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NUTRACEUTICALS: AN OVERVIEW

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ABSTRACT

Traditional use of medicines is recognized as a way to learn about potential future medicines. The World Health Organization estimates that 80 percent of the world's population presently uses herbal medicine for some aspect of primary health care. Nutraceuticals are the hybrid of 'Nutrition' and 'Pharmaceutical'. nutraceutical refers to food having a medical effect on the health of human being.it consist of food supplements, herbal Products, Probotics and prebiotics,medical food meant for prevention and tratment of diseases.In recent years there is a growing interest in nutraceuticals which provide health benefits and are alternative to modern medicine. Nutrients, herbals and dietary supplements are major constituents of nutraceuticals which make them instrumental in maintaining health, act against various disease conditions and thus promote the quality of life.these nutraceuticals help in combating some of the major health problems such as obesity, cardiovascular diseases, cancer, osteoporosis, arthrities, cholesterol . In whole, 'Nutraceutical' has led to the new era of medicine and health, in which the food industry has become a research-oriented sector.

KEYWORDS: Nutraceutical, Dietary supplements, antioxidants, prebiotics, Nutrition.

INTRODUCTION[1,2,3,4]

Consumers today are deeply concerned about their own food habits, health and lifestyle. With globalisation, the quality of life has improved with economic development. A major challenge in the form of lifestyle diseases has also risen, in addition to growth. Consumption of junk food has increased numerous, resulting in a number of nutritional deficiencies-related diseases. It may play an important role in regulating nutraceuticals. The word 'nutraceutical'

comes from two different words - 'nutrition' and 'pharmaceutical' These products may range from isolated nutrients, nutritional supplements, and unique diets to genetically modified foods and herbal products. Nutraceuticals can be defined as "alternative beneficial products produced wholly or partially from foods that maintain optimum health and function against nutritionally induced diseases, thereby promoting the quality of life."

A modern food wellness model has emerged over the past few years, placing more emphasis on the beneficial aspects of food. The modern lifestyle embraced today by humans has changed the latter's simple food habits. People today have modified the latter's simple alimentary habits. Consumption of fast food has exploded, leading to a variety of diseases caused by poor nutrition. Now obesity is recognised as a global epidemic. In most developing countries worldwide, heart disease appears to be a primary cause of death, followed by cancer, osteoporosis, arthritis and many more. Consumers who are dissatisfied with the costly, high-tech approach to treating disease in current medicines want to supplement alternative beneficial products and the complexity of managed care makes Nutraceuticals especially attractive.

Importance[5,6]

Functional foods and nutraceuticals offer many benefits from the point of view of consumers.

- Raise our diet's health value.
- Help us to live longer.
- Help us to avoid specific medical conditions
- Regarded as more "natural" than conventional medicinal products and less likely to produce unpleasant side effects
- May provide food for special needs populations (e.g., nutrient-dense foods for elderly people).
- Used for the prevention, treatment or cure of a condition or disease
- It can be administered with a view to restoring, correcting or modifying physiological functions in human beings.
- Nutraceuticals not only complement the diet but also assist with illness and/or deficiency prevention and/or treatment.
- Nutraceuticals are used as a traditional food or as a single-meal item

HISTORY OF NUTRACEUTICALS[7,8,9,10]

Three thousand years ago, the idea of nutraceuticals disappeared. Hippocrates (460-377 B.C) proclaimed that 'let food be the medicine and medicine be the food' to foresee the relationship between the required healthy food and its therapeutic benefits. In the early 1900s, food producers in the United States started to add small quantities of iodine to salt in order to avoid goitre. In Japan, England and other nations, nutraceuticals are already becoming part of the dietary landscape, nutraceuticals are now the fastest-growing industry segment and the globalizing nutraceutical market is estimated at USD 117 billion.

Traditional and non-traditional nutraceuticals

There is a wide variety of nutraceutical foods on the market which fall within the category of traditional foods and non-traditional foods.

A) Traditional Nutraceuticals[9,10,11]

Food comes under the category of conventional nutraceuticals in which no change is made to the product; it is simply natural, whole food with new information about its potential health qualities. No change has been made to the individual foods, other than the way consumers perceive them. Many fruits, vegetables, grains, fish, dairy and meat products contain several natural components which provide benefits beyond basic nutrition, such as tomato lycopene, salmon omega-3 fatty acids or soy saponins. In some studies, also tea and chocolate were notes containing health benefits attributes.

b) Non-traditional Nutraceuticals[10,11,12,13]

They are the products of organic breeding or added nutrients and/or ingredients such as calcium-fortified orange juice, vitamin or mineral-based cereals and folic acid-added flour are non-traditional nutraceuticals. Successfully, agricultural scientists have come up with techniques to improve the nutritional value of some crops. Research on improving the nutritional quality of several other crops is currently underway.

