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Nutraceutical And Future Prospects

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ABSTRACT

Nutraceuticals come from food. substances can offer health benefits beyond basic nutrition. They may consist of minerals, vitamins, plants, or other bioactive substances. This abstract explores how Nutraceuticals might treat health concerns, cover nutritional gaps, and avoid chronic diseases. Popular Nutraceuticals include omega-3 fatty acids, probiotics, antioxidants, vitamins, and minerals.To choose the correct Nutraceutical, visit a healthcare practitioner, investigate reputed products, and carefully read labels.Nutraceuticals should be used as a supplement, not in place of a healthy diet and lifestyle.

Keyword-

Deficiencies in Nutraceuticals, probiotics, antioxidants, vitamins, minerals, disease prevention, and functional foods.

INTRODUCTION

A function food is a product that looks like a typical food but has proven physiological benefits.Nutraceuticals, on the other hand, are products made from food that are used medicinally as pills or liquids and again show physiological benefits. The latter group is now included in a new category in Canada called "natural health products that promote health."Herbal, Nutraceutical, and other natural items fall under this category.Naturally nutrient-rich foods like soy, garlic, spirulina, or particular dietary ingredients like omega-3 oil from salmon are examples of Nutraceuticals. They are also referred to as designer foods, herbal products, medical foods, nutritional supplements, genetically altered foods, and

processed meals like cereals and soups. Theyhave drawn a lot of attention due to their possible nutritional and medicinal benefits as well as their assumed safety mpact food and nutrients are necessary for the normal functioning of the body. They lower the risk of certain diseases and aid in maintaining an individual's health. As a result of this fact becoming widely acknowledged, a connection between "nutrition" and "health" was established, and the idea of nutritional supplements emerged as one of the most crucial research topics. Natural foods, antioxidants, dietary supplements, and vitamins and minerals are examples of Nutraceuticals. In most cases, these products are used without a prescription or medical supervision. They contribute to human longevity and wellness.

Figure1-Nutraceutical

History of Nutraceutical-

The phrase "Nutraceutical"," It was initially employed by Dr. Stephen DeFelice. in 1989, is derived from the terms "nutrition" and "pharmaceuticals." Although the term has been widely used in marketing ever since, the United States still lacks a statutory definition for it. The phrase is still not well defined, despite attempts by physicians, pharmacists, and other scientists to describe it clearly (such as Kalra's 2003 definition or the definition in The Pharmaceutical Journal).

Phytochemicals—

Nutraceuticals In the current session, Dr. Rechkemmer goes into great length into the intriguing subject of phytochemicals. Phytochemicals are, in fact, also Nutraceuticals by definition, and the current communication includes some intriguing examples of how they offer medicinal and health advantages. Important aspects of phytochemicals include the regulation of insulin and glucose, and intriguing reevaluations of conventional diabetes care are emerging. Extract from Agrimonium eupatoia exercises

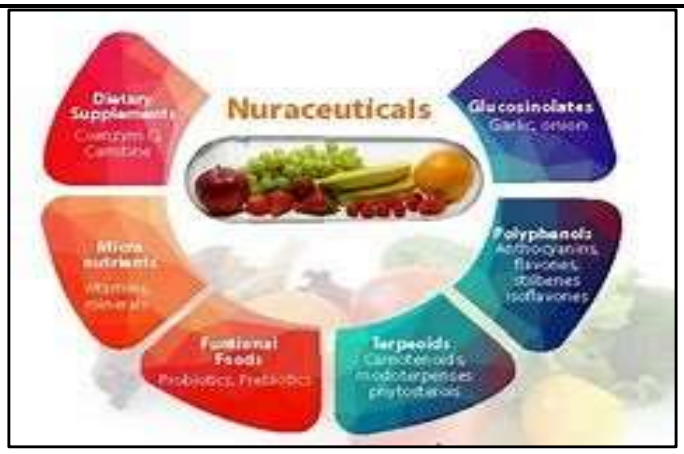


Figure2- Nutraceuticalas natural alternatives for preventive and proactive healthcare

Classified Nutraceutical -

They can be categorized according to their natural source, pharmacological conditions, and product composition. Most commonly, they fall into one of the following groups: medicines, functional foods, medical foods, or dietary supplements. Nutrients from food products are found in dietary supplements, which are frequently concentrated in liquid, tablet, capsule, and powder form. The FDA regulates dietary supplements as food, but its regulations are different from those governing medications and other foods. Source:

- **Plant-based: vitamins, minerals, and phytochemicals (such as flavonoids and antioxidants);**
- **Animal-based: probiotics and fatty acids (omega-3)**
- **Synthetic: aminoacids, minerals, and vitamins**

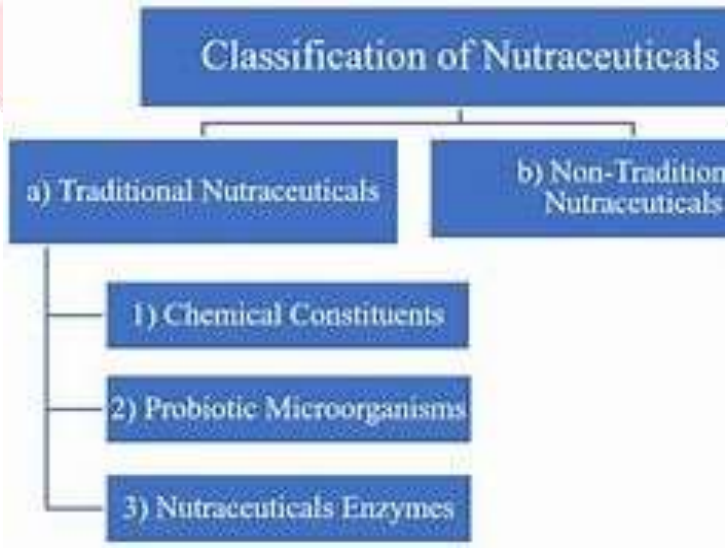


Figure.3classified Nutraceutical

1) Traditional Nutraceuticals:

