

## Overview on Nutraceuticals as a Functional food

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Submitted: 12-01-2023

Accepted: 25-01-2023

### ABSTRACT :-

Lately there is a developing interest in nutraceuticals which give medical advantages and are option in contrast to present day medication. Supplements, herbals and dietary enhancements are major constituents of nutraceuticals which make them instrumental in keeping up with wellbeing, act against different sickness conditions and hence advance the personal satisfaction. The hazardous development, research improvements, absence of guidelines, showcasing enthusiasm, quality confirmation and guideline will play a crucial job in its prosperity or disappointment. In India the most well-known types of practical food varieties and nutraceuticals are accessible as customary Indian Ayurvedic Medications (IAM); these are showcased under various brand names. India is the home of an enormous number of restorative spices, flavors and tree species that have a considerably huge homegrown market with no major unfamiliar contest at present. In any case, it is critical to take note of that there are no severe drug guidelines on Ayurvedic and nutraceutical wellbeing items in India. In india and china have enormous populaces, specifically in provincial, remote and distant regions which are absolutely subject to naturalcures and other normally accessible bioresources which they use to treat normal infirmities, furthermore, as broad preventive and defensive prescriptions. In the worldwide commercial center nutraceuticals what's more, practical food varieties have turned into an extravagant industry and evaluations inside Canada propose that the Canadian nutraceutical and practical food industry can possibly develop to \$50 billion US. Japan is the second biggest market on the planet for nutraceutical items after the US. Its nutraceutical market has displayed a consistent normal development pace of 9.6% per annum.

**Key Words:-** Nutraceuticals, functional Food, future food

### INTRODUCTION:-

The interest in nutraceuticals and practical food sources keeps on developing, fueled by moderate researchendeavors to recognize properties

and possible uses of nutraceutical substances, and combined with public interest and purchaser interest. The chief purposes behind the development of the useful food market are current populace and wellbeing patterns. Across the globe, populaces are maturing. Future keeps on ascending, as does the commitment made by more established people to the complete populace. Likewise, weight is currently perceived as a worldwide issue as its frequency keeps on moving in nations all through the world. In the U.S., roughly 62% of the grown-up populace is delegated overweight (in light of weight record (BMI)), and more than a big part of those grown-ups are named stout. Coronary illness keeps on being an essential driver of demise, answerable for 32% of passings in the U.S., and disease, osteoporosis, and joint pain remain profoundly predominant. As of this composition, the Worldwide Stoutness Team reports that the occurrence of weight in most of European nations has expanded by 10 to half in the last 10 years. Individuals can advance the wellbeing advancing abilities of their eating routine via supplementation and by devouring food varieties that have been figured out or braced to incorporate wellbeing advancing variables. One more justification behind the developing pattern in useful food varieties is public schooling. Individuals today are more nourishment smart than any time in recent memory, their advantage in wellbeing related data being met by many courses of data.

### (i) Nutraceuticals or Functional Food:-

The term nutraceutical is a mixture or compression of sustenance and drug. Supposedly, it was begat in 1989 by DeFelice and the Establishment for Development in Medication. Rehashed and explained in a public statement in 1994, its definition was "any substance that might be viewed as a food or part of a food and gives clinical or medical advantages, including the counteraction and treatment of infection. Such items might go from secluded supplements, dietary, supplements and diets to hereditarily designed 'architect' food sources, home grown items, and

handled food varieties, for example, oats, soups, and drinks

As per the International Food Information Council (IFIC), useful food varieties are "food varieties or dietary parts that might give a medical advantage past essential sustenance." [4] The International Life Sciences Institute of North America (ILSI) has characterized useful food varieties as "food varieties that by ideals of physiologically dynamic food parts give medical advantages past essential sustenance." Wellbeing Canada characterizes useful food varieties as "comparative in appearance to a customary food, ate as a component of the standard eating regimen, with exhibited physiological advantages, as well as to lessen the gamble of persistent illness past fundamental wholesome capabilities." The Sustenance Business Diary grouped utilitarian food as "food strengthened with added or though fixings to useful levels, which further develops wellbeing or execution. Practical food source incorporate improved grains, breads, sport drinks, bars, braced nibble food sources, child food varieties, ready feasts, and that's just the beginning."

