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Nutraceuticals - Used For Restorative And Healthiness Life

Ashwini Vasantrao Patil*, Dattakala college of Pharmacy, Department: -Pharmacognosy

Mrs.Shital Umakant Darekar, Dattakala college of Pharmacy, Department: -Pharmacognosy

Gopika Dattatray Dongare, Dattakala college of Pharmacy, Department: -Pharmacognosy

Abstract: - Nutraceutical is regarded as the bio active substance and the constituents are either of known therapeutic activity or are chemically defined substance generally accepted to contribute substantially to the therapeutic activity of the drug. Nutraceutical is the hybrid of nutrition and pharmaceutical. Nutraceuticals; in broad, are food or part of food playing a significant role in modifying and maintaining normal physiological function that maintains healthy human beings. The food products used as nutraceuticals can be categorized as dietary fiber, prebiotics, probiotics, polyunsaturated fatty acids, antioxidants and other different types of herbal natural foods.

Key Words: - Prebiotics, Probiotics, Nutrition, Dietary Fiber.

Introduction: -

The term 'nutraceutical' was coined from 'nutrition' and 'pharmaceutical' in 1989 by DeFelice and was originally defined as, a food (or part of the food) that provides medical or health benefits, including the prevention and/or treatment of a disease (1).The role of dietary active compounds in human nutrition is one of the most important areas of investigation with the findings having wide-ranging implications for consumers, healthcare providers, regulators and industry(2).A clear understanding of nutraceuticals in a regulatory system will reduce the confusion in establishing the policy for nutraceuticals. However, in current scenario the regulatory position of nutraceuticals is different depending on the country's regulatory framework (3) .

History:- The wise words of Hippocrates, who lived almost 2,000 years ago, "Let food be your medicine, and medicine be your food." (The realization that "nutraceuticals" are essential for improving health has spurred a wave of interest worldwide.) The Chairman of the Foundation for Innovation in Medicine, Dr. Stephen De Felice, "Nutraceutical" is a phrase he coined in 1989, combining the words "nutrition" and "pharmaceutical" (4).The term "FIM" was first used by Dr. DeFelice, but Health Canada has since changed its definition to include the following: a nutraceutical is a product that has been isolated or purified from food and is typically sold in medicinal forms that are not typically associated with food and that have been shown to have a physiological benefit or to protect against chronic disease (5,6,7).

The markets for nutraceuticals are expanding rapidly, particularly in the US, India, and Europe. Herbal nutraceuticals are a potent tool for preserving health and combating acute and chronic diseases that are triggered by diet, therefore fostering longevity and a high quality of life. With a predicted compound annual growth rate (CAGR) of 7.5%, nutraceuticals are currently one of the industry's fastest-growing areas (Healthcare Packaging 2019] (8). The phrase "nutraceutical" is a marketing term that implies a pharmacological effect from a food product or molecule whose therapeutic advantages have not been verified by science or approved (9,10).

Classification :-

Classification of Nutraceuticals The food sources used as nutraceuticals are all natural and can be categorized as

1. Dietary Fiber
2. Functional foods
3. Probiotics
4. Prebiotics
5. Polyunsaturated fatty acids
6. Antioxidant vitamin
7. Polyphenols
8. Spices

1. Dietary Fiber :-

A dietary supplement is a product that contains nutrients derived from food products that are concentrated in liquid or capsule form. Dietary supplements Include- Vitamins, minerals, co- enzyme Q, carnitine, etc.

The Dietary Supplementation Health Education Act (DSHEA) formally defined "dietary supplement" using several criteria. It includes products such as an approved new drug, certified antibiotic, or licensed biologic that was marketed as a dietary supplement or food before approval, certification, or license (unless the Secretary of Health and Human Services waives this provision) [11].

2.Functional Foods

Functional foods are designed to allow eating enriched foods close to their natural state, rather than by taking dietary supplements manufactured in liquid or capsule form. Sometimes, additional complementary nutrients are added, such as vitamin D to milk [12].