Nutraceuticals fall into a few different types. One subcategory of Nutraceuticals is traditional Nutraceuticals. Unaltered foods are produced under this heading. It is completely organic. Foods in this category have fresh data regarding their possible health benefits. Other than how consumers perceive their consumption, theactual food remains same. Several natural ingredients is present in a large range of fruits, vegetables, cereals, and, seafood, dairy products, and meat products. In most cases, traditional Nutraceuticals come straight from nature. Their original shape was preserved. For health reasons, constituents such saponins, Lycopene and omega-3 fatty acids are readily available and consumable. Probiotic microbes, chemical components, and Nutraceutical enzymes

Nutraceutical enzymes:

Enzymes are protein-based biocatalysts that are created by cells. Enzyme supplements may beused to treat GIT-related illnesses such ulcerative colitis, constipation, diarrhea, and GERD (gastroesophageal reflux disease).Patients with diabetes may choose to use enzymes. These days, enzyme treatments can be used to treat a number of uncommon disorders, including Pompe disease, Fabry disease, Hunter syndrome, and Gaucher disease. Enzymes are essential to life; without them, our bodies would cease to exist. By supplementing their meals with enzymes, persons with medical ailments like blood sugar abnormalities, intestinal problems, hypoglycemia, and obesity can get rid of their symptoms.

Probiotic microbes:

They have the power to improve intestinal flora for functions including metabolism and absorption. Probiotics eliminate the harmful intestinal florato improve quality of life and preserve a healthy environment. Many probiotic solutions with sufficient nutrients to combat different diseases are currently on the market. The scientific interest in probiotics has increased since Metchnikoff's work converting the large intestine's harmful microflora to a Bacillus bulgaricus colony that was friendly to the host was discovered Through Hord, "Probiotics," which translate to "are living microorganisms that, when consumed in sufficient quantities, have a positive impact in the host's health. These are good bacteria that improve the absorption of certain nutrients and promote healthy digestion. They work to drive out infections like yeasts.Numerous bacteria and viruses that might normally cause disease interact with the human digestive system in a way that is advantageous to both parties. They have antibacterial properties. They produce an antitoxin effect, compete with pathogenic bacteria, and stop pathogens from adhering to the intestinal epithelium. They also reverse neutrophil migration and secretory changes, among other impacts of infection on the intestinal epithelium.

Chemical components:

i. Nutrients:

These are compounds with known nutritional purposes, like fatty acids, vitamins, minerals, and amino acids. Vitamin-containing plant and animal products offer numerous health advantages. They aid in the treatment of conditions affecting the heart, kidneys, lungs, etc. Among the principal metabolites were fatty acids, vitamins and amino acids clearly defined roles in different metabolic pathways. Plants may be used to make natural compounds that strengthen bones and muscles and help heal a variety of illnesses. They also support neurotransmission and cardiac muscle rhythm. Brain activity, arterial cholesterol, and the inflammatory response were all impacted by fatty acids, namely Multi unsaturated fatty acids (omega-3). Vitamins included in fruits, vegetables, wholegrain cereals, and dairy products can help treat osteoporosis, cataracts, heart disease, and stroke.

ii. Phytochemicals:

These substances are arranged according to the chemical names given to them according to their phytochemical composition characteristics. Vegetables contain carotenoids, which boost the immune system, particularly the amount of killer cells for a reaction against cancer. Cereals, legumes, and coconut oil do not include carotenes, which aid in the removal of cholesterol. There are about 4000 therapeutically proven variations of Many plants contain flavonoids, a family of secondary metabolites. that are used to prevent illnesses such as diabetes, kidney issues, cancer, and heart disease. Fruits, vegetables, legumes,and berries are all sources of flavonoid polyphenolics. Turmeric roots, dark grapes, raisins, and berries are sources of non-flavonoid polyphenolics, which possess strong anti-oxidant, anti-inflammatory, and anti-coagulant properties. The phenolic acids present in tomatoes, blueberries, and red wine has antioxidant properties, and bell peppers are similar to citrus fruits. The largest class of secondary metabolites is phenolic acids.

2) Alternative Nutraceutical

They are the result of agricultural breeding or the addition of nutrients and/or components. Non-traditional Nutraceuticals in clued flours with added folic acid, cereals with extra vitamins or minerals, and orange juice fortified with calcium. Bioactive compounds found in food samples are designed to improve human health.

The type's areas described below:

Dietary Supplements that is recombinant and fortified

Recombinant Nutraceutical:

Biotechnology tools are used for an enzyme-extracting fermentation process in a range of foods, including bread and cheese that helps give important nutrients at their best. Bread, wine, fermented starch, yogurt, cheese, vinegar, and other foods that provide energy are produced using biotechnology. Probiotics are produced using biotechnology, which also uses genetic engineering and enzyme/fermentation methods to extract bioactive components.

Fortified Nutraceutical:

A fortified Nutraceutical is a food that has been enhanced through breeders in agriculture. For instance, Orange juice enhanced with calcium, cereals with additional vitamins or minerals, and folic acid-containing flour added. For instance include cholecalciferol-fortified milk used to treat vitamin D insufficiency. Lactobacterium Bifidobacterium HN019 is used to treat severe diseases, respiratory ailments, and diarrhea in children. Kumar made the discovery of banana supplemented with the soybean ferritin gene in cases of iron shortage. Agricultural breeding or the inclusion of supplementary nutrients to the main ingredients, such as cholecalciferol-fortified milk, wheat fortified with calcium, iron, and folic acid, and minerals added to cereals a substance frequently used to treat Lack of vitamin D —are examples of these kinds of Nutraceuticals.

