

ROLE OF NUTRACEUTICALS IN HUMAN HEALTH

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ABSTRACT

A nutraceutical is a pharmaceutical alternative which have physiological benefits. "Nutraceutical," a combination of "nutrition" and "pharmaceutical," is a meal or food product that claims to boost health and treat or prevent disease. Since it does not match the legal definitions of "food" or "drug," "nutraceutical" falls into a "grey area" between them. "Nutraceuticals" can include isolated nutrients, herbal products, nutritional supplements and regimens, genetically modified "designs" foods, and processed foods like cereals, soups, and drinks. Nutraceuticals are functional foods. Nutraceuticals improve physiology and prevent chronic diseases. They prevent and treat illness. Due to consumer awareness of health care, the promise of a "nutraceutical" pharmacological breakthrough as an alternative to current treatment has been appealing. Public health awareness has opened this door. The revolution will change medicine and health by making the food sector research-focused like the pharmaceutical industry. This article discusses the definition, origins, evolution, categorization, problems, opportunities, regulation, global market context, and motives for nutraceutical development.

Key Word: *Nutraceutical, pharmaceutical, phytochemical, curcumin, polyphenols.*

INTRODUCTION

As a result of progress in economics, people now have a better standard of living in terms of their income, the amount of money they spend, and the way they live their lives. On the other hand, it has also presented a significant obstacle in the shape of so-called "lifestyle diseases." The first thing to go as a result of this shift in lifestyle has been our eating routine. The consumption of fast food has skyrocketed, which has contributed to a rise in the number of ailments that are caused by a lack of proper nutrition and nutraceuticals have the potential to play a significant part in their management. It is hardly surprising that an increasing number of individuals are turning to nutraceuticals. The relationship between what we eat and how we feel has been known for a very long time. The ancient Greek physician Hippocrates is credited as having remarked, "Let food be thy medicine and medicine be thy food." There are many instances of foods that have been used to prevent sickness and treat illness in traditional medicine throughout the world. Food, on the other hand, has come to be seen primarily as a source of sustenance (that is, energy, protein and fat), to the exclusion of being used for any other reasons, as a result of the impact of rationalistic Western medicine. However, a rising body of research shows that focused nutrition utilising naturally occurring compounds may be able to stabilise or perhaps cure many of the world's most difficult health conditions, even as shifting demographics accelerate the spread of chronic illnesses. This comes at a time when changing demographics are helping to speed up the spread of chronic diseases. Hippocrates, who lived from 460 to 377 BC and is widely regarded as the "Father of Modern Medicine," is credited with coining the phrase "Let food be thy medicine and medicine be thy food." Hippocrates made this statement in order to forecast the association between proper diets and health as well as

the therapeutic effects of foods. Isolated nutrients, herbal items, dietary supplements, and even diets can all fall under the category of nutraceuticals. The consumption of nutraceuticals does not have any adverse effects because they are non-toxic. The phrase "nutraceuticals" is a compound word that is formed by combining the terms "nutrients" and "pharmaceuticals." Products that fall within the categories of pharmaceuticals, food additives, and dietary supplements are referred to as "nutraceutical".

Classification of nutraceutical

A. According to the component chemicals

1. Nutrients: Vitamin A, K, E, C, B1, B2, B3, B6, folic acid; calcium, iron, magnesium, phosphorous, chromium, cobalt, copper, and iodine.
2. Herbal remedies or botanical remedies
3. Dietary supplements
 - a. Ketogenic diets
 - b. Grains that have been minimally refined
 - c. Phytoestrogens
 - d. Several different kinds of edible mushrooms
 - e. Sulphates of glucosamine and chondroitin
 - f. Peptides and hydrolysates
 - g. Dairy products

B. Nutraceuticals That Aren't Considered to Be Traditional Alongside Those That Are

1. Nutraceuticals that are considered traditional
2. Nutraceuticals that are not considered traditional

C. Due to various disorders

- Diabetes comes in first, followed by obesity, and then cancer.
- Activities that reduce swelling and inflammation
- Allergy
- Alzheimer's illness
- Agents that improve one's vision
- Osteoarthritis

The Ideology Behind Nutraceuticals

Nutrients necessary for good health and medical treatments for illness and damage equal the nutraceutical and pharmaceutical approach to preventative medicine. It is necessary to obtain clinical test findings, as well as results from research and experiments conducted on animals, in order to verify the effects of a pharmaceutical product before it can be developed. On the other hand, in the field of nutrition, there was no technique of checking whether or not certain meals were effective in warding off sickness in the past. In more recent years, however, it has become scientifically established that the composition of food can create diseases connected to lifestyle choices.