NUTRACEUTICALS[4]

Stephen De Felice, Founding Basis for Creativity in Medicine, invented the word "Nutraceutical" from "Nutrition" and "Pharmaceutical." Nutraceutical, according to De Felice, can be described as "a food (or part of food) that provides medical as, 'a benefit, including disease prevention and or treatment. Nutraceuticals are to be found in a mosaic of items from which.

a) The food industry,

b) The herbal and dietary supplement market,

c) pharmaceutical industry, and

d) The newly merged pharmaceutical/agribusiness/nutrition conglomerates.

Nutritional therapy is a healing technique using nutritional therapeutics or nutraceuticals as complementary therapy. This therapy is based on the idea that foods can not only be sources of nutrition and energy but may also have therapeutic benefits. According to the theory of nutraceuticals and nutritional therapy, by using such nutraceutical effectiveness on detoxifying the body, preventing vitamin and mineral shortages, and restoring food digestion and dietary patterns, phytonutrients are nutrients with unique biological activities to benefit human well-being.

Concept of Nutraceuticals[14]

In the phase of pharmaceutical production, clinical test results from animal experiments and trials are needed to check the effects. In the case of nutrition, on the other hand, in the past, there was no testing process for foods to avoid diseases. However, in recent years the composition of food has been scientifically proven to cause lifestyle-related diseases and has become a social problem as Figure 1.

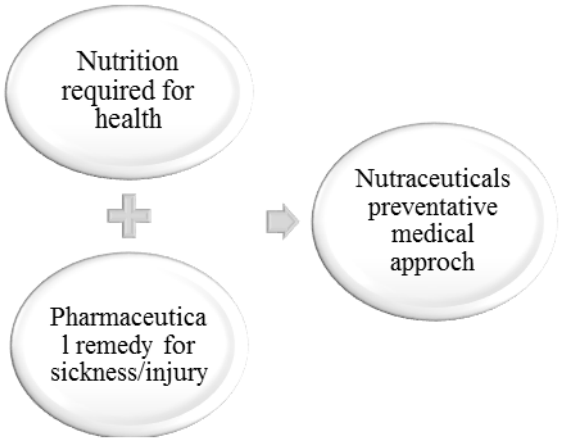

Fig.1: Concept of Nutraceuticals.

NUTRACEUTICAL REVOLUTION[15]

The nutraceuticals revolution started in the early 1980s, when clinical research published in distinguished medical journals confirmed the real or possible health benefits of calcium, fibre, and fish oil, and when physicians started educating their colleagues and customers

about these substances through the mass media. The nutraceutical revolution having an effect on certain factors listed in figure 2.

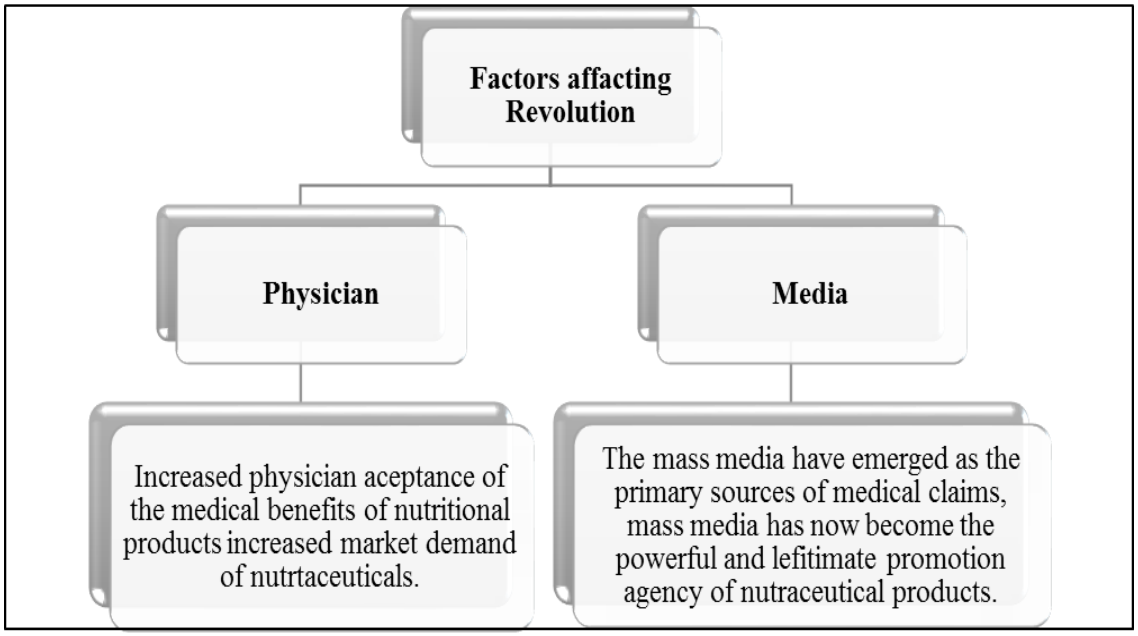

Figure 2: Factors affecting Revolution.