The Nutrition Business Diary expresses that it utilizes the term nutraceutical for whatever is consumed fundamentally or especially for wellbeing reasons. In light of that definition, a useful food would be a sort of nutraceutical. Then again, Health Canada expresses that nutraceuticals are an item that is "ready from food sources, yet sold as pills or powders (mixtures), or in other restorative structures not for the most part connected with food varieties. A nutraceutical is shown to have a physiological advantage or give insurance against persistent infection." In view of this definition and how practical food varieties are described, as noted already, nutraceuticals would be particular from utilitarian food varieties

### (ii) Nutraceutical Factor

Contingent on one's advantage or potentially foundation, the proper hierarchical plan for nutraceuticals can change. For instance, cardiologists might be most keen on those nutraceutical substances that are related with decreasing the gamble elements of coronary illness. In particular, their interest might lie in substances suspected to decidedly impact hypertension and hypercholesterolemia and to decrease free revolutionary or platelet-subordinate thrombotic movement. Nutraceutical factors like n-3 unsaturated fats, phytosterols, quercetin, and grape flavonoids would be exceptionally compelling. In

the mean time, oncologists might be more keen on those substances that target anticarcinogenic exercises. These substances might be related with expansions of microsomal detoxification frameworks and cell reinforcement protections, or they might slow the movement of existing malignant growth. Consequently, their advantage might lie in both chemoprevention and potential adjunctive treatment. The anticarcinogenic triterpene limonin is lipid-dissolvable and seriously severe, fairly restricting its business use as a utilitarian food fixing. Be that as it may, the glucoside subordinate of limonin, what shares a portion of the anticarcinogenic movement of limonin, is water dissolvable and for all intents and purposes boring, in this manner improving its likely use as a fixing.

### (iii) Food and non-food wellsprings of nutraceutical factors

One of the more extensive models of association for nutraceuticals depends on their true capacity as a food source to people. Here nutraceuticals might be isolated into plant, creature, and microbial (i.e., microbes and yeast) gatherings. One fascinating thought with this association framework is that the food source may not really be the starting place for at least one substances. An clear model is formed conjugated linoleic acid (CLA), which is important for the human eating regimen, generally as a part of hamburger and dairy food sources. Nonetheless, it is really made by microbes in the rumen of the cow. In this way, issues including the pecking order or cooperative connections might need to be considered for certain people working with this association conspire. Due to reasonably saved biochemical angles across species, numerous nutraceutical substances are seen as in both plants and creatures, and now and again in microorganisms. For instance, microorganisms, plants, and creatures contain choline and phosphatidylcholine. This is likewise valid for sphingolipids; notwithstanding, plants and creatures are better sources. Likewise, linolenic corrosive (18:3  $\omega$ -3 unsaturated fat) can be tracked down in an assortment of food assets including creature tissue, notwithstanding the way that it is basically blended in plants furthermore, other lower individuals from the pecking order. Table 1 presents a portion of the more conspicuous nutraceutical substances assembled by food-source suppliers.

Nonfood wellsprings of nutraceutical factors have been obtained by the improvement of present day maturation techniques. For instance,

amino acids and their subsidiaries have been delivered by microbes filled in maturation frameworks. The development of recombinant-hereditary procedures has empowered new roads for acquiring nutraceutical compounds. These strategies and their items are being assessed in the fields of the commercial center and administrative worries around the world. A model is the creation of eicosapentaenoic acid (EPA) by microorganisms. This unsaturated fat is delivered by some green growth and microorganisms. The EPA got from

salmon are delivered by green growth also, are subsequently consolidated in the salmon that consume the green growth. EPA can now be created by non-EPA delivering microorganisms by bringing in the fitting DNA through recombinant strategies

The capacity to move the development of nutraceutical atoms into organic entities that permits for financially possible creation is cause for both hopefulness and conversation concerning administrative and well known acknowledgment.

