physical activity in individuals experiencing this condition, resulting in energy imbalance and weight gain. Increased weight can exacerbate existing problems, through additional stress on joints Glucosamine (GLN) and chondroitin sulfate (CS) are widely used to alleviate symptoms of OA. These nutraceuticals have both nutrient and pharmaceutical properties and seem to regulate gene expression and synthesis of NO and PGE2, providing a plausible explanation for their anti-inflammatory activities. Many diseases start from nutritional deficiency.

CONCLUSION

Numerous Ayurvedic remedies offer outstanding nutritional advantages. A challenge for pharmaceuticals is the large number of traditional preparations that have not been used in treatments. Additionally, there is a need for more research and development on these nutritional supplement compositions. The way that nutraceuticals work depends on the individual. Each person's susceptibility to a specific disease is influenced by their lifestyle, environment, and genetic predisposition. But there is no disputing the importance of nutraceuticals in the treatment, prevention, and prevention of a number of diseases.

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