REGULATORY ASPECTS[16]

The primary collection of laws regulating the nutraceutical industry is in 1994 passed Dietary Supplement Health and Education Act (DSHEA). The Food Safety and Quality Authority has also released regulations regarding the licencing and registration of food companies, packaging and labelling manufacturing, food product standard etc.

The Food Safety and Standard Rale and Regulations and as of August 2011 effective. This act would enable manufacturers for Product Research and Development for Product Research and Development to develop accurate protocols and carry out clinical trials The Foreign Direct Investment Act recently passed in 2012 also offers new opportunities for multinational companies to produce and sale nutraceutical products in India.

So, there is only one authority in India to control nutraceuticals production, distribution and marketing.

CLASSIFICATION OF NUTRACEUTICAL[3,6,17,18,19]

There are multiple different types of products which fall under the category of nutraceuticals to differentiate between the broad varieties of products.

Dietary supplements

A dietary supplement is a substance containing nutrients extracted from food items collected in the form of a liquid or capsule. Nutritional supplements include- vitamins, minerals, Q enzyme, carnitine, etc. Using several criteria, the Dietary Supplementation Health Education Act (DSHEA) formally specified "dietary supplement" Nutritional supplement.

- Is a substance (other than tobacco) intended to complement a diet that carries or includes one or more of the following dietary ingredients: a vitamin, a mineral, a herbal or another botanical ingredient, an amino acid, a dietary ingredient for human use to complement the diet by increasing the total daily intake, or a concentrate, metabolite, component, extract or combination of that ingredient.
- It is intended for pill, capsule, tablet or liquid ingestion.
- Is not intended for use as a traditional food or as the sole meal/ diet component.
- Is called a "nutritional supplement"
- Includes products such as an approved new medication, authorized antibiotic or licensed biologic that has been sold as a dietary supplement or food before it has been registered, accredited, or licensed (unless the Health and Human Services Secretary waives this).

Functional Foods

Functional foods are intended to consume fortified foods similar to their natural state, rather than consuming liquid- or capsule-made dietary supplements. Additional nutrients, such as vitamin D in milk, are also added. (Example: Oats, bran, psyllium, and lignins for heart disease and colon cancer Prebiotics-intestinal flora control oligofructose, cholesterol reduction canola oil with lowered triglycerides, etc.

Medical Foods

Medical foods are foods specially designed and intended for the dietary management of disease with distinctive nutritional requirements which cannot be fulfilled by a regular diet alone. Medical foods are not sold to customers as an over-the-counter product. The FDA considers that medical foods are "formulated to be ingested or administered internally under a physician's supervision, and intended for the precise dietary management of a disease or condition for which medical evaluation establishes distinctive nutritional criteria based on accepted scientific principles. “Medical foods can be consumed through the mouth or by feeding through the nozzle. Health foods are regulated closely by medical supervision.

Farmaceuticals

In agricultural circles, the term pharmaceuticals are most commonly associated with the medical applications of genetically modified crops or animals. Farmaceuticals is a combination of the farm and pharmaceutical terms. It refers to medically valuable compounds (usually by biotechnology) developed from modified agricultural crops or animals. e.g., Transgenic cows and lactoferrin, transgenic plants for oral vaccination against infectious diseases, for immune enhancement.

DEVELOPMENT OF NUTRACEUTICALS[3]

Identification of components

There are currently several nutraceuticals on the market. Table no. 1: describes some of the nutraceuticals available, and their possible benefits to human health.

Table No. 1: Nutraceuticals and human health Benefits.

Sr. No.	Nutraceuticals	Health Benefits and function
1	Cinnamon	Rich in antioxidants like polyphenols, phenolic acids, and flavonoids. Help to control diabetes. Prevent cancer.
2	Garlic	Aids in the digestion process. Strengthen immunity. Help in weight loss. Possess antifungal and antibacterial properties.
3	Ajwain	Contain thymol ais in digestion and prevent regurgitation. Prevent cardiovascular disease.
4	Aloe Vera	Rich in antioxidants. Promotes immunity. Aids in weight loss
5	Green Tea	Prevent allergies, Possess antibacterial activity. Helps in lowering bold cholesterol. Prevent bold loss.