OBJECTIVES OF THE STUDY

1. Study of Nutraceuticals.
2. Study of health benefits.

A. Nutraceutical Scenario in India

The nutraceutical business in India has a bright future ahead. It is estimated that the nutritional market in India is worth one billion dollars. whereas the worldwide market is expanding at a compound annual growth rate of 7%. The Indian market has been expanding at a compound annual growth rate of 18% over the course of the past three years. In a market that is worth USD 1 billion, functional food holds a market share of 54%, which is followed by the market share of dietary supplements at 32% and the market share of functional beverages at 14%. The market situation is depicted in figure 1.



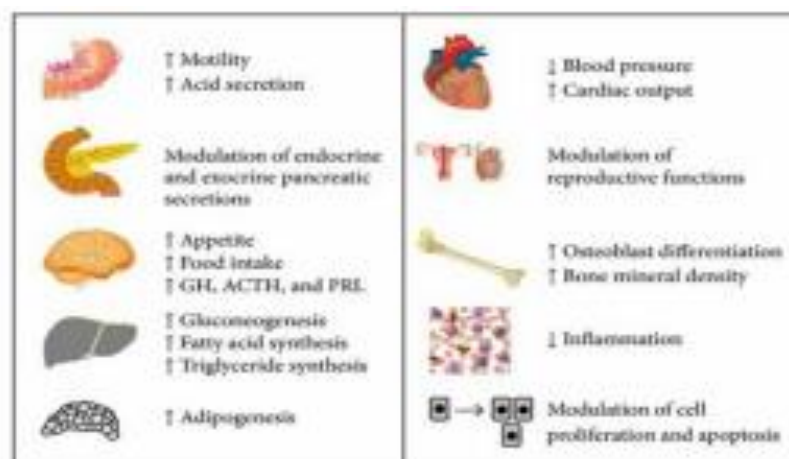
Fig. 1 indian market scenario

Significance of nutraceutical

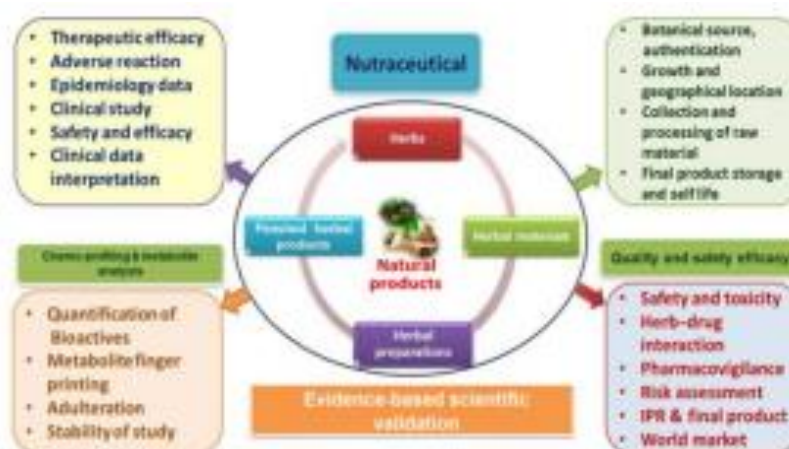
1. Raise the overall nutritional quality of our diet.
2. Help us live longer.
3. Help us to prevent certain medical disorders.
4. Application in the diagnosis, treatment, and prevention of illnesses.
5. It is commonly consumed in the form of food.
6. Maximize the positive effects on one's health.
7. Have no unintended consequences or impacts.

8. Can be utilized in any conditions related to cardiovascular disease and cancer.

The Positive Effects That Nutraceuticals Have On The Body's Regulatory Processes



Nutraceuticals are therapeutic foods that serve a function in maintaining welfare, enhancing health, modulating protection and as a result, preventing as well as treating certain illnesses. Therefore, the field of nutraceuticals may be conceived as one of the erroneous building elements in the process of improving a person's physical state.



Participation in Cancer

Nutraceuticals have the potential to slow the rate at which cancer cells multiply. It also has the potential to minimize the toxicity associated with chemotherapy and radiation, both of which stop the multiplication of cancer cells and cause them to commit suicide. Nutraceuticals have the potential to boost the activity of natural killer cells. Nuclear factor κ B (NF- κ B) is a transcription factor that is responsible for the formation of growth by modifying the genes of cell, cell adhesion, inflammation and growth. However, certain of the phytochemicals have an effect on that factor, blocking the activation process and so reducing the risk of developing cancer. The following is a list of some of the phytochemicals that are utilized in the treatment of cancer:

