

## Nutraceuticals: A Modern Era of Pharmacological Bioactive Agent

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### ABSTRACT

Nutraceutical can be explained as the food things overall or a section which has some nutraceutical alongside the medical properties. As of now populace is bit by bit experiencing numerous metabolic and degenerative illnesses, which are principally brought about by dietary lack. The Current article centers around the requirement for devouring proper weight control plans, medical problems encompassing inability to stick to the realized smart dieting models, advancement of new nutraceuticals/utilitarian food sources/food supplements with novel medical advantages, explanation systems of activity of these items, to characterize and comprehend the insightful, definition and administrative parts of nutraceutical. Lately a drug item can give significant medical advantages particularly in the counteraction and therapy of intense and ongoing illness. The Broad Explores have uncovered the contribution of these specialists in the therapy of many problems like malignant growth, Joint pain, metabolic anomalies, diabetes and numerous others.

**Keywords:-**Nutraceuticals, Dietary supplements, Phytosterols, Omega 3 & ω-3 fatty acids.

### I. INTRODUCTION

Since old times, regular food and natural concentrates have been perceived as an essential piece of the all-encompassing way to deal with accomplish total wellbeing and health, particularly in the old Ayurveda framework in India, notwithstanding customary Chinese, Roman, and Greek medication.

The Greek physician Hippocrates adopted the philosophy of food as medicine, with his renowned quote "Let food be the medicine and medicine be the food".

[The word is a Nutraceuticals of the words "nutrition" and "pharmaceutical", was coined in 1989 by Stephen L. Defelice, founder and chairman of the Foundation of Innovation Medicine.]

Nutraceuticals are items gotten from food sources that are suspected to give additional medical advantages, notwithstanding the fundamental dietary benefit tracked down in food varieties. Contingent upon the ward, items might profess to forestall persistent illnesses, further develop wellbeing, postpone the maturing system, increment future, or backing the construction or capability of the body.

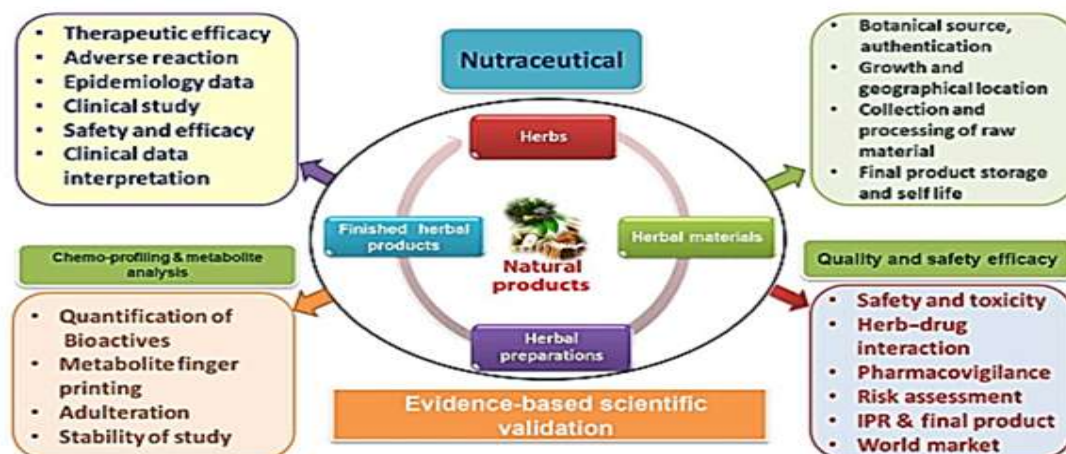


Figure: 1 Scientific Validation of Nutraceutical

Nutraceuticals have been started to be aligned with the expectation on as well as/or therapy of numerous persistent infections and infirmities, for example, malignant growth, diabetes, heart sicknesses, hypertension, joint pain, osteoporosis and so on. Factual information assigns that 35% of all disease are associated with the food that we eat and furthermore connected with specific dietary propensities. The U. S. Food and Medication Organization (FDA) has not endorsed nutraceuticals for medical advantages or illness counteraction; in any case, the makers of nutraceuticals have been promoting them as wellbeing advancing specialists.

**Sources of Nutraceuticals:-**Numerous items embraced to treat different illness states, whether as given medicine or as supplement, track down their starting point in the plant realm. This is obvious considering the way that plant produce numerous optional mixtures, like alkaloids, to safeguard themselves from contamination as well as these constituents are in many cases valuable in treatment of human illness.. One example is recently introduced Taxol ,derived from taxoids got from pathogens of the American yew tree then currently utilized in ovarian malignant growth. Likewise, the job of flavonoids other than other plant compounds as cell reinforcements and free-extremist foragers is starting to have significant impacts in area of constant provocative sickness as well as disease. Unrefined concentrate of various pieces of plant are evaluated for pharmacological movement, frequently founded on utilization in society medication One an outcome is found, the substances are recognized by chromatography as well as filtered further before in vivo testing is begun, A couple of these lead mixtures may ultimately become authorized as drugs.