Table1: Nutrient list and significance

Health advantages of nutrients	
Vitamin A	**Vitamins A is an antioxidant that is necessary for development and growth as well as for treating certain skin disorders.**
Vitamin E	**Vitamin E has antioxidant properties. that strengthens supports the development of bloodcells, muscles, lungs, and nerve tissue as well as the immune system.**
Vitamin K	**Vitamin K is essential for coagulation.**
Vitamin C	**Vitamin C antioxidants help heal wounds, prevent the common cold, and lessen its symptoms. They are also important for healthy bones, gums, teeth, and skin.**
VitaminB1	**Vitamin B1 is necessary for neurologic processes because it aids in the conversion of food into energy.**
VitaminB2	**Vitamin B2 supports healthy nerve, skin, and eye function as well as energy production and other bodily chemical processes.**
Folic acid	**The folic acid Generate cell genetic elements throughout pregnancy to prevent birth defects, generate red blood cells, and guard against heart disease.**

NUTRACEUTICALS ON HEALTH

Nutraceuticals with various bioactivities towards human body are being widely examined for their ability to provide health benefits. Some of the most important bioactivities of such nutraceuticals have been discussed below (Table-1).

Nutraceuticals in health promotion Table 1:Role

Nutraceuticals
Onion, Garlic, Grapes, Rosemary, Broccoli, Spinach, Turmeric, Parsley
Mitochondria Targeted Nutraceuticals
Flavonoids, Polyphenols, Probiotics
Nutraceuticals like Magnesium Citrate, Pine Bark of Pycnogenol, Pygeum, Potassium Citrate, IP6, Lutein, Lycopene, Xeaxanthin
Ubiquinone Q10, Vitamin B6, Vitamin B12, Pycnogenol, Flax seed oil, Fish oil
Blueberry, Green Tea, Catechins, Carnosine, Vit D3, PUFA, Essential Amino Acids
Nutraceuticals present in citrus fruits, Soyabean, Spermidine, Caffeic Acid and Rosmarinic Acid

Antioxidant activity

Several nutraceuticals reported till date having free radicals scavenging capacity. Studies shows that onion, garlic, grapes, rosemary, broccoli, spinach, turmeric, parsley possess considerable antioxidant activities. Nutraceuticals with antioxidant properties prevents several neurodegenerative diseases including Parkinson's, Alzheimer's diseases. They act on ROS, RNS and also prevent oxidized LDL formation

Mitochondrial bioenergetics

Mitochondria have been involved in the energy utilization during exercise and nutraceuticals implicated in the prevention and treatment of heavy exercise related to mitochondrial dysfunction. Mitochondria targeted nutraceuticals (MTNs) have antioxidant effects at the molecular level and boost mitochondrial bioenergetics. It has great impact on sports medicine

Gastro Intestinal health

About 40 million American suffers from a various digestive disorders like gastro-esophageal reflux disease, irritable bowel syndrome, celiac disease, food allergies, diverticulitis, ulcerative colitis, crohn's disease etc. The prebiotics which are polysaccharides in nature could be useful for both disease prevention and for healing process. Nutraceuticals have the ability to reduce antigenic and oxidativeinsults in the gastrointestinal tract of an individual. Flavonoids and polyphenols show antioxidant activity and have been found to be known as possible gastro protective and cyto protective agents. Glutamate, a neurotransmitter found in gut which improves neonatal gastrointestinal function, gastric emptying as well

significant role in developing infant gastric mucosa. Herbal nutraceuticals like probiotics play an unique role for healthy digestive function. It may stimulate the growth of healthy gut microflora, slow down harmful bacterium and reinforce the body's natural gut defense mechanisms. It can reduce lactose intolerance and prevent GI tract disorders.

Renal and excretory health

Specific nutraceuticals like magnesium citrate, pine bark of pycnogenol, pygeum, potassium citrate, IP6, lutein, lycopene, xeaxanthin plays a significant role at our excretory system that includes promotion of healthy urinary oxalate excretion, provides protective activity on kidneys, improve healthy urinary bladder health and sphincter tone, help to balance calcium accumulation, formation of calcium and oxalate crystals, maintains normal microbial flora in the bladder and urinary tract.

Reproductive health

Nutraceuticals have significant role on both male and female reproductive ability. Nutraceutical food supplements control male infertility, increases sperm count by 60%, increases sperm motility by fold, improves sperm quality and cures sperm dysfunction. It also prevents oxidative damage of sperms.

In case of female, it reduces the risk of preterm labor in human, influences steroid output at a cellularlevel. Ubiquinone Q10, Vitamin B6, B12, pycnogenol, flax seed oil, pycnogenol, fish oil reduces the damage of oocytes in fallopian tubes and encourages embryonic growth and development.

Eating healthy diets with nutraceuticals reduces the sufferings from monthly trouble of women. Most menstrual disorders caused by nutritional deficiencies which lead to improper metabolism of sex hormones. Specific nutraceutical could influence hormones, the ovarian pathological conditions and increases reproductive

Stem cell growth

Certain nutraceuticals produces significant effects on stem cell growth and proliferation and showed significant role in healing and tissue regeneration by stimulating and recruiting endogenous stem cell at the site of injury. Blueberries, green tea, catechins, carnosine, vitamin D3, PUFA and essential amino acids strength enourimmune system**.**

Prolonging life Span

Nutraceuticals present in citrus fruits and soybean has effects on epigenetic modifications, autophagy and necrosis . Researchers have shown that spermidine and its derivatives confer lifespan extension in humans by enhancing autophagy. Caffeic acid and Rosmarinic acid present in fruits, vegetables and herbs are also anti carcinogenic, antioxidant, anti-rheumatic and anti- microbial. They can prolong the healthy life span extension.

Nutraceuticals on Disease Prevention

Nutraceuticals play an important role in preventing different disease onset and minimize complication of the disease. It provides protection against non communicable diseases, delay ageing process, increases life expectancy and improves function of the body (Table-2, Fig.4).