(E.g. Oats, bran, psyllium and lignins for heart disease and colon cancer Prebiotics oligofructose for control of intestinal flora, Canola oil with lowered triglycerides for cholesterol reduction, etc

3. Probiotics

Probiotics are live bacteria and yeasts that are good for your health, especially your digestive system. We usually think of bacteria as something that causes diseases. But your body is full of bacteria, both good and bad. Probiotics are often called "good" or "helpful" bacteria because they help keep your gut healthy. Probiotics are naturally found in your body. You can also find them in some foods and supplements.

4. Prebiotics

Prebiotics are substances that induce the growth or activity of microorganisms (e.g., bacteria and fungi) that contribute to the well-being of their host. The most common example is in the gastrointestinal tract, where prebiotics can alter the composition of organisms in the gut microbiome. However, in principle it is a more general term that can refer to other areas of the body as well.

For example, certain hand moisturizers have been proposed to act like prebiotics to improve the activity or composition of skin microbiota (13).

5. Polyunsaturated fatty acids

The group of poly-unsaturated fatty acids (PUFAs) is divided into two groups: omega-3 (n-3) and omega-6 (n-6) polyunsaturated fatty acids (PUFA), differing in the position where the first double C-bound is located. Two PUFAs are called essential fatty acids since they cannot be synthesized in the human body and are vital for physiological integrity. Therefore, they must be obtained from the diet.

6. Antioxidant vitamin

Antioxidants are our first line of defense against free radical damage, and are critical for maintaining optimum health and wellbeing. Oxygen is a highly reactive atom that is capable of becoming part of potentially damaging molecules commonly called “free radicals.”

Humans have evolved a highly sophisticated and complex antioxidant protection system. It involves a variety of components, both endogenous and exogenous in origin, that function interactively and synergistically to neutralize free radicals (14).

7.Polyphenols

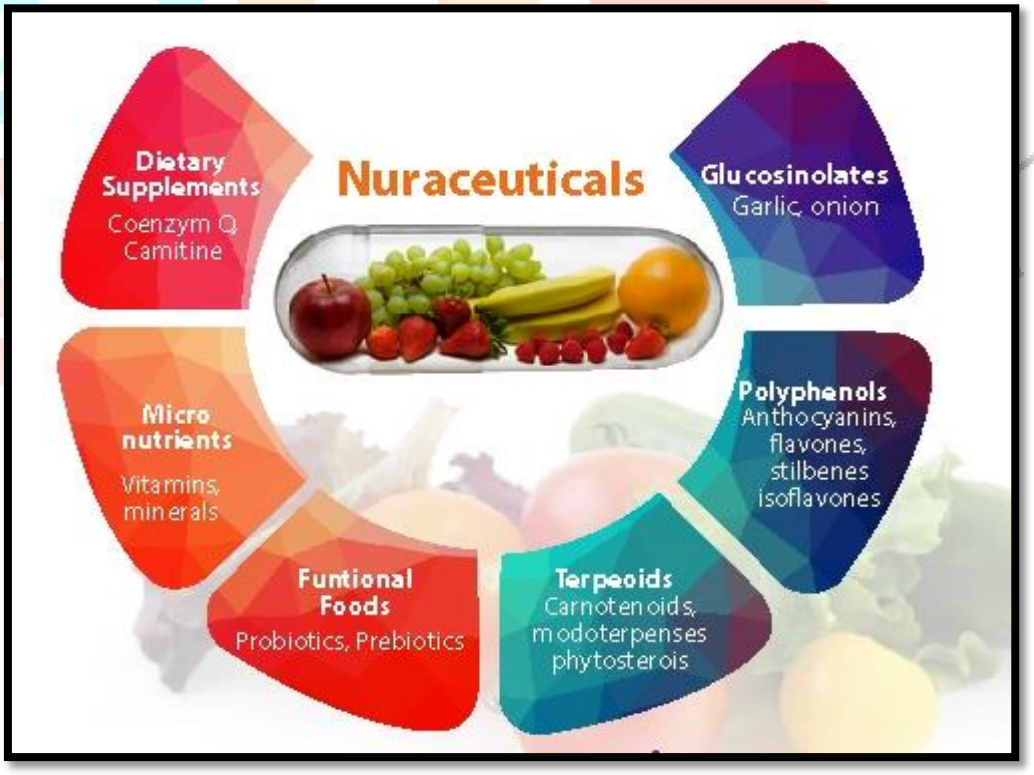
Polyphenols are natural phytochemical compounds in plant-based foods, such as fruits, vegetables, whole grains, cereal, legumes, tea, coffee, wine and cocoa; more than 8000 polyphenolic compounds, including phenolic acids, flavonoids (15), tilbenes, lignans and polymeric lignans have been identified in whole plant foods .