**Categories based on natural source:-**

- Carbohydrates & Fiber.
- Fat & Essential fatty acids
- Protein.
- Minerals like Macrominerals& Trace minerals,
- Vitamins.
- Water.
- Other nutrients like Antioxidants, Phytochemicals & Intestinal bacterial flora recombinant nutraceuticals.

**\*Health Benefits of Nutraceuticals:-**

From the consumers' point of view nutraceuticals offer following benefits:

- Increase the health value of our diet.
- Helps to live longer.
- Help to avoid particular medical conditions.
- May have a psychological benefit from doing something for oneself.
- May be perceived to be more "natural" than traditional medicine and less likely to produce unpleasant side effects.

Herbal medicine constitutes an effective source of both traditional and modern medicines. According to the World Health Organization (WHO), 80 per cent of rural population depends on herbal medicine for their primary healthcare. Medicinal plants though they are inadequately explored, they provide rich source of a variety of health benefits.

**Health Benefits of Phytochemicals:-**

The health benefits of phytochemicals are as follows:

- Substrate for biochemical reactions.
- Cofactors of enzymatic reactions.
- Inhibitors of enzymatic reactions.
- Absorbents that bind to and eliminate undesirable constituent in the intestine.
- Scavengers of reactive or toxic chemicals.
- Enhance the absorption and / or stability of essential nutrients.
- Selective growth factor for beneficial bacteria.

**Physiological Benefits of Nutraceuticals:-**

The physiological benefits of nutraceuticals are as follows:

- Cardiovascular agents,
- Anticancer agents,
- Anti-diabetics,
- Anti-obese agents,
- Chronic inflammatory disorders,
- Immune boosters, and Antioxidant.

**Nutraceuticals and Diseases:-**

**I.Cardiovascular diseases:-**

Cardio-Vascular Diseases (CVD) is a group of disorders of the heart and blood vessels that include hypertension (high blood pressure), coronary heart disease (heart attack), cerebrovascular disease (stroke), heart failure, peripheral vascular disease, etc.

Nutraceuticals in the form of antioxidants, dietary fibers, omega-3 Poly-Unsaturated Fatty Acids ( $\omega$ -3 PUFAs), vitamins, and minerals are recommended together with physical exercise for prevention and treatment of CVD.

Nutrients and nutraceuticals with calcium channel blocking activity (thus antihypertensive activity) include  $\alpha$ -lipoic acid, magnesium, Vitamin B6(pyridoxine), Vitamin C, N-acetyl cysteine, Hawthorne, Celery,  $\omega$ -3 fatty acids, etc.

Cholesterol is a major significant risk factor in CVD. Sterols occur in most plant species and are called as phytosterols. Green and yellow

vegetables contain significant amounts and their seeds' concentrate the sterols. Phytosterols compete with dietary cholesterol by blocking the uptake as well as facilitating its excretion from the body.

Phytosterols in diet have the potential to reduce the morbidity and mortality from CVD. Milk and eggs are important animal sources of nutraceuticals like proteins and polyunsaturated fats or Essential Fatty Acids (EFAs). EFAs are required for production and rebuilding of cells, to reduce BP, lower cholesterol and triglycerides, reduce the risk of blood clots, help prevent many diseases including arthritis, arrhythmias, and other CVDs.