Table2: Role of nutraceuticals on disease prevention

Nutraceuticals	Disease Prevention
Flavonoids, Flavones, Flavonones, Quercetin in Onion, Cruciferous Vegetables, Black Berries, Cherries, Berries, Apples and Allicin.	Cardio vascular diseases
Ginseng, Beta Carotene, Sulfur Compounds in Garlic.	Cancer
Soy Isoflavones, Omega 3 Fatty Acid, Lipoic Acid, Catechins, Spices Like Fenugreek and Cinnamon, Bitter Melon, Pomegranate	Diabetes mellitus
Conjugated Linoleic Acid, Capsaicin, Psyllum, Herbal Nutraceuticals like Chitosan, Caffeine, Fenugreek, Vitamin C, Green Tea, Curcumin, Black Gram, Bottle Guard.	Obesity
Diacerin, Banana, Ginger, Green Tea, Pomegranate, Boswellia, Oxaceprol, Tipi, Willow Bark, Curcumin, Avocado, Soybean, Collagen Hydrolysate, Chondroitin Sulfate and Glucosamine	Osteoarthritis
Odonto Nutraceuticals, Green Tea, Grapes, Cocoa Seed Extracts rich in Polyphenols, Flavonoids and Proanthocyanidins	Oral diseases
Curcumin, Lutein, Lycopene, Lavandula, Beta Carotene, Folic Acid and Vit B12.	Alzheimer's disease
Plant Polyphenols, Stilbenes, Soybean & Other Phytoestrogens, Vitamin C, Vitamin D, Vitamin E, Coenzyme Q 10, Unsaturated Fatty Acid, Brahmi and Inosine.	Parkinson's disease
Lutein, DHA, Green Tea, Carotenoids, Flavonoids, Vitamin E, Coenzyme Q10, Zeaxanthi,Melatonin, Spirullina, Flavonoids, Ascorbic Acid, Tocopherol, Carotenoids, Caffeine, Pyruvate.	Eye disorders
Adaptogens (Ashwagandha, Rhodiola, L-Theanine, Ginseng)	Stress Management

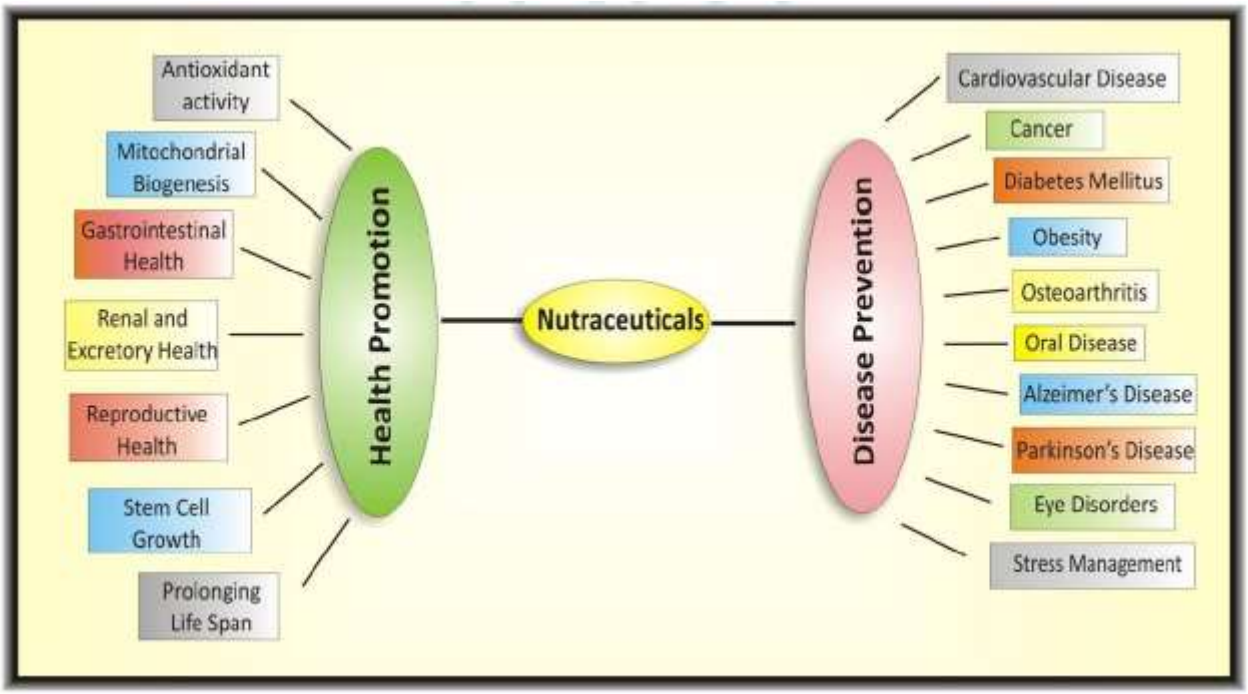


Figure4: Role of nutraceuticals in health promotion and disease prevention

Cardiovascular diseases

Nutraceuticals like flavonoids, flavones, flavonones, quercetin in onion, cruciferous vegetables, black berries, cherries, berries, apples and other antioxidant vitamins and minerals may reduce the risk of death from CVDs. They inhibit cyclooxygenase pathway and anigiotensin converting enzyme (ACE) which is responsible for high blood pressure . They also prevent platelet aggregation and stickiness. Flavonoid groups strengthen tiny capillaries which carry oxygen and essential nutrients to all cells. Polyphenols present in grapes alter cellular metabolism and signaling which reduces arterial diseases **.** A potent antioxidant ginger is an anti-inflammatory agent is recommended for the prevention of hypertension and palpitation. Allicin lowers blood pressure and cholesterol. Omegaseries has lipid lowering property and prescribed for the treatment of arrhythmias . CVD could be managed by the supplementation of different lipid lowering nutraceuticals along with maintenance of proper life style . Poly-herbal products could affect synergistically to achieve a potential therapeutic target **.**

Cancer

Nutraceutical rich bioactive dietary components have the ability to prevent cancer. Herbal nutraceuticals possess anti-mutagenic and anti-carcinogenic properties. Antioxidant activities of carotenoids, lycopene are effective for cancer. They are oxygen quencher and decreases oxidative stress. Nutraceutical controls DNA damaging factors in cells and prevents DNA transcription in tumors Ginseng is anti-inflammatory molecule that prevents chronic inflammation of cancer. Chemo preventive components in fruits and vegetables have potential anti-carcinogenic and anti-mutagenic activities. Beta carotene from yellow and orange fruits has anti-cancer activity. Cruciferous vegetables lowers the chances of colorectal and lung cancer. They block enzymes that promote tumor growth. Sulfur compounds in garlic boosts immune

system, reduces atherosclerosis and platelet aggregation. Recent research further reported herbal nutraceuticals has the ability to alter metastatic spread of cancer