Table 1. Examples of nutraceutical substances grouped by food source

Plants	Animal	Microbial
$\alpha$ -Glucan	Conjugated Linoleic Acid (CLA)	Saccharomyces boulardii (yeast)
Ascorbic acid	Eicosapentaenoic acid (EPA)	Bifidobacterium bifidum
$\gamma$ -Tocotrienol	Docosahexenoic acid (DHA)	B. longum
Quercetin	Spingolipids	B. infantis
Luteolin	Choline	Lactobacillus acidophilus(LC1)
Cellulose	Lecithin	L. acidophilus(NCFB 1748)
Lutein	Calcium	Streptococcus salvarius (subs. Thermophilus)
Gallic acid	Coenzyme Q10	
Perillyl alcohol	Selenium	
Indole-3-carbonol	Zinc	
Pectin	Creatine	
Daidzein	Minerals	
Glutathione		
Potassium		
Allicin		
$\delta$ -Limonene		
Genestein		
Lycopene		
Hemicellulose		

Lignin  
 Capsaicin  
 Geraniol  
 $\beta$ -Ionone  
 $\alpha$ -Tocopherol  
 $\beta$ -Carotene  
 Nordihydrocapsaicin  
 Selenium  
 Zeaxanthin  
 Minerals  
 MUFA

**(iv) Nutraceutical Variables In Unambiguous Food sources**

In an association model connected with the

one above, nutraceuticals can be assembled based upon relatively concentrated food varieties. This model is more suitable when there is interest in a specific nutraceutical build or related builds, or when there is interest in a particular food for agricultural/geographic reasons or useful food-improvement purposes. For instance, the interest might be in the nutraceutical characteristics of a neighborhood crop or a generally devoured food in a geographic district, for example, pepper natural products in the southwestern US, olive oil in Mediterranean districts, and red wine in Western Europe and Northern California.

-- Examples of foods with higher content of specific nutraceutical substances --

Nutraceutical Substance/Family	Foods of Remarkably High Content
Allyl sulfur compounds	Onions, garlic
Isoflavones (e.g., genestein, daidzein)	Soybeans and other legumes, apios
Quercetin	Onion, red grapes, citrus fruit, broccoli, Italian yellow squash
Capsaicinoids	Pepper fruit
EPA and DHA	Fish oils
Lycopene	Tomatoes and tomato products
Isothiocyanates	Cruciferous vegetables
$\beta$ -Glucan	Oat bran
CLA Beef and dairy	Beef and dairy
Resveratrol	Grapes (skin), red wine
$\beta$ -Carotene	Rosemary
Catechins	Teas, berries
Adenosine	Garlic, onion
Indoles	Cabbage, broccoli, cauliflower, kale, brussels sprouts
Curcumin	Tumeric
Ellagic acid	Grapes, strawberries, raspberries, walnuts
Anthocyanates	Red wine
3-n-Butyl phthalide	Celery
Cellulose	Most plants (component of cell walls)
Lutein, zeaxanthin	Kale, collards, spinach, corn, eggs, citrus
Psyllium	Psyllium husk

Monounsaturated	fatty acids Tree nuts, olive oil
Inulin, Fructooligosaccharides (FOS)	Whole grains, onions, garlic
Lactobacilli, Bifidobacteria	Yogurt and other dairy
Catechins	Tea, cocoa, apples, grapes
Lignans	Flax, rye

There are a few nutraceutical substances that are tracked down in higher fixations in unambiguous food varieties or food families. These incorporate capsaicinoids, which are found essentially in pepper organic product, also, allyl sulfur (organosulfur) compounds, which are especially moved in onions and garlic. Table 1.3 gives a posting of certain nutraceuticals that are viewed as exceptional to certain food varieties or food families. One thought for this model is that for a few substances, for example, those just named, there is a somewhat short rundown of food varieties that are concentrated sources. Nonetheless, the rundown of food hotspots for other nutraceutical substances can be significantly longer and can incorporate various apparently inconsequential food sources. For example, citrus organic product contain the isoflavone quercetin, as do onions, a plant food apparently inconsequential. Citrus organic product develop on trees, while the consumable bulb of the onion plant (a spice) creates at ground level. Other plant food varieties with higher quercetin content are red grapes however not white grapes, broccoli (which is a cruciferous vegetable), furthermore, the Italian yellow squash. Once more, these food

varieties seem to look similar to citrus natural product or onions so far as that is concerned. Then again, there are no ensures that firmly related or apparently comparative food varieties contain the equivalent nutraceutical compounds. For instance, both the onion plant and the garlic plant are enduring spices emerging from an established bulb and are likewise cousins in the lily family. Be that as it may, despite the fact that onions are stacked with quercetin, for certain assortments containing upto 10% of their dry load of this flavonoid, garlic is quercetin-void.