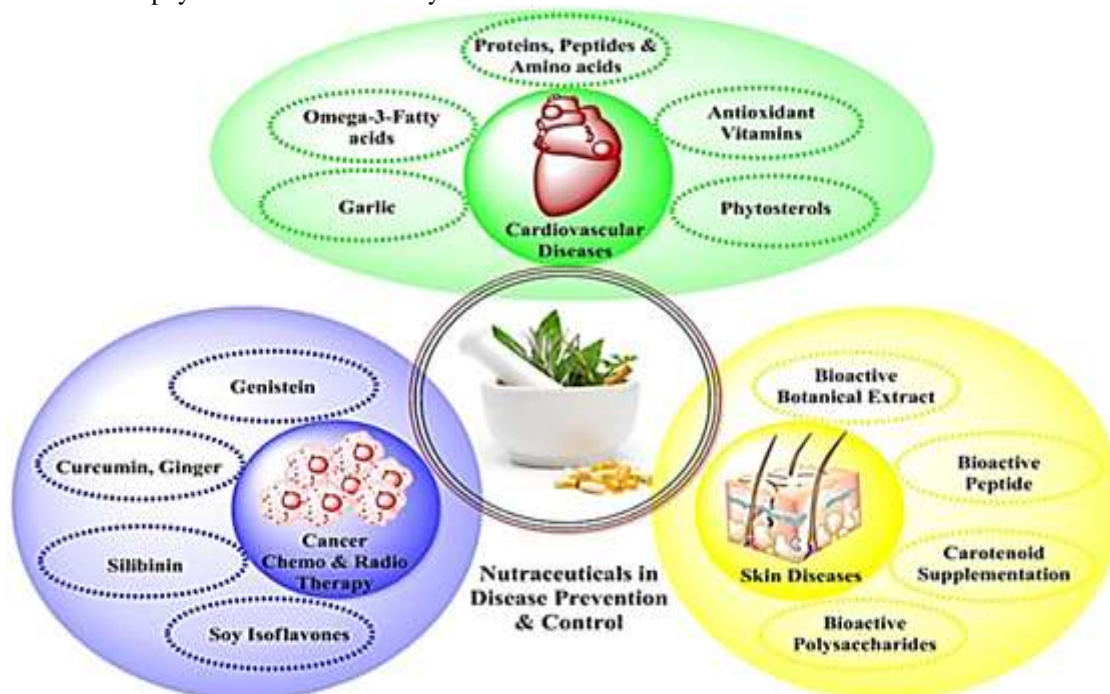


Figure: 2 Disease prevention & control

Nutritional value of egg is increased because of added Gamma Linolenic Acid (GLA) which has many benefits, including prevention and management of CVD like hypertension. Fatty acids present in fish such as  $\omega$ -3 series ( $\omega$ -3 fatty acids) are well-established dietary components affecting plasma lipids and the major cardiovascular disorders, such as arrhythmias.

## II. Diabetes:-

Diabetes mellitus is characterized by abnormally high levels of blood glucose, either due to insufficient insulin production, or due to its ineffectiveness. The most common forms of diabetes are type I diabetes (5%), an autoimmune

disorder; and type 2 diabetes (95%), which is associated with obesity.

Gestational diabetes occurs in pregnancy. Diabetes, like most chronic health conditions, not only economic burdens on society as a whole but also imposes considerable economic burdens on individual patients and their families.

Diet therapy is the cornerstone for the management of gestational diabetes mellitus. The use of herbal dietary supplements are believed to benefit type 2 diabetes mellitus.

$\omega$ -3 fatty acids have been suggested to reduce glucose tolerance in patients predisposed to diabetes. For the synthesis of the long chain  $\omega$ -3 fatty acids, insulin is required; the heart may, thus,

be particularly susceptible to their depletion in diabetes. Ethyl esters of  $\omega$ -3 fatty acids may be potentially beneficial in diabetic patients.

Docosahexaenoic acid modulates insulin resistance and is also vital for neurovisual development. This is especially important in women with gestational diabetes mellitus which foster the recommendation for EFAs during pregnancy.

### III. Obesity-

Obesity is a global public health problem and is defined as accumulation of unhealthy amount of body fat. It is a well-established risk

factor for many disorders like angina pectoris, congestive heart failure (CHF), hypertension, hyperlipidemia, respiratory disorders, renal vein thrombosis, osteoarthritis, cancer, reduced fertility, etc.

One of the primary causes for rapid rise in obesity rates is the increased availability of high-fat and energy dense foods. Excessive consumption of energy-rich foods such as snacks, processed foods and soft drinks can encourage weight gain, which calls for a limit in the consumption of saturated and trans-fats apart from sugars and salt in the diet.

**Table: 1 Classification of Nutraceuticals Based Upon Food Source:-**

S. No.	Food Source	Examples
1.	PLANTS	$\beta$ -glucan, Ascorbic acid, tocotrienol, Quercetin, Cellulose, Leutin, Gallic acid, Perillyl alcohol, Potassium, Allicin, Lycopene, Hemicellulose, Lignin, Capsaicin, Geraniol, $\alpha$ -tocopherol, Selenium, Zeaxanthin etc...
2.	ANIMALS	Conjugated Linoleic Acid (CLA), Eicosa, Pentaenoic Acid (EPA), Docosa Hexenoic Acid, (DHA), Spingolipids, Choline, Lecithin, Calcium, Coenzyme Q10, Selenium, Zinc, Creatinine, Mineral etc...
3.	MICROBES	Saccharomyces boulardii (yeast), Bifidobacterium bifidum, Bifidobacterium longum, Bifidobacterium infantis, Lactobacillus acidophilus (LCI), L- acidophilus (NCFB 1748), Streptococcus salvarius

### IV. Immune boosters:-

Nutrients present in the diet play a crucial role in maintaining an “optimal” immune response, on the organism’s immune status and susceptibility to a variety of disease conditions. A wide range of phytopharmaceuticals with a claimed hormonal activity, called “phyto-estrogens”, is recommended for prevention of various hormonal imbalance diseases.