1. Polyphenols:

- Resveratrol may be found in a variety of foods, including peanuts, pistachios, grapes, both red and white wine, blueberries, cranberries, and even cocoa and dark chocolate. It is a polyphenol that has been shown to have health benefits. It possesses a natural ability to inhibit cell proliferation. It inhibits the growth of cancer cells and works as an anticancer agent.
 - Epigallocatechin-3-gallate, often known as EGCG, is most commonly found in green tea. However, it may also be found in other fruits, albeit in much lower concentrations, including cranberries, strawberries, blackberries, kiwis, cherries, pears, peaches, apples, and avocados. Because of its low bioavailability and the ease with which it may be converted into inactive methylated metabolites, it has several restrictions.
 - Quercetin: Quercetin is the flavonoid that is found in the greatest abundance. Onions, apples, grapes, berries, broccoli, citrus fruits, cherries, and tea are some of the foods that naturally contain quercetin. The process of inducing apoptosis in cells is connected to the effects that quercetin has.
 - Anticancer properties can be possessed by phenolic substances such as curcumin, gallic acid, ferulic acid, and caffeic acid. Curcumin may be found in turmeric, while gallic acid can be found in flax seeds, walnuts, hops, and apples among other foods. Ferulic acid may be found in pineapple, asafetida, cereals, vegetables, beans, artichoke, peanuts, and other nuts and seeds, as well as in the seeds of coffee plants. Caffeic acid may be found in berries, cabbage, apples, radishes, coffee, wine, and turmeric, among other foods and beverages.
1. Lycopene: Tomatoes, guava, pink grapefruit, and watermelon are excellent sources of lycopene. Lycopene is known for its powerful antioxidant properties due to the fact that it is an unsaturated compound. It does this by reducing oxidative stress and the amount of damage done to DNA.
 2. Tannins: Grapes, tea, blackberries, blueberries, and cranberries all contain tannins. Tannins are also found in cranberries. It eliminates cancer-causing free radicals and carcinogens by acting as a scavenger.
 3. Saponins: Peas, soybeans, tomatoes, potatoes, alfalfa, and spinach all contain this compound, which is also found in alfalfa. Because of its anti-tumor effect, it reduces the likelihood of developing cancer. It causes an action that stops cancer cells from developing, hence it is quite effective.
 4. Pectin's are a type of soluble fiber that may be found in apples. They limit the spread of prostate cancer by preventing cancer cells from sticking to other cells in the body and so preventing metastasis.
 5. Vitamins: The vitamins A, C, and E all have the ability to act as an antioxidant. Vitamin A deficiency increases cancer.
 6. Beta-carotene: It is found in Tomatoes, Sweet Potatoes, Oranges, Broccoli, Carrots, and Spinach Beta-carotene may be found in vegetables and fruits that are yellow, orange, or green with leafy greens. It protects against cancer thanks to its antioxidant properties.
 7. Garlic: The allyl sulfur compounds found in garlic have the potential to reduce the risk of developing cancer. Garlic's flavonoids have been shown to have potent anticancer properties and to destroy cancer cells.

8. Marine nutraceuticals: The phytochemicals acetylpoaranotin, astaxanthin, and siphonaxanthin, which may be found in marine resources, are employed in the treatment of colon cancer.

Nutraceuticals Can Be Either Food Or Medicine.

One possible distinction between a nutraceutical and a food is that a nutraceutical is not likely to have a proven nutritious value, but a food typically does. Foods are needed to contain some nutritious value and must be labeled with this information in order to be held accountable for these qualities. One other distinction that can be made between a feed (food) and a nutraceutical is that GRAS status can be attained by feed but not by nutraceuticals. Nutraceuticals are pharmaceutical products (pills, capsules, powders, and the like) that include a concentrated version of a putative bioactive phytochemical or zoochemical agent derived from a food and are used with the intention of enhancing health in doses that are higher than those that could be received from regular foods. Nutraceuticals are used for the goal of improving health in dosages that are higher than those that could be obtained from normal foods. The legislation in the majority of nations classifies nutraceuticals as dietary supplements; hence, regulation of these products is not as strict as that of pharmaceuticals.

Both Difficulties And Prospects May Be Found Here.

The pharmaceutical model, which is focused on the efficacy of single agents, has undergone a paradigm change as a result of the widespread consensus that the health-related features of foods are not because of individual components of food stuffs. This has caused a paradigm shift in the field of nutraceuticals. Because many of the bioactive phytochemicals that are the subject of this research were overlooked for a considerable amount of time, there are currently no procedures for their handling or quantification. This new category of health items, which falls between the categories of food and medications, presents a number of issues for government regulatory authorities as well. The fields of biotechnology and genetic modification are sometimes grouped together with the fields of nutraceuticals and functional foods, which can lead to confusion and misunderstanding in all three areas.