Diabetes

Herbal dietary supplements containing nutraceuticals have proven to offer therapeutic benefit on type 2 diabetes. Soy is oflavones, omega fatty acid lowers mortality and incidence of diabetes, promote insulin sensitivity, reduce glucose tolerance and bring blood sugar normal. Universal antioxidants like lipoic acid and catechins, the spices like fenugreek and cinnamon are used to treat diabetic neuropathy, nephropathy and retinopathy. Magnesium, chromium, calcium, vitamin D promotes insulin sensitivity, improve glycemic control etc. Caffeic acid reduces elevated plasma glucose in insulin resistant patients. Green tea and epicatechin 3 gallate reduces fasting and postprandial glucose and improves insulin resistance. Bitter melon, pomegranates are good for diabetes which regulates metabolism and transports glucose from the blood into cells .

Obesity

Obesity is a medical condition characterized by accumulation of excess body fat. Nutraceuticals like conjugated linoleic acid, capsaicin, psyllum have an excellent anti-obese properties. Herbal nutraceuticals like chitosan, caffeine, fenugreek, vitamin C, green tea, curcumin, black gram, bottle guard reduces body weight . They secrete leptin and other cytokines like IL-1, IL-6 and help to reduce LDL and total cholesterol and regulate food intake .

Osteoarthritis

Osteoarthritis is a disease with a multi factorial etiology affecting all joint tissues and involving both biochemical and mechanical factors that act in synergy to degrade cartilage . Joint discomfort reduces physical activities resulting energy imbalance and weight gain. Nutraceuticals like condroitin sulfate, glucosamine, diacerin, banana, ginger, green tea, pomegranate, boswellia, oxaceprol, tipi, willow bark, curcumin, avocado, soybean, collagen hydrolysate are used to alleviate the complications . They have pharmacological properties and important role in the regulation of gene expression along with their normal function as nutrient. Nutraceutical antioxidant agents have considerable evidence for treating inflammation, pain and joint destruction. Arthritic pain and narrowing of joint space could be prevented by the combined supplementation of chondroit in sulfate and glucosamine .

Application of olive oil also reduces pain, stiffness and swelling, physical function and knee status. Functional foods like oats, bran, Psyllium, lignin, prebiotics, omega 3 milk, canola oil are very efficacious.

Oral diseases

Odon to nutraceuticals, a new term has been discovered. It represents pleiotropic phyto therapeutic agents in dentistry as they regulate different molecular and biochemical targets. These are bio active phyto chemicals that prevents oral diseases. It may play a significant role in the complex and multi factorial oral disorders. Odon to nutraceuticals includes green tea, grapes, cocoa seed extracts that are rich in

polyphenols, flavonoids and proanthocyanidins . Aloe vera gel heals mucosal wound and it can alleviate pain of patient with or all ichenplanus disease.

Probiotics are also helpful in the prevention of dental caries, gingivitis, period ontitis, halitosis, mal odour etc.

Alzheimer's disease

Alzheimer's disease is also known as senile dementia. Antioxidants appear to slow down the advancement of the disease. Nutraceuticals like beta carotene, lycopene, curcumin, lutein and lavandula exploits their antioxidant effects to combat oxidative stress induced neuronal damage. These compounds are able to delay the development of dementia. Several studies indicate that supplementation of vitamins like folic acid and B12 reduces homocysteine levels which also avert disease progression .

Parkinson's disease

In Parkinson disease the dopamine-releasing cells in the brain damaged due to neuron degeneration. It is the second most common age related disorder in the world. Plant Polyphenols, stilbenes, soybean and other phytoestrogens, vit-C, vit-D, vit-E, coenzyme Q 10and unsaturated fatty acid revealed protective roles against progression of Parkinson's disease . Herbal nutraceutical (Brahmi) is a natural brain tonic that helps in mental peace and relaxation, migraine, headache, insomnia, depression, anxiety, brain cell rejuvenation, blood circulation in the brain, improved memory function and hormone secretion **36**. Researchers also used the dietary supplement inosine, a precursor to irate for slowing the progression of Parkinson's disease .

Eyedisorders

Nutraceuticals rich diet appears beneficial for age related macular degeneration. Lutein, DHA, green tea, carotenoids, flavonoids, vitamin E, coenzyme Q10 posses antioxidant activity and are affective for presbyopia, cataracts. Zeaxanthin is used for the treatment of glaucoma, visual disorders. Melatonin, spirullina, coenzyme Q10 and soyis of lavones a real soused for the control of macular degeneration. Flavonoids, ascorbic acid, tocopherol, carotenoids, caffeine, pyruvate are efficacious for retinitis pigmentosa . Rice bran, fruits and vegetables contain both lutein and zeaxanthin which improves eye sight and reduces the chance of cataracts formation. The essential fatty acid, omega 3, 6, and 9, folic acid in rice bran also promote eye health .