Nutraceuticals that belong to the category of immune boosters and / or antiviral agents are useful to improve immune function and accelerate wound-healing.

They include extracts from the coneflowers, or herbs of the genus Echinacea, such as Echinacea purpurea, Echinacea angustifolia, Echinacea pillida, and mixtures thereof; extracts from herbs of the genus Sambuca, such as elderberries; and Goldenseal extracts.

Astragalus membranaceus, Astragalus mongolicus, and other herbs of the genus Astragalus are also effective immune boosters in both natural and processed forms. Astragalus stimulates development and transformation of stem cells in the marrow and lymph tissue to active immune cells.

Supplementation with probiotics may provide maturational signals for the lymphoid tissue and improve the balance of pro- and anti-inflammatory cytokines. Dietary nucleotides may improve growth and immunity; optimize maturation, recovery and function of rapidly dividing tissue.

### CATEGORIES OF NUTRACEUTICALS ON THE BASIS OF NATURAL SOURCES:-

1. Functional foods
2. Medicinal foods
3. Pharmaceuticals

**1. Functional foods:** The term functional food includes whole foods and fortified, as well as enriched or enhanced dietary components that may reduce the risk of chronic diseases and provide a health benefit beyond the traditional nutritional effects.

\* Examples of functional foods: 1. Yogurt : probiotics promote intestinal health, 2. Fortified or enriched Foods/snacks/cereals: treatment of nutritional deficiencies, 3. omega -3 enriched oils: lowers cholesterol, 4. Oats/Bran/Lignins: Reduces



heart risks,5.Stanols: Regulation of cholesterol absorption,6.Prebiotics: Control of intestinal flora.

**2. Medicinal foods:** Medicinal foods are designed to be consumed or administered internally under the supervision of a qualified physician. They are used in specific dietary management of a disease or condition for which distinctive nutritional requirements are established by the medical evaluation and on the basis of recognized scientific principles. These constitute different parts of plants viz. seeds, berries, leaves, roots, flowers and barks that possess nutraceutical properties. They are helpful in prevention of different kinds of illnesses. These are now widely used in the form of medicinal nutritional therapies.

**3.Farmaceuticals:**Farmaceuticals are components produced from modified agricultural crops or animals, having high intent of medicinal value. This term includes a combination of the two words “farm” and “pharmaceuticals.”

**On the basis of prevalence of nutraceuticals in marketing they can also be categorized in to:-**

\*Traditional Nutraceuticals: No alterations can be made on this kind of nutraceuticals. They contain

natural active components of food that provide health benefits to mankind. Nutrients, herbs and phytochemicals may be covered under this category.

\*Non-Traditional Nutraceuticals: The alterations may be made in foods to derive health benefits for mankind with the help of certain scientific processing techniques.

**Foods that show nutraceutical properties can be discussed as:-**

- 1.Dietary Fibre
- 2.Probiotics
- 3.Prebiotics
- 4.Polyunsaturated fatty acids
- 5.Antioxidant vitamins
- 6.Spices

**1.Dietary Fibre:** Whole grains cereals and pulses, fruits and vegetables are a major source of dietary fibre in our diet. These cannot be digested completely in our gut and thus provide roughage and are essential for healthy functioning of our gut.

**Dietary fibers are of two types**

- 1Water insoluble fibers.
2. Water soluble fibers.

**Table: 2 Examples of The Best High-Fiber Foods**

FIBROUS FOOD	CONTENT OF FIBRE(gm)
Split Peas	16.3 grams per cup
Lentil	15.6 grams per cup
Black Beans	15 grams per cup
Lima Beans	13.2 grams per cup
Brussels Sprouts	10.3 grams per cup

**2.Probiotics:** It includes both live bacteria and yeasts having a good impact on health, especially on gut health. Actually the body is a home of both good and bad bacteria. “Good” or “helpful” bacteria constitute this category that is important for a healthy digestive system of the body. They are found to be suitable for the treatment of diarrhea, irritable bowel syndrome (IBS), inflammatory bowel disease (IBD), allergies, cold and skin conditions like eczema.They are found in dairy products like yogurt, fermented products, and chocolates.

**3.Prebiotics:** Their intake causes the growth or activity of microorganisms like bacteria and fungi that promote well being of their host. Prebiotics

change the constitution of gut microbiota. Some of the prebiotics boost the functions of skin microbiota. Scientific studies revealed that all prebiotics act as fiber, but not all fiber performs the function of prebiotic.