These compounds are secondary metabolites of the plants that act as a defense against ultraviolet radiation, oxidants and pathogens.

8.Spices:-

Spices like turmeric, red pepper, black pepper, clove, ginger, garlic, coriander, rosemary, saffron and cinnamon has been shown to exert its activity against neurodegenerative diseases (16). The concept of beauty and cosmetics is as ancient as mankind and civilization. Herbs and spices have been used in maintaining and enhancing human beauty since time immemorial. For example turmeric is used for skin care.

The anti-ageing and cosmeceuticals is gaining importance in the beauty, health and wellness sector. Spices like turmeric, cardamom, clove, aniseed, coriander, basil, saffron, garlic and sage are used mainly in beauty and cosmetic industry (16).


Nuraceuticals
Dietary Supplements
Coenzym Q
Camitine
Glucosinolates
Garlic, onion
Micro nutrients
Vitamins, minerals
Polyphenols
Anthocyanins, flavones, stilbenes isoflavones
Funtional Foods
Probiotics, Prebiotics
Terpeoids
Carnotenoids, modoterpenses phytosterois

Some examples of nutraceuticals which are widely used for therapeutics effects(17):-

Class	Source (s)	Potential health benefits
1. Fatty acids		
Conj. Linoleic Acid	Cheese, milk and meat products	Improved body composition, reduce different types of cancers
n-3 FA (DHA, EPA)	Mmustard, rapeseed, linseed and tree nuts	Reduce the risk of CVD, improve mental and visual health
2. Polyphenols		
Catechins	Tea, mustard cake, rape seed	Antioxidant, anti-carcinogenic
Flavones and Flavonone	Citrus fruits and soybean	Antioxidant, anti-carcinogenic
Phenolic acid A. Hydroxycinnamic B. Hydroxybenzoic acids	Coffee, wine, artichokes, basil, kale, mentha, rose, rosemary, rice, strawberries	Analgesic, anti-inflammatory, and prevention of arrhythmia, cancer, Antioxidant, support weight loss and prevention of cancer, reducing low-density lipoprotein (LDL) cholesterol
Stilbenes (Resveratrol)	Grapevine, berries and peanuts	protection against chronic diseases like cancer, cardiovascular and neurodegenerative pathologies
Flavonoids		
A. Anthocyanidine (Delphinidin, Malvidin, Pelargonidin, Cyanidin etc.)	Apple, black olive, blueberry, peach, cherry	Neutralizes free radicals, anti-carcinogenic
B. Flavan-3-ols (Proanthocyanidins)	Apples with skin, chocolate, dark, tea, green, brewed, wine, red, shiraz	Beneficial for metabolic and cardiovascular health
C. Flavonols (Isorhamnetin, Kaempferol, Myricetin, Quercetin)	Blueberries, Broccoli, Chili peppers, Kale, Spinach, Cowpea	Anti-inflammatory, antimicrobial, anticancer, cardioprotective, neuroprotective, antidiabetic
D. Flavanones (Hesperetin, Eriodictyol, Naringenin)	Citrus fruits (oranges, grapefruits, lemons)	It acts as a strong antioxidant, have very high free radical scavenging activity, its antioxidant activity owes to its ability to increase superoxide dismutase (SOD) and catalase activities
E. Flavones (Apigenin, Luteolin)	Celery hearts (green), celery, parsley, peppermint, Thyme	Neuro-protective, anti-inflammatory, prevention of neuro inflammation, enhanced cognitive and monastic functions
F. Isoflavones (Diadzein,Glycitein, Genistein)	Soybeans and soy foods, legumes Soy based fermented foods	Lowering of low-density lipoproteins, lower breast cancer, decrease risk of endometrial cancer, can reduce hot flushes in menopausal symptoms
3. Terpenoids (Salvinorin, cannabinoids, ginkgolide, curcuminoids)	Citral, menthol, camphor, *Salviadivinorum*, cannabis, ginkgo biloba, turmeric and mustard seed.	Anti-feedants in plants, important as signal transducers and growth regulators, antimalarial, anti-ulcer, hepaticidal, antimicrobial and anti-diuretic
4. Glucosinolates (Isothiocyanates, sulforaphane gluconasturtiin, glucoraphanin, glucomoringin)	Cauliflower, cabbage, broccoli, bok choy, turnip, kohlrabi, rapeseed, radish	Antibacterial and antifungal activities of isothiocyanates Detoxification of undesirable compounds and improve antioxidant defense system
5. Pollyacetylene Falcarinol Falcarindiol	Parsley, bishop's weed, celery, coriander, asafoetida, ajowan	Anti-platelet-aggregatory, anti-inflammator and antibacterial; Neurotoxicity; Allergenicity