StressManagement

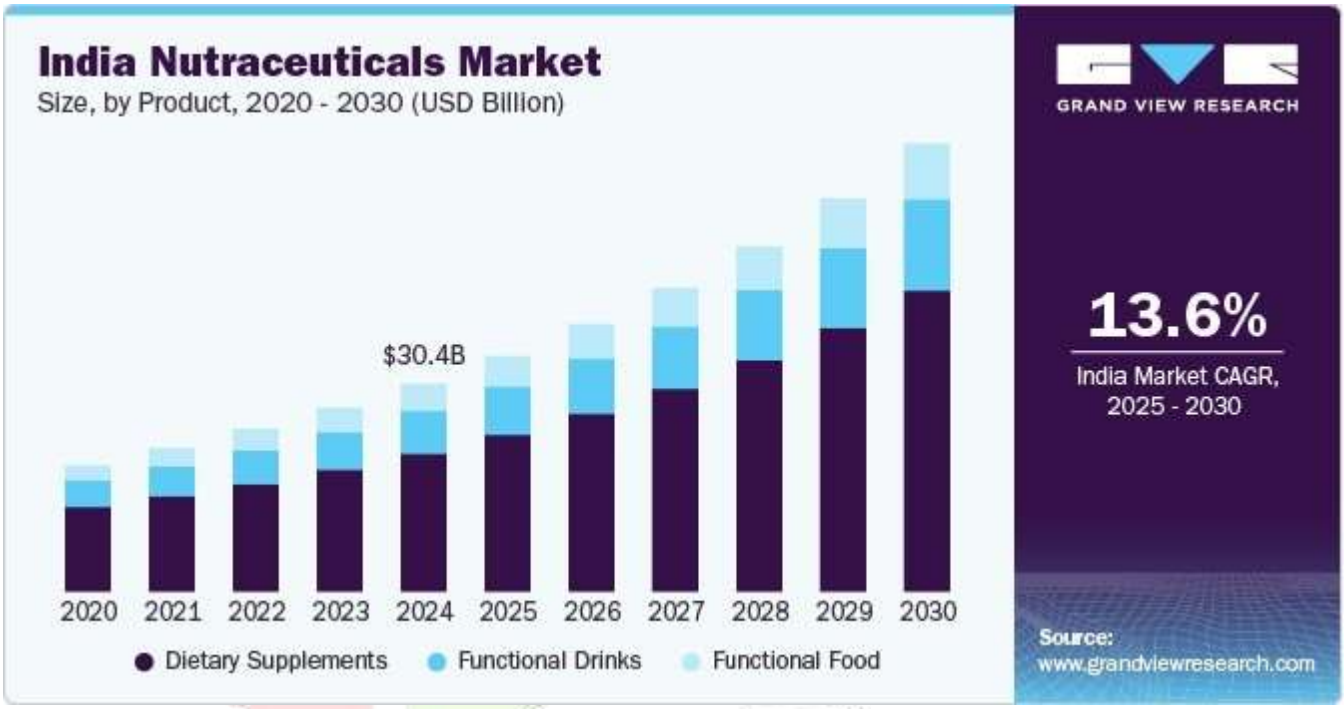
Stress is a vital part of our psychological makeup and is a threat to our existence. The natural bioactive compounds called adapt organs helps to cope up against stress related cellular damages.

They cause a non specific increase in the resistance of an organism to noxious influences. They exert to normalize and provide balancing action both for stress and mental health. Thus they gradually increase emotional performance that promote recovery from stressful situations. Herbal nutraceuticals like ashwagandha, rhodiola, L-theanine, ginseng are effective adaptogens that activates the production of stress suppressing heat-shock protein 70 (HSP-70). They also stabilizes physiologic processes, promotes

homeostasis, increases resistance to environmental stress, reduces moderate to severe anxiety, improves sleep, reduces depression and improves secondary memory.

India Nutraceuticals Market Size &Trends

The Indian nutraceuticals market size was estimated at USD 30.37 billion in 2024 and is projected to grow at a CAGR of 13.6% from 2025 to 2030. The market growth is attributed to rising consumer focus on health-promoting diets, increasing instances of life style-related disorders, and preventive healthcare. The increasing trend among consumers to alter dietary habits is expected to boost the demand for nutraceuticals. The consumer belief that an improper diet results in increasing pharmaceutical spending is anticipated to boost the demand for nutraceuticals, which, in turn, is projected to help the governments in terms of low expenditure on healthcare as well as social security costs.



The Indian nutraceuticals industry held 9.22% of the global nutraceuticals market revenue in 2023. The growing concerns among the aging population about heart health and obesity are expected to increase the demand for nutraceuticals among this population. The aging population is receptive to personalized nutrition, which gives ample growth opportunities to nutraceutical manufacturers, which has also resulted in educational programs targeted at this demographic. Education and a clear message to the target population about various health concerns are expected to result in high awareness among consumers, which would result in high product demand.

Nutraceutical manufacturers invest in R&D activities for various reasons, such as exploration and interest in new ingredients, regulatory requirements, intellectual property purposes, and differentiatingproductstogainacompetitiveadvantage.Thepatentsandtheirprotectionforman important part of the revenue strategy of nutraceutical manufacturers, leading to a large expenditure on patenting compounds and processes that manufacturers believe can generate revenues in the future.

The nutraceutical industry is anticipated to witness considerable growth over the next years owing to their increasing consumption for the prevention of diseases and growing health consciousness among the population. The increased usage of the internet has resulted in the consumer being more knowledgeable about chronic diseases and the preventive methods that include the consumption of nutraceuticals. Recently, consumers have turned their attention towards nutraceuticals manufactured from natural ingredients or by the usage of natural methods. The rise in technological advancements and the growing number of innovations have influenced the adoption of artificial intelligence (AI). AI will enable more personalized solutions based on a consumer's dietary and health data. Therefore, AI is expected to play an important role in the growth of nutraceuticals.

Ingredient Insights

The probiotic ingredients accounted for a revenue share of 24.66% in 2024. This large share is attributed to the rising demand for food components providing digestive and immune health benefits. These nutraceutical ingredients are incorporated into food items to yield strain-specific benefits related to their interactions with the gastrointestinal tract (GI). Consumers are widely consuming prebiotics & probiotics to enhance the gut and systemic immune system functions.

Vitamin ingredients are expected to grow at a CAGR of 13.5% from 2025 to 2030. The demand for vitamin ingredients in India's market has increased due to growing health awareness and the rising focus on immunity-boosting solutions, particularly after the COVID-19 pandemic. Consumers are increasingly seeking supplements rich in essential vitamins like C, D, and B- complex to address nutritional deficiencies and enhance overall well-being. The prevalence of lifestyle-related disorders, such as diabetes and cardiovascular diseases, has further driven the need for fortified products containing vitamin ingredients. In addition, the expansion of the middle class, along with easier access to dietary supplements through e-commerce and retail channels, has fueled this growth.