**4.Polyunsaturated Fatty Acids:** They exhibit health promoting effects and are helpful in curing various disorders and lifestyle chronic diseases like coronary heart disease, hypertension, diabetes, arthritis and other inflammatory conditions and autoimmune disorders.

Sunflower oil, soybean oil, olive oil, canola oils and other vegetable oils, fish oils, oily fishes like salmon, soybean, flaxseed, canola, pumpkin, walnut are major sources of

polyunsaturated fatty acids. Some studies revealed that regular consumption of fish oils reduce both morbidity and mortality risks from cardiovascular disease including ischemic heart disease, nonischemic myocardial heart disease, and hypertension.

**5. Antioxidant Vitamins:** Vitamins like vitamin C, vitamin E and carotenoids are collectively known as antioxidant vitamins. Antioxidants form the first line of defense against this mutilation, and play an important role in the optimum health maintenance. Antioxidants stabilize or deactivate free radicals in turn prevent damage to cells.

These compounds are considered as nutrient-derived antioxidants (vitamin C, vitamin E, carotenoids, glutathione and lipoic acid), antioxidant enzymes (superoxide dismutase, glutathione peroxidase, and glutathione reductase), metal binding protein (ferritin, lactoferrin, albumin, and ceruloplasmin).

**Antioxidants are of 3 categories:-**

- 1 True antioxidants.
  - 2 Reducing agents .
  - 3 Antioxidant, synergists
- Deficiency causes diseases like Cancers, rheumatoid arthritis, alzheimers disease, cardiovascular diseases.

**Table: 3 Examples of Antioxidant & their sources**

ANTIOXIDANT	SOURCE
<b>VITAMINS</b>	
Vitamin C	Citrus fruits , vegetables
Vitamin E	Grains, nuts, oils
<b>CAROTENOIDS</b>	
Lycopene	Tomatoes
Beta carotene	Carrots, sweet potato
<b>XANTHOPHYLLS</b>	
Beta cryptoxanthin	Mango, papaya, oranges
<b>FLAVANOIDS</b>	
Rutin	Tobacco, eucalyptus species
Luteolin	Lemon, red pepper, olive
Quercetin	Onion, appleski, black grapes
Kaempferol	Grape fruits, tea
Liquiritin	Liquorice

**6. Spices:-** They play a major role in seasoning food rather than providing nutrition. The spices provide significant flavor, aroma and pungency to foods. Besides it, spices are also important in indigenous medicines, pharmaceuticals, Nutraceuticals, aroma therapy, preservatives, beverages, natural colors, perfumes, dental preparations, cosmetics and botanicals as pesticide. Some spices are having nutraceutical effects such as cinnamon, clove, curcuma spp., saffron and long pepper etc.

They are a good source of vitamin C and rich in antioxidants, Hence boosts immunity, promotes digestion and prevents cough, asthma, fever, heart diseases. Turmeric, red pepper, black pepper, clove, ginger, garlic, coriander, rosemary, saffron and cinnamon has been shown to exert its activity against neurodegenerative diseases like Alzheimer's disease, Parkinson's disease, multiple sclerosis, brain tumor and meningitis, etc.

**Table: 4 Mechanism of Action of Nutraceuticals**

Anticancer	Positive influence on blood profile	Antioxidant activity	Anti-inflammatory	Osteogenic or Bone protective
Alpha tocopherol	Alpha Glucan	CLA	Linolenic acid	CLA
Capasaicin	Tocotrienol	Ascorbic acid	EPA	Soya Protine
CLA	MUFA	Beta-carotene	DHA	Genestein
Daidzein	Quercetin	Tocopherols	GLA	Daidzein
Ellagic acid	Omega-3 PUFA	Tocotrienols	Capsaicin	Calcium
Equol	Reveratrol	Indole 3-carbinol	Quercetin	Casein
Genistein	Tannins	Alpha tocopherols	Curcumin	Phosphopeptides
L.bulgaricus	Saponins	Ellagic acid		FOS (frutooligosaccharides)
Lactobacillus acidophillus	Pectin	Lycopene		
Lutein	Guar	Lutein		
Sphingolipids		Glutathione		
Curcumin		Luteolin		
		Oleuropein		
		Catechins		
		Tannins		
		Gingerol		
		Chlorogenic acid		

**Potential health benefits:-**

In recent years, nutraceuticals have created remarkable interest in their potential nutritional and therapeutic effects. These products have a role in biological processes, including antioxidant defenses, cell proliferation, gene expression and mitochondrial integrity.