**(v) Mechanism of action:-**

One more method for ordering nutraceuticals is by their instrument of activity. This framework gatherings nutraceutical factors together, paying little mind to food source, in view of their demonstrated or implied physiological properties. Among the classes would be cancer prevention agent, antibacterial, antihypertensive, antihypercholesterolemic, antiaggregate, calming, anticarcinogenic, osteoprotective, and so on. Like the plan recently talked about, solid Web assets may demonstrate significant to this methodology.

**Examples of nutraceuticals grouped by mechanisms of action :-**

Anticancer	Positive Influence on (BLP)	Antioxidant Activity	Anti-inflammatory	Osteogenic
Capsaicin	$\alpha$ -Glucan	CLA	Linolenic acid	CLA
Genestein	$\gamma$ -Tocotrienol	Ascorbic acid	EPA	Soy protein
Daidzein	$\delta$ -Tocotrienol	$\beta$ -Carotene	DHA	Genestein
$\alpha$ -Tocotrienol	MUFA	Polyphenolics	GLA	Daidzein
$\gamma$ -Tocotrienol	Quercetin	Tocopherols		Calcium
CLA	$\omega$ -3 PUFAs	Tocotrienols		Casein
				phosphopeptides

Lactobacillus acidophilus	Resveratrol	Indole-3-carbonol	Capsaicin	FOS(fructooligosaccharides)
Sphingolipids	Tannins	$\alpha$ -Tocopherol		Quercetin
Limonene	$\beta$ -Sitosterol	Ellagic acid		Curcumin Inulin
Diallyl sulfide	Saponins	Lycopene		
Ajoene	Guar	Lutein		
$\alpha$ -Tocopherol	Pectin	Glutathione		
Enterolactone		Hydroxytyrosol		
Glycyrrhizin		Luteolin		
Equol		Oleuropein		
Curcumin		Catechins		
Ellagic acid		Gingerol		
Lutein		Chlorogenic acid		
Carnosol		Tannins		
L. bulgaricus				

**(vi) Grouping nutraceutical factors in light of substance nature**

One more technique for gathering nutraceuticals depends on their compound nature. This methodology permits nutraceuticals to be ordered under atomic/natural gatherings. This fundamental model incorporates a few enormous gatherings, which then give a premise to sub grouping or subgroups, etc. One method for gathering nutraceuticals horribly is as per the following :

- Isoprenoid subordinates
- Phenolic substances
- Unsaturated fats and underlying lipids
- Carbs and subordinates
- Amino corrosive based substances
- Organisms
- Minerals

**(vii) Marketed preparation of nutritional supplement**

Product	Category	Contents
Coral calcium	Calcium supplements	Calcium and trace minerals
Weight smart	Nutritional supplements	Vitamins and trace elements
Omega women	Immune supplements	Antioxidants, vitamins and phytochemicals
Appetite Intercept	Appetite suppressants	Caffeine, tyrosine and phenylalanine
Chaser	Hangover supplements	Activated calcium carbonate
Rox	Energy drink	Taurine, caffeine and glucuronolactone
Mushroom optimizer	Immune supplement	Mushroom, polysaccharides and folic acid
Biovinca	Neurotonic	Vinpocetine
Proplus	Nutritional supplements	Soy proteins
Snapple-a-day	Meal replacement beverage	Vitamins and minerals
wellife	Amino acids supplements	Granulated-L-glutamine
PNer plus	Neuropathic pain supplements	Vitamins and other natural
Olivinol	Dietary supplements	Natural antioxidants
Threptin diskettes	Protein supplement	Protein and vitamin B
GRD	Nutritional supplements	Protein, vitamins, minerals
Proteinex	Protein supplement	Predigested protein, vitamins, minerals and carbohydrates
Calcitriol D-3	Calcium supplements	Calcium, vitamins