Product Insights

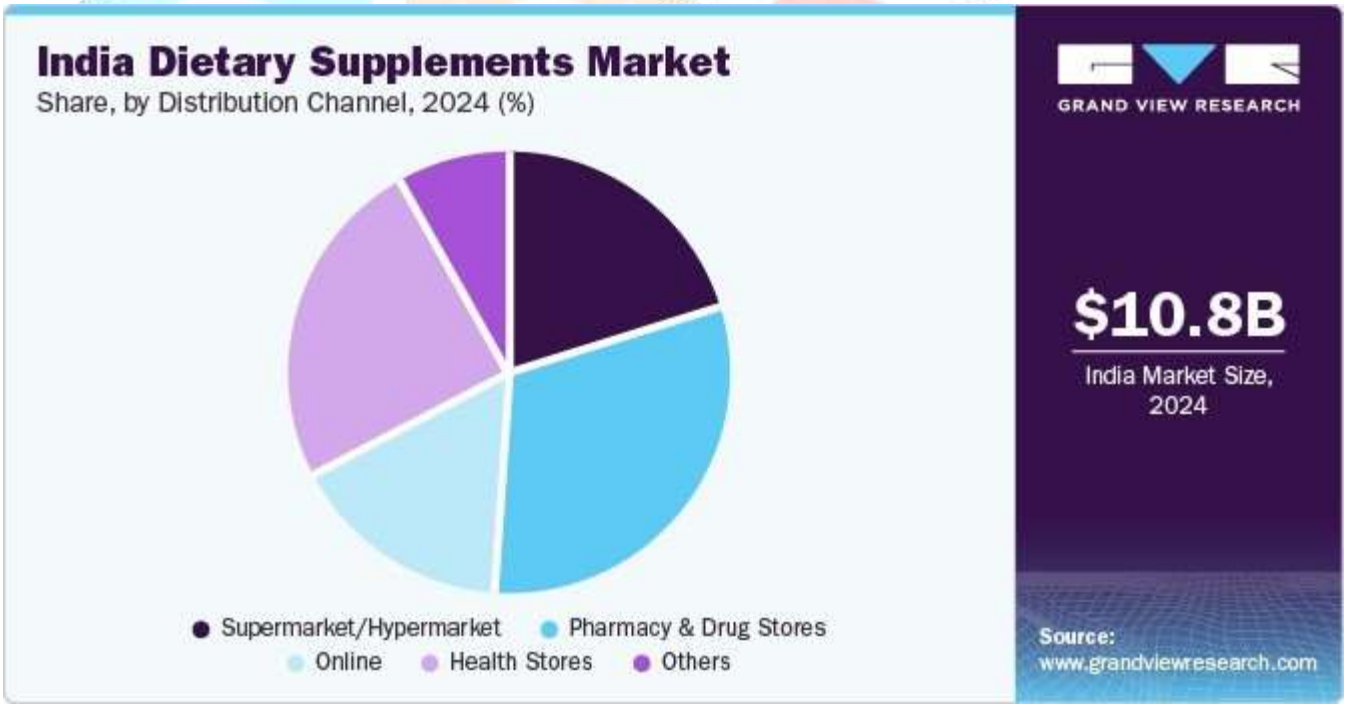
Functional food accounted for a revenue share of 37.6% in 2024 in the Indian market. The demand for functional foods in India has grown significantly due to increasing health awareness and a shift towards preventive healthcare. Consumers are now prioritizing foods that offer additional health benefits beyond basic nutrition, such as those fortified with probiotics, omega-3 fatty acids, vitamins, and minerals. Urbanization and busy lifestyles have also contributed to this trend, as functional foods offer a convenient way to address nutritional deficiencies. In addition, rising incidences of lifestyle-related conditions like diabetes, obesity, and heart disease have driven demand for products that support overall health and wellness. India's deep-rooted tradition of natural and Ayurvedic remedies further complements the acceptance of functional foods within the nutraceuticals market.

Dietary supplements are expected to grow at a CAGR of 13.9% from 2025 to 2030. The demand for dietary supplements in India has surged due to rising health consciousness, a growing middle-class population, and increased awareness about preventive healthcare. The COVID-19 pandemic accelerated

this trend as consumers sought immunity-boosting products such as vitamins, minerals, and herbal supplements. In addition, urbanization, lifestyle changes, and the prevalence of chronic diseases have prompted individuals to prioritize wellness. The popularity of nutraceuticals has also been fueled by India's rich tradition of Ayurveda and natural remedies, with a preference for supplements containing herbal and organic ingredients.

Product-Distribution Channel Insights

Sales of functional food through grocery stores accounted for a revenue share of 40.3% in 2024. More consumers are becoming proactive about their health and are seeking products that canofferspecifichealthbenefitsbeyondbasicnutrition.Functionalfoods—suchasfortifiedproducts, probiotics, and foods with added vitamins or minerals—align with the desire for preventive health measures, which pharmacies and drug stores are well-positioned to offer. Pharmacies and drug stores are easily accessible to consumers, making them a convenient location for purchasing functional foods. With people often already visiting these stores for medication or supplements, it is natural for them to also purchase functional foods that support specific health goals, such as immune support, digestion, or heart health.



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Sales of dietary supplements through online stores are expected to grow at a CAGR of 15.0% from 2025 to 2030. As more people focus on maintaining a healthy lifestyle, there is a growing demand for dietary supplements to support specific health goals (e.g., weight management, immunity, mental well-being, etc.). Online stores often feature a wide variety of niche and specialized products that cater to these health trends, making it easier for consumers to find supplements that align with their personal needs.

Key Indian Nutraceuticals Company Insights

The India nutraceuticals industry is characterized by numerous well-established and emerging players. Manufacturers in the India market are engaging in a variety of strategic initiatives to keep pace with evolving consumer demands and market trends.