Therefore, nutraceuticals may be used to promote health, prevent chronic diseases, postpone the aging process and in turn increase life expectancy or just support the functions and overall integrity of the body. These products are considered to be healthy sources for the prevention of various diseases such as diabetes, renal disorders, gastrointestinal diseases and different infections.

A wide range of nutraceuticals has proved to impose crucial roles in immune status and susceptibility to certain diseases. Nutraceuticals also exhibit diseases related to oxidative stress including allergies, Alzheimer's disease, cardiovascular diseases, cancer, eye conditions, Parkinson's diseases, and obesity

**Healthy life style :-**

**Nutricosmetics:** Nutricosmetics are nutritional supplements which purpose to support the function and the structure of the skin. Many micronutrients have this effect. Vitamin C, for example, has a

well-established anti-oxidant effect that reduces the impact of free radicals in the skin.

**Cosmeceuticals:** It is the combination of cosmetics and pharmaceuticals. Cosmeceuticals are cosmetic products with bioactive ingredients purported to have medical or drug-like benefits. Dermatological research suggests that the bioactive ingredients used in cosmeceuticals have benefits beyond the traditional moisturizer

**Nutrition:** It is the science that interprets the interaction of nutrients and other substances in food in relation to maintenance, growth, reproduction, health and disease of an organism. It includes food intake, absorption, assimilation, biosynthesis, catabolism and excretion

**Nutraceuticals Approach in Ayurveda**

The prime aims and objectives of the Ayurveda is the establishment of the healthy condition and removes disease condition. In Ayurvedic dietetics importance given to food in prevention and treatment of disease as well as herbs and herbal formulations are the part of daily food supplements. According to Acharya Charak, a diet which besides providing the basic nutrition to the body, help to maintain the healthy state of the body and prevents the occurrence of diseases should be consumed.

An interesting verse by Acharya Lolimbaraja regarding the importance of food is, if wholesome diet is given in a planned way, then there is no need to administer medicines and if wholesome diet is not being used then too there is no need to give medicine as this is not going to cure the disease in the absence of wholesome diet. The concept of Aahar is a holistic approach and far beyond the modern view. An indication of Pathya-apathy, Hita-ahita and Satmya-asatmya are based on individualistic approach. Ayurveda has a great emphasis on the quality of nutritious food as Rasayana (preventing degenerative changes), Balya (Post illness nutrition), Brihan (Provides deficient nutrient), Jeevaniya (maintaining longevity), Vyadhikshmatva (enhancing the immunity) and Vajikaran (maintaining vitality and vigor). The science of food and nutrition in Ayurveda was much developed. Acharya Charak has categorized all food items into twelve classes, Acharya Sushrut in ten and thirteen.

There is another classification based on consistency of food products as Ashita (Semi-solids, advised for aged people), Khadita (solid food, advisable for young people with good digestion), Peeta (liquid in consistency, advisable for the newborns, children and diseased people and advocated in summer) and Leeda (Paste form that can be licked, advisable for children, convalescing and old people).

The nutraceutical products are recognized not only for their health benefits to reduce the risk of cancer, heart diseases and other related ailments, but also to prevent or treat hypertension, high cholesterol, excessive weight, osteoporosis, diabetes, arthritis, macular Poor diet No exercise Hectic lifestyle Inoculations.

## CURRENT SCENERIO OF NEUTRACEUTICAL WORLDWIDE

### India's Nutraceutical Market Development:-

- India's nutraceutical market is prepared to be a worldwide pioneer at USD 4-5 billion. It is normal to develop around USD 18 billion by 2025.
- The dietary enhancements market in India is esteemed at USD 3924.44 million out of 2020 and reports say that it will arrive at USD 10,198.57 million by 2026 that is 22% development rate year on year.

- The continuous pandemic and the rising significance about preventive medical care has prompted the dramatic development of this area.
- Indian populace has started to have faith in resistance helping supplements and has prompted a huge change in purchasing behaviors and market conduct. Nutrient cases, enjoyable tablets and chewy candies are instances of the liberal purchasing conduct of purchaser of healthcare products.

## RISE OF PREVENTION HEALTHCARE

Preventive medical care has turned into a significant line of protection during the pandemic demonstrating the nutraceuticals area to be serious areas of strength for an accomplice to individuals. Indeed, even after the pandemic seriousness has limited, nutraceuticals buys are taking off. The subsequent wave demonstrated that the nutraceutical area has constructed and will keep on developing its presence on the lookout. The utilization of potentia supplements and miniature supplements like Vitamin A, Vitamin D, L-ascorbic acid, folate, selenium, zinc, and so on has significantly expanded for better resistance. As per a concentrate by Nourishment and Dietary Enhancements, numerous fixings can be remembered for everyday eating routine to conceivably acquire invulnerability or insurance against Covid. Polyphenols, leguminous seeds containing plant protease inhibitors, as well as proteins, for example, whey protein could be integrated into the day to day diet.