**(vii) Clinical food varieties as nourishing enhancements:-**

Clinical food sources are food varieties that are exceptionally planned and expected for the dietary administration of an illness that has particular healthful requirements that can't be met by typical eating routine alone. They were characterized in the Food and Medication Organization's 1988 Vagrant Medication Act Revisions 16,17] furthermore, are dependent upon the overall food and security naming prerequisites of the Government Food, Medication, what's more, Restorative Demonstration. Clinical food sources are unmistakable from the more extensive class of food sources for unique dietary use and from customary food sources that bear a wellbeing guarantee. To be viewed as a clinical food the item must, at least:

- be a nourishment for oral ingestion or cylinder taking care of (nasogastric tube)
- be named for the dietary administration of a

particular clinical issue, infection or condition for which there are unmistakable wholesome prerequisites, and

- be planned to be utilized under clinical watch.

Clinical food varieties can be characterized into the accompanying classes:

- Healthfully complete recipes
- Healthfully deficient recipes
- Recipes for metabolic issues
- Oral rehydration items

**(viii) Development stays a need:-**

"Advancement is fundamental for the business - particularly in the feeling of working on the taking care of and application qualities of existing particles," says Jager. "We will keep on putting resources into advancement; it is an unaltered need for us." BASF is especially perky following the send off of its scope of General Equation items in Spring. The organization has

made details of every single significant nutrient and carotenoids - colors tracked down in plants - that satisfy all administrative prerequisites in Asia, Europe or the US. This outcomes in a fundamentally less complicated store network furthermore, buying process for the client, less gamble of stirring up fixings, and adaptability that permits inventories to be advanced - exceptionally significant elements during circumstances such as the present. DSM Dietary Items, in the mean time, is additionally seeing rising deals for wellbeing food varieties and dietary enhancements and fair interest, says Philipp Siebrecht, worldwide business administrator. All things considered, items advancing wellbeing and prosperity are significantly to a greater degree a need for cash cognizant buyers. In a little more than a year since DSM sent off its ResVida image in Walk 2008, the high-immaculateness type of the normal fixing resveratrol is selling firmly, and Siebrecht is hopeful about development in the market. The ongoing monetary emergency is going individuals to drink - yet for simply restorative reasons. Resveratrol - a characteristic fixing tracked down in red wine - shows specific commitment and has been commended as having huge medical advantages. It has been demonstrated to assist with limiting the dangers of coronary illness, as well as working on locomotor abilities - the premise of human development, and saving abilities to learn and perseverance. Resveratrol happens normally in various plants, including grapes, mulberries, peanuts, white hellebore and a Chinese plant called monster knotweed. "A many individuals are familiar the advantages of red wine when tipsy in humble amounts," says Siebrecht, alluding to a peculiarity known as the French Conundrum that proposes that there are less instances of stoutness and coronary illness in France, in spite of a full-fat eating regimen and a propensity for wine drinking. "DSM figured out how to extricate that atom, and we presently supply it to the practical food industry, which adds it to its dietary enhancements or refreshments and food items," One method for expanding future is to lessen calorie consumption, says Siebrecht somewhat. Scientists have tracked down that low dosages of resveratrol in the eating regimen of mice mirror this impact. DSM has improved the characteristics of resveratrol and gives a close to 100% unadulterated structure. A portion of 30- 200mg a day could decidedly affect wellbeing; simply 30mg would be what might be compared to five or six jugs of wine yet without the conspicuous wellbeing suggestions. Albeit the

nutraceuticals market is a moderately new idea, going back years and years, it has areas of strength for flaunted, immovable development in its short life expectancy. While different areas are battling in the monetary agony, players are still to a great extent perky - basically while buyers still have a solid hunger for utilitarian food varieties and enhancements.

#### **(ix) Market and demand:-**

Almost 66% of the American populace takes no less than one kind of nutraceutical wellbeing item. The US wellbeing and health industry is approximated to be a \$91 billion dollar market, fundamentally under a \$250 billion gauge given by Stephen L. DeFelice. The differentiation between which items consider nutraceuticals makes it hard to measure the size precisely of the market. Indeed, even without explicit monetary figures, business reports ceaselessly propose that the market is reliably developing. One potential clarification for the development of nutraceuticals in the US is the maturing babyboomer populace. As the normal age of the residents keeps on rising, the populace increments its emphasis on wellbeing and health. By part of the way through the 21st hundred years, there could be just about 142 million Americans beyond 50 a years old, on an extended populace of almost 400 million residents. Albeit the cost of some nutraceuticals may drop as conventional items advance into the market, individuals' reliance on these items and their rising accessibility proposes that the development of the market will stay stable.