Development of products

Nutraceutical architecture involves a multidimensional approach.

Either the whole food

Nutraceuticals are produced by integrating the entire crop, which contains the desired property during processing, into the product. You can combine them in the form of either powder or juice extract. For example, a Mixture of amla powder, fruit juices, etc.

Active component separation: This method involves isolating or purifying the active compound from food and adding physiological benefits or defense against diseases in other foods. For e.g., turmeric curcumin, onion, and garlic allyl sulphur compounds, fish oils EPA, and DHA, etc.

However, as the composition of food has been scientifically shown to cause lifestyle-associated diseases in recent years, it has become a social issue. The idea of nutraceuticals with new functions for disease prevention was started with the combination of genome science and technology, which was accomplishing remarkable verification growth. Therefore, the genome technique was developed called Nutrigenomics. Nutrigenomics is a recently developed approach combined with various approaches in genomics and molecular biology. It was then used as a fundamental technology that became a driving force for the development of nutraceuticals.

For illnesses that are predicted to rise in number, but can be avoided by behavioral change, such as metabolic syndromes, patients are encouraged to change their lifestyles positively. Changing their diet is one remedy. Nutraceuticals can help avoid such illnesses. For nutraceuticals, the technology has three main problems.

- Creating a scientific research framework for disease prevention,
- Development of the human disease prevention evaluation framework and
- Development of a seamless framework for moving from basic to industrial research.

APPLICATIONS OR HEALTH BENEFITS OF NUTRACEUTICALS[10]

Cardiovascular disease

The nutraceuticals used are for the prevention and treatment of CVD antioxidants, dietary fibers, omega-3 fatty acids, vitamins, and minerals. The prevention and control of arterial diseases by polyphenol (in grape form). Flavonoids (in onions, vegetables, grapes, red wine, apples, and cherries) block the ACE and reinforce the tiny capillaries which carry oxygen and essential nutrients to all cells.

Diabetes

Lipoic acid, an antioxidant, has been used to treat psyllium-derived diabetic neuropathy dietary fibers for glucose control in diabetic patients and to lower lipid levels in hyperlipidemia. N-3 fatty acid ethyl esters can be of interest to diabetic patients.

Docosahexaenoic acid modulates insulin resistance and is also essential to the production of neuro-visual goods.

Obesity

Stimulants to the drug, such as ephedrine. Caffeine, ma huang-guarana, chitosan, and green tea help you lose your body weight. Buckwheat seed proteins function like fibers found in food. 5-Hydroxytryptophan and Green Tea Extract can promote weight loss, while the former decreases appetite, and the latter increases energy consumption.

Cancer

Flavonoids which block enzymes producing estrogen reduce the number of cancers caused by estrogen. It is recommended that phytoestrogens prevent prostate/breast cancer. Soy foods are the source of iso-flavones, curry curcumin and soy isoflavones have protective properties in the cancer chemo. It concentrates lycopene in the skin. Tests, prostate and adrenal defenses against cancer. Saponins have antitumor activity and antimutagenic activity. Curcumin (diferuloylmethane) which is a turmeric polyphenol has anti-carcinogenic, anti-oxidant, and anti-inflammatory properties. Documented to have anti-tumor activity were beetroots, cucumber fruits, spinach leaves, and turmeric rhizomes.

Anti-inflammatory Activities

Curcumin which is a turmeric polyphenol has anti-carcinogenic, anti-oxidant, and anti-inflammatory properties. Linoleic acid (found in green leafy vegetables, nuts, and vegetable oils, i.e., evening primrose oil, blackcurrant seed oil, hemp seed oil, cyanobacteria, and spirulina) is used to treat inflammatory disorders and autoimmune diseases. Glucosamine and chondroitin sulphate are used to treat osteoarthritis and to control gene expression and NO and PGE2 synthesis.

Vision-improving agents

Lutein (found in mangoes, corn, sweet potatoes, carrots, squash, tomatoes, and dark leafy greens such as kale, collars, and bockchoy) also known as Hellenic is used for the treatment of Zeaxanthin visual disorders (found in corn, egg yolks and green vegetables and fruits such as broccoli, green beans, green peas, Brussel sprouts, cabbage, kale. Collard leaf, Spinach, lettuce, kiwi and honeydew) used mainly for the treatment of visual disorders in traditional Chinese medicine.

Osteoarthritis

Glucosamine (GLN) and Chondroitin Sulphate (CS) are used for osteoarthritis therapy.

Alzheimer's Disease

By neutralizing the negative effects of oxidative stress mitochondrial dysfunction and various forms of neural degeneration, B-carotene, curcumin, lutein, lycopene, turmerone etc can exert positive effects on specific diseases.

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