## INDUSTRY OVERVIEW

In the pharmaceutical industry, it is compulsory to do clinical tests on creatures or in vitro for the confirmation of a compound's belongings. In actuality, in sustenance, there was no such strategy in the past for the confirmation of impacts of food varieties in forestalling or treating sicknesses. As of late, in any case, the food arrangement has been experimentally tried and confirmed as individuals are turning out to be increasingly more mindful of wellbeing related issues and how food can straight forwardly or in a rounda bout way be liable for keeping up with legitimate wellbeing and forestalling sicknesses.



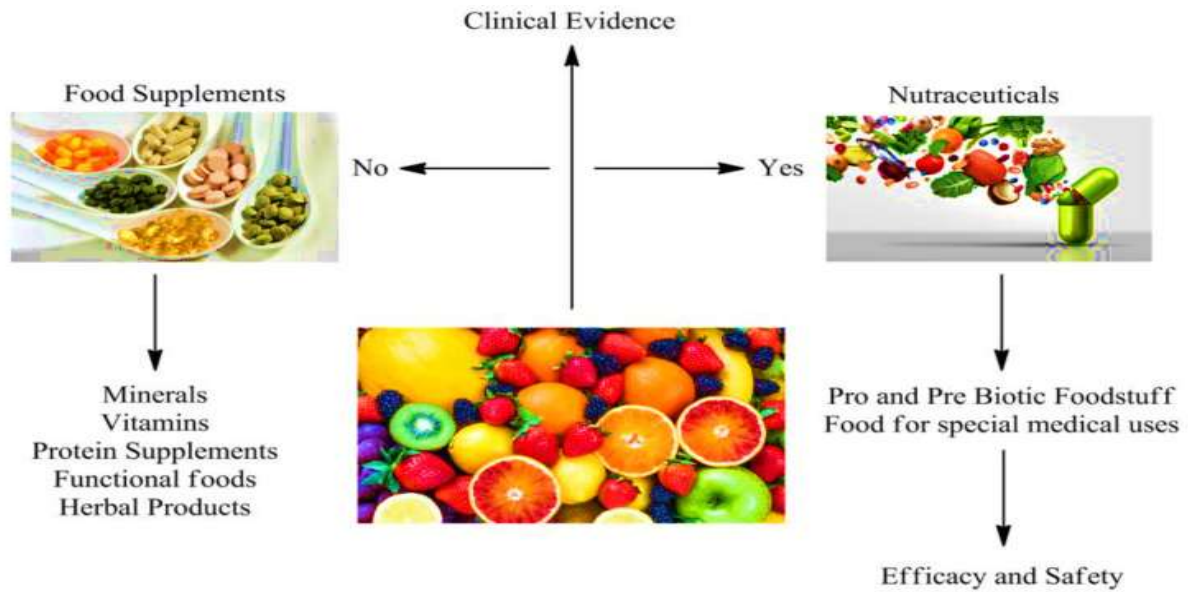


Figure: 3 Clinical evidence of industrial overview

**Global Nutraceutical Market Stats**

At present, 90% of the all out worldwide nutraceutical market is caught by the USA, Japan and Europe. The worldwide market ought to arrive at USD 336 billion by 2023 from USD 247 billion out of 2019 at a build yearly development rate (CAGR) of 8%.