#### **(x) Viability and security:-Regulation**

In contrast to drug drugs, nutraceutical items are broadly accessible and negligibly checked. Organizations are not committed to back claims about the capability and adequacy of their item, yet many organizations endeavor to give logical sponsorship of their items to increment believability

#### **Global Sources:-**

In the worldwide market, there are critical item quality issues [19] Nutraceuticals from the global market might profess to utilize natural or intriguing fixings, yet the absence of guideline may think twice about security and viability of items. Organizations hoping to make a wide overall revenue might make unregulated items abroad with inferior quality or incapable fixings



### **Bioavailability:-**

Bioavailability, which can be considered the "retention rate" of an enhancement item, is one of the fundamental difficulties in finding compelling nutraceutical items. The bioavailability of supplements is higher in food eaten in its normal state. Indeed, even among natural food varieties, not all food varieties are separated and processed as successfully. Nutraceuticals with unfortunate assimilation rates results in supplements being arranged from the body without giving any nourishing or restorative advantage

### **Effect of placebo effect :-**

Part of the viability of nutraceuticals might be credited to a self-influenced consequence. Shoppers utilizing nutraceuticals may incorrectly credit their utilization of nutraceuticals for mending disease, when the body is frequently ready to recuperate all alone.

### **(xi) Future Prospects:-**

After virtually overlooking nourishment for as far back as century, in any event, marking anybody guaranteeing benefits from nutrients or wellbeing food sources as a food faddist or quack, presently researchers and nutritionists are guaranteeing that the association among nourishment and sickness is another disclosure. Another revelation it very well might be for those researchers who, for the past 50 years, have been laughing at the direct encounters and positive recounted reports of millions of customers all over the planet, however for the food faddist whose thoughts regarding sustenance have generally been considerably more steady than those of researchers, there is minimal that is truly new. Normal food sources are ideal. Nutrients and different supplements safeguard against illness. The same old thing here for food faddists.

Science is anyway to be saluted for at last paying attention to the food faddists. While latest things in nourishment are a much needed development to be sure contrasted with the negative, shortsighted, and one-sided approach of most sustenance research last 100 years, the way that food advertisers currently see utilitarian food varieties as an approach to showcasing low quality foods is a stressing pattern which raises gigantic questions about how much has truly been found out about nourishment over the beyond few many years. Useful food varieties it appears are to numerous simply a showcasing trick. The test here is for general wellbeing specialists to exhibit plainly that their faithfulness is to general

wellbeing also, not the benefits of gigantic food, compound, and drug organizations. It is fascinating to note in this regard that the public authority is seeking after administrative changes in the food industry which are not to the greatest advantage of shoppers and general wellbeing and which progressively favor political obstruction. As per Lawrence, In the ongoing worldwide financial climate, and given the move by global organizations to add dietary enhancements to food sources so they can make explicit wellbeing cases to advance promoting of their food sources, the ongoing worldwide mission to limit the retail accessibility of dietary enhancements in wellbeing food stores is to be expected. It is richly clear that the utilitarian food industry won't completely succeed assuming shoppers are allowed to make their own decisions about the particular dietary enhancements and doses they require. The achievement of utilitarian food varieties subsequently rests to a significant endless supply of this opportunity of decision. Now that the infection forestalling capability of supplements has been found by researchers furthermore, global food and medication organizations, the capacity of purchasers to "cure" themselves should be forestalled and accordingly control of dietary enhancements should be moved to specialists, drug organizations, and food producers. All things considered, medication has now at last understood that the dietary enhancements openly consumed by healthfully mindful individuals for a really long time have undeniably more potential to forestall or maybe even fix ongoing infections than all the immenserange of doctor prescribed drugs they have available to them.

### **Acknowledgements :-**

The authors are thankful to Mr. Shubham Bhatt Sir of S.C.P.M college of Pharmacy, Gonda, UP for the helping hands.

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