Worldwide Nutraceutical Market

The global market for nutraceuticals has demonstrated significant growth rates over the past twenty years, and the global nutraceuticals business is currently worth multiple billion dollars. However, the European market is falling behind in this growth: whereas both the worldwide and the United States markets increased by more than 10-fold between 1999 and 2006, going from \$5.7 billion to \$75.5 billion, the European market only increased by 5-fold over that time period. With an annual growth rate that is greater than 7%, the global nutraceuticals industry is now the largest and most quickly increasing nutraceuticals market in the whole globe. In the United States, around two-thirds of the population uses some kind of nutraceutical health product. This number may be higher in other states. 72% of individuals polled in the United States take supplements to feel better, 67% to avoid sickness, 50% to live longer, 37% to build muscle and strength, 12% for weight management, and 33% on the recommendation of a physician. This information comes from a poll that was conducted in 2001 by Harris Interactive in Rochester, New York, USA. It is noteworthy that 53% of respondents said that nutraceuticals offer advantages that cannot be matched by traditional medications while also having fewer adverse effects. (Dietary Supplement Education Alliance, 2001) A staggering 95% of people reported being pleased with their supplements.

Applications

Because of the advent of the industrial age, an increase in work and living pace, longer work schedules, and a variety of psychological demands, the lifestyles of human beings have undergone a dramatic transformation, which has resulted in a rise in the prevalence of diabetes, obesity, as well as a number of other cancers and cardiovascular illnesses. Endogenous substances are the most common type of nutraceutical. These are natural chemicals that are capable of causing a physiological response in otherwise healthy persons. Nutraceuticals that are intended to be consumed as part of a diet are known as dietary nutraceuticals. Some examples of dietary nutraceuticals are soy isoflavones, alpha lipoic acid, and carotenoids, to mention just a few. Some plant components, such as resveratrol from grapes and wine, are examples of separate entities that are rapidly becoming available. Other plant constituents, such as pycnogenol, are examples of complex mixtures of constituents. Both glucosamine and chondroitin, which belong to the class of molecules known as glycosaminoglycans (GAGs), originate from different parts of animals.

New Directions in Research and Development for Nutraceuticals

Nutraceuticals are destined to play an essential part in the future advances of therapeutic treatments and will continue to appeal to a large population owing to the ease that they provide for today's lifestyle. Increasing numbers of people are becoming aware of the importance of physical fitness and health as a result of increased coverage of these topics in the media. As a result, the majority of the public is beginning to adopt better lifestyles by exercising more and eating healthier foods. The rise of the nutraceuticals industry in India is helping to drive expansion in the market for nutraceuticals throughout the world. It would appear that the burgeoning market for nutraceuticals is going to dominate the industry in the new millennium.

- Many prominent researchers in the scientific community feel that enzymes constitute an intriguing opportunity for the nutraceutical business. "Enzymes have been underemployed. They are likely to be a very popular topic in the years to come.
- The technique of microbial fermentation has significant potential for promise.
- The use of nutraceuticals into applications related to sports medicine is intriguing. (Action Sports Hub, often known as ASH, is the premier institute for developing future champions.)
- According to Eileen Mourry, the Business Manager for nutrition at Eostman Chemical in Kingsport, Tennessee, "tocotrienol is promising for nutraceuticals because of its health benefits. The two major carotenoids, lutein and lycopene, possess tremendous nutraceutical potential." "Research demonstrates that tocotrienols are effective antioxidants. The results of several preliminary studies suggest that it may also have anticancer benefits.
- Growing beta glucan is something that interests Gerry McKierman. "We received a great deal of interest in our natural fermentation grade betaglacans," the company said. It is essential for lowering soluble forms of cholesterol and also combats colon cancer.

CONCLUSION

The rise of the nutraceutical business is far outpacing that of the food and pharmaceutical industries combined. Researchers and industry professionals have a wealth of options to capitalize on the usefulness of nutraceuticals, thanks to the outstanding prospects presented by these products. The current body of knowledge that has been gathered concerning nutraceuticals unquestionably poses a significant challenge for nutritionists, medical doctors, food technologists, and food chemists. Although nutraceuticals are starting to carve out a

space for themselves in clinical research, there are still significant pharmacological and clinical difficulties that need to be investigated further. Therefore, switch to nutraceuticals, which are food-based medications supported by scientific data, and let food be your medicine. Herbal nutraceutical is a potent weapon in sustaining health and acting against nutritionally caused acute and chronic diseases, hence promoting optimal health, longevity, and quality of life. Herbal nutraceutical can also be used to prevent nutritionally induced acute and chronic diseases.

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