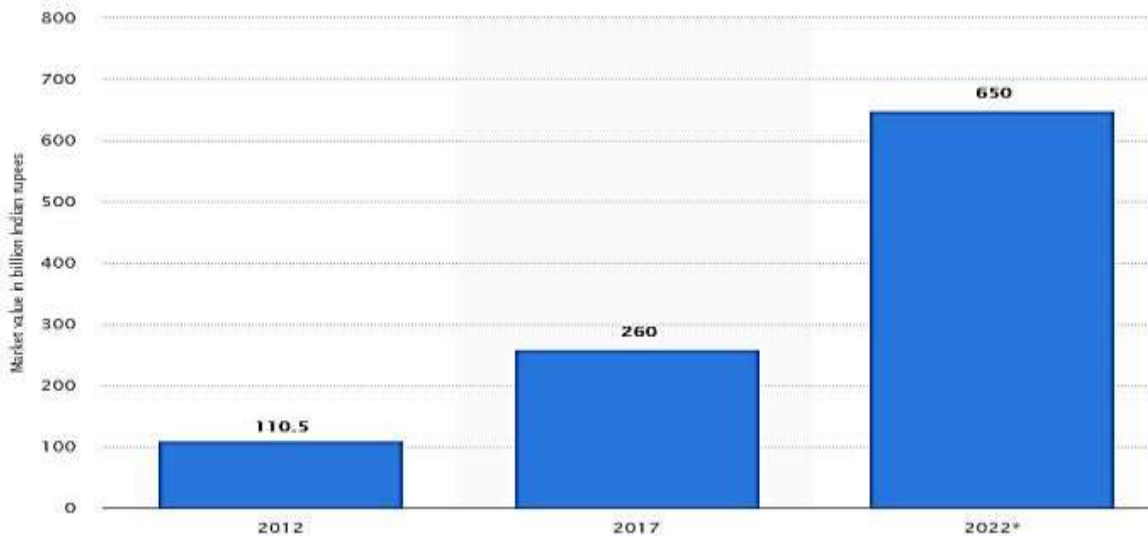
**Indian Nutraceutical Market Stats**

1. After these worldwide business sectors have accomplished development, the nutraceutical

associations are currently moving to creating economies in the Asia Pacific.

2. In 2017, the Indian market held just a 2% piece of the worldwide nutraceutical market and its assessed valuation remains at around \$5 billion starting around 2019. It is normal to arrive at USD 11 billion by 2023, expanding at a CAGR of 21%.

3. By 2023, India is likewise expected to hold essentially a 3.5% portion of the overall industry of the worldwide market.



4. Drugs trade from India remained at USD 16.3 billion in FY20. As of November 2020, India traded drugs worth USD 15.86 billion in FY21. Drug trades remained at USD 16.28 billion in FY20 and USD 2.07 billion in October 2020.

5. Right now, the Indian market imports more than it trades; USD 1.5 billion in products and bringing in the USD 2.7 billion worth of nutraceuticals. The market is supposed to develop at a critical 22% CAGR by 2023.

6. The Indian nutraceuticals industry has been developing at 25% every year during the pandemic. The Unfamiliar Direct Speculation (FDI) has likewise expanded from USD 131.4 million (FY12) to USD 584.7 million (FY19).

#### Recent Trends in Nutraceuticals:-

Lately, rising mindfulness among shoppers towards the medical advantages of food sources and their nourishing advantages for infection avoidance and wellbeing improvement. Slowly expanded understanding about the possible system of naturally dynamic parts in food, which could further develop wellbeing and most likely lessen the gamble of sickness and upgrade in general prosperity.

Arising field in nutraceuticals are Nanoneutraceuticals, Nutrigenomics, Nutrigenetics, Sub-atomic sustenance and wellbeing and adequacy of nutraceuticals. Tremendous requests of home grown items project the drug businesses to create herbals dietary enhancements.

#### Status of Nutritional in India:-

Dietary supplements and nutraceuticals have become well known in India because of nonattendance of satisfactory admission of nourishment in the food. The admission of micronutrients in the Indian day to day diet isn't palatable. A few projects have been sent off throughout the long term in India to further develop sustenance and wellbeing status of the Indian populace; regardless of this an enormous part of the populace is as yet impacted by micronutrient lacks. There is obvious proof of a segment, epidemiological and sustenance progress in India. Numerous Indian organizations are offering diet supplements/nutraceuticals/practical food varieties, for example, Kellogg India Restricted (cornflakes and oats), Britannia Ventures Restricted (Nutrichoice bread rolls, Tiger glucose rolls) Settle India Restricted (ActiPlusDahi, CEREGRROW, MILO, Child and Me), Agro Tech Food varieties Restricted (Sundrop cooking oil), Ruchi Soya

Businesses Restricted (Nutrela), Amway India Endeavors Restricted (Nutrilite), Dabur India Restricted (Glucose-D), Patanjali (Aloe vera Fiber Juice).

## II. CONCLUSION

Neutraceuticals are the sort of normal items that have been known for their helpful qualities. Innutraceuticals numerous food fixings with differing fixation. In the focus, time and span of nutraceuticals impact human health. Diet rich nutraceutical with standard activity, stress decrease and support of sound body weight will boost wellbeing and diminish sickness risk. Be that as it may, research in regards to nutraceuticals and their purposes corresponding to their parts and their natural impacts are as yet anticipating. There are not many explores that guarantee the advantages of nutraceuticals and their use by people in general in their day today life, corresponding to their true capacity for advancing general wellbeing. It very well may be reasoned that nutraceuticals are accessible in different structures and are effectively available. They give every one of the fundamental supplements important to advance wellbeing. Furthermore, nutraceuticals are having defensive, sound and novel methodologies that can overcome different diseases without hurting people. These can be a reasonable option in contrast to present day medications.

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