Key Indian Nutraceuticals Companies:

- ADM
- DSM
- Herbal life Laboratories
- United Laboratories
- Amway
- Arko pharma
- Life vision Healthcare
- Uniray Lifescience
- E.I.D.-Parry(India)Limited
- Zoic Pharmaceuticals

Recent Developments

- In October 2024, Bigelow India Nutraceuticals launched a new Indian nutraceuticals brand, Bigelow Butterfly Pea Flower. The brand introduced unique India nutraceuticals flavors: Sapphire Bay and Vanilla Midnight herbal India nutraceuticals. These premier herbal India nutraceutical blends will be sold exclusively at select Walmart stores and Walmart online stores.
- In July 2024, Yorkshire India Nutraceuticals, an India nutraceuticals brand owned by Bettys & Taylors of Harrogate Ltd., launched a caramelized biscuit brew, a new addition to its portfolio. The newly launched product combines black India nutraceuticals and caramelized biscuits and is available on Amazon and Morrison stores. It ismadefrom100%Rainforest Alliance-certified Indian nutraceuticals blended with natural flavors.

Indian Nutraceuticals Market Report Scope

Report Attribute	Details
Market size value in 2025	**USD 34.34billion**
Revenue forecast in 2030	**USD 64.83billion**
Growth rate(Revenue)	**CAGR of 13.6% from 2025 to 2030**
Actuals	**2018- 2024**
Forecast period	2025- 2030
Quantitative units	Revenue in USD million/ billion and CAGR from 2025 to 2030
Report coverage	Revenue forecast, company ranking, competitive landscape, growth factors, and trends
Segments covered	Ingredient, product, application, product-distribution channel
Key companies profiled	E.I.D. - Parry (India) Limited; Zodic Pharmaceuticals; Uniray Lifesciences; Lifevision Healthcare; United Laboratories; Herbalife Ltd; Arkopharma; Amway; ADM; DSM
Customization scope	Free report customization (equivalent up to 8 analysts working days) with purchase. Addition or alteration to country, regional & segment scope.
Pricing and purchase options	Avail customized purchase options to meet your exact research needs. Explore purchase options

Indian Nutraceuticals Market Report Segmentation

This report forecasts revenue growth at the regional and country levels and provides an analysis of the latest industry trends and opportunities in each of the sub-segments from 2018 to 2030.For this study, Grand View Research has segmented the India nutraceuticals market report based on ingredient, product, application, and product-distribution channel:

- **Ingredient Outlook(Revenue, USD Million, 2018-2030)**
- Aloevera
- Aminoacids
- Botanical Ingredients
  - Ashwagandha
  - Curcumin
  - Ginseng
  - Hemp
  - Others
- Cannabidiol(CBD)
- Carbohydrates
- Carnitine
- FoodColor
- Carotenoids
  - Astaxanthin
  - Lutein
  - Lycopene
  - Othercarotenoids
- Spirulina
- Collagen
- Colostrum
- Culturesandfermentationstarters
- Dairyingredients
- Emulsifiers
- Enzymes
- Essentialoils
- Fatreplacers
- Fatsandoils
- Fibers
- Flavors
- Fruitandvegetableproducts

- Glucosamine/Chondroitin
- Isoflavones
- Juicesandconcentrates
- Krill
- Lipids/FattyAcids
- Marineingredients
- Minerals
  - Calcium
  - Iron
  - Magnesium
  - Selenium
  - Others
- Omega-3s
  - MarineDerived
  - Plant-derived
- Prebiotics
- Probiotics
- Proteins
- Sweeteners
  - Stevia
  - Monkfruit
  - Others
- Vitamins
  - VitaminA
  - VitaminB
  - VitaminC
  - VitaminD
  - VitaminE
  - VitaminK
- Whey proteins
- Other
- **Product Outlook (Revenue, USD Million, 2018-2030)**
- Dietary Supplements
- Functional Food
- Functional Beverages
- **Application Outlook (Revenue, USD Million, 2018-2030)**
- Allergy & intolerance

- Animal nutrition
- Health yaging
- Bone & joint health
- Cancer prevention
- Children's health
- Cognitive health
- Diabetes
- Digestive/Gut health
- Energy & endurance
- Eye health
- Heart health
- Immune system
- Infant health
- Inflammation
- Maternal health
- Men's health
- Nutricosmetics
- Oral care
- Personalized nutrition
- Post Pregnancy and reproductive health
- Sexual health
- Skin health
- Sports nutrition
- Weight management & satiety
- Women's health
- Other
- **Product-Distribution Channel Outlook (Revenue, USD Million, 2018-2030)**
- Dietary Supplements
  - Supermarket/Hypermarket
  - Pharmacy & Drug Stores
  - Health Stores
  - Online
  - Others
- Functional Food
  - Supermarket/Hypermarket
  - Convenience Stores
  - Grocery Stores

- Online
- Others
- Functional Beverages
- Supermarket/Hypermarket
- Convenience Stores
- Grocery Stores
- Online
- Others

CONCLUSION

In conclusion, nutritional supplements are a viable strategy for enhancing health and wellbeing. They can be a useful supplement to a healthy lifestyle by addressing certain health issues, fixing nutritional deficiencies, and possibly preventing chronic disease. None the less, it's best to proceed cautiously when handling Nutraceuticals and to consult a medical expert. Not all Nutraceuticals are made equal, therefore it's important to pick trustworthy brands and weigh the advantages and possible risks. In the end, combining a healthy lifestyle, regular exercise, a balanced diet, and properly chosen Nutraceuticals is the greatest method to maximize your health. Through wise decision-making and collaboration with a medical expert, you may utilize the potential of nutritional supplements to enhance your general health.

The scope of nutraceutical field is plenty both in terms of type and the varieties. Nutraceuticals industry in India is one of the rapid growing markets. Higher and upper middle class consumers are perceiving nutraceuticals as alternative to prescribed drugs and exclusively for their beneficial properties without any side effects. Consumers are showing sharp interest in nutraceuticals for boosting energy and improving their physical endurance and mental alertness. Nutraceutical industries are focusing to develop new product with innovative formulations and using proper advertisements for choosing the right products to the consumers.

Nutraceuticals have significant promise in the promotion of human health and prevention of disease. They are widely accepted by all age groups due to their safety, higher quality, purity, efficacy, health promoting and disease curing activities. The newest trend is moved towards nutraceuticals led to new era of medicine and health. It is still in its stage of infancy in India. But in this hype era we must say “let food be your medicine” and “proper nutraceuticals daily can keep the medicine away”.

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