Advantages and Limitations of Nutraceutical :-

Advantage	Limitation
Improve health	Not subjected to same testing and regulations as pharmaceuticals
Delay aging	Majority not regulated by FDA in USA
Increases life expectancy Increases life expectancy	Companies creating unregulated products to
Food supplies being on a dwindling mode	create a wide profit margin
Markets focusing on supply of highly processed	Bioavailability of nutrients is lower No regulatory definition
Media drawing peoples attention to nutraceuticals	Side effects and toxicity have been continuously reported not only due to ingection of the nutraceuticals itself but also owing to the possibility of contamination.
Baby boomers reaching golden ages	

Scope: -

Nutraceuticals play a significant role in modifying and maintaining normal physiological function that maintains healthy human beings. The food products used as nutraceuticals can be categorized as dietary fiber, prebiotics, probiotics, polyunsaturated fatty acids, antioxidants, and other different types of herbal natural foods [18].

Sr.No	Disease	Source	Nutraceuticals
1	Joint health	Glucosamine	Found in ligaments, cartilages
		Chondroitin	Proteoglycans of articular cartilage
2	Cardiovascular health	Co Q-10	Soyabean , olive oil
		Melatonin	Bone marrow pineal glands
		DHA	Fish oil
		Reseveratrol	Grapes, red wine
		Caretonoids	Carrot sweet potato
		Catechin	Tea extracts
3	Eye health	DHA	Linseed (flax oil), fish oil
		Pycnogeal	Barley
		Lutein	Spinach
		Caretonoids	Carrot sweet potato
4	Cancer Prevention	DHA	Linseed (flax oil), fish oil
		Lycopene	Tomatoes, grape fruit
5	Anti-inflammatory activities	Curcumin	turmeric
6	Alzheimer's disease	β-carotene, curcumin, lutein, lycopene	Carrot sweet potato, turmeric, Spinach Tomatoes, grape fruit
7.	Adrenal Dysfunction	Flavonoids,eugenol,ginsenoside,withanolide D	Ginkgo biloba, Ocimum sanctum, Panax ginseng and, Withania somnifera

Conclusion: - Nutraceuticals have demonstrated their capacity to prevent disease and improve health; as such, they ought to be consumed in accordance with approved intake guidelines. In the current self-medication landscape, nutraceuticals are crucial to the creation of new therapeutics. However, preserving their efficacy, safety, purity, and quality is essential to their success. The most prosperous nutraceutical businesses in the years to come will probably be those whose functional products are only one element of a wide range of products

meeting conventional and health-conscious value points. The perception of the connection between diet and disease among consumers will determine the future demand for nutraceuticals.

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