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A REVIEW ON NUTRACEUTICALS AS SUPPLEMENTS OF IMMUNE BOOSTERS

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ABSTRACT

Nutraceuticals is the combination of “nutrition” and “pharmaceutical“. It is a food or part of food that provides health benefits, including the prevention and treatment of disease. Disorderly the lifestyle of humans due to mechanistic life, track life style, longer work schedules and psychological stress are the reasons for diabetes, obesity, cancer, cardiovascular diseases and physiological disorders. New technologies such as Internet, virtual communication networks leads to threatens the physical and mental health. To support immune system, one can eat immunity supporting foods. Along with supplements. Vitamins and minerals like vitamin C, B, D and zinc.

KEYWORDS

Nutrition, Pharmaceutical, Prevention, Lifestyle, Psychological stress, Nutraceuticals, Supplements and Immune boosters.

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INTRODUCTION

A proverb stated as "There is no need of medicine, when diet is correct and there is no use of medicine, when diet is wrong". The focus of people is shifting for the prevention of disease and to stay healthy. The term “Nutraceuticals” was proposed by Stephen Defelice in 1989. It is defined as a food or part of food that provides medical or health benefits, including the prevention and treatment of disease¹. Thousands of research has been done in the field of

nutraceuticals. That revealed these products are extremely active, have profound effect on cell metabolism, immune system, ageing, cancer². Nutraceuticals are available in the form of isolated nutrients and specific diets to genetically engineered foods, Herbal products and processed foods. Dietary supplements in the form of capsules, tablets etc³. Hippocrates (460-377 BC) known as father of medicine. Stated that "Let food be your medicine and medicine be your food". To establish the relationship between the foods for health and their therapeutic benefits⁴. Disorderly the life style of humans due to the industrial age, mechanistic life track, life style, longer work schedules and various psychological pressure, aloofness from nature and natural products. Which are the reasons for increased incidence of metabolic disorders like diabetes and physiological disorders⁵. Thomas Edison quoted that "The doctor will no longer treat the human with drugs, in the future, but with nutrition will cure and prevent disease". Linus Pauling has stated that "Tomorrow's medicine is the optimum nutrition"⁶.

CLASSIFICATION OF NUTRACEUTICALS

Chemical Constituents

Nutrients

Primary metabolites such as amino acids, vitamins and fatty acids had well defined functions in various metabolic pathways. Plants and animal products along with vitamins have many health benefits and helpful in curing diseases related to heart, kidney, lungs etc.

Herbals

Nutraceuticals along with herbs prevents the various chronic diseases to make life better. For example: Salicin present in willow bark (*salixnigra*) is proved for anti inflammatory, analgesic, anti pyretic, astringent and anti arthritic response clinically⁷.

Phyto chemicals

Classified on the basis of phytochemicals carotenoids (Isoprenoids) present in vegetables will enhance the immunity system. Mainly killer cells accounting for anticancer response⁸.

PROBIOTIC MICRO ORGANISMS

Metchnikoff coined the term "Probiotic". It's use is well boosted in modern medicine. Because of its ability to make the intestine more friendly for process such as absorption and metabolism⁹.

Nutraceuticals enzymes

Enzymes are protein us in structure, they are produced by the cell and act as biocatalyst. The medical problems related to GIT, like GERD (gastro esophageal reflux disease), constipation, diarrhoea, or ulcerative colitis can be treated with enzyme supplements.

NON TRADITIONAL NUTRACEUTICALS

These are foods enriched with supplements or designed crops to boost the nutrients.

For example: Rice and broccoli these are rich in β -carotene and vitamins.

Fortified Nutraceuticals

These nutraceuticals include breeding or addition of compatible nutrients to the main ingredients. Like minerals added to cereals, flour fortified with calcium, iron and folic acid¹⁰.

Recombinant Nutraceuticals

Biotechnology tools are been well applied through fermentation process in various good materials. Like cheese, bread to extract the enzyme. Useful in providing necessary nutrients¹¹.

VARIABLES OF LIFESTYLE THAT INFLUENCE ON HEALTH

Lifestyle

A large number of people follow an unhealthy lifestyle. They encounter illness, disability and even death. They may face problems like metabolic diseases, joint and skeletal problems, cardio vascular diseases, overweight, hypertension, violence etc. Malnutrition, unhealthy diet, alcohol, consuming, smoking, drug abuse, stress etc. Are the reasons for unhealthy lifestyle. New technologies, such as Internet and virtual communication networks leads to threatens the physical and mental health. Because of overuse and misuse of the technology¹².

Diet

It is the greatest factor in lifestyle Poor diet and obesity are the common health problems in urban

societies. Leads nutrition problems like eating fast foods and poor foods, will increase problems like cardiovascular diseases¹³.

Exercise

Exercise should be included in the lifestyle to treat General health problems. Exercise along with healthy diet will increase the health¹⁴.

Sleep

One of the important bases of healthy lifestyle is the sleep. Sleep disorders have several impacts on social, economical, psychological and healthy consequences. Lifestyle will effect on sleep and this leads to influence on mental and physical health¹⁵.

Substance abuse

Addiction is considered has an unhealthy lifestyle. Smoking and using other substances will result in various health problems. Like cardiovascular diseases, asthma, cancer, brain injury¹⁶.

Application of modern technology

Misuse of technology results in unpleasant consequences. For example:- using of computer and other devices for long time, up to midnight will effect on the pattern of sleep and disturb the sleep. Addiction of using mobile is related to depression symptoms¹⁷.

Study

Study is the exercise of soul. Placing the study as a factor in lifestyle leads to more physical and mental health.

For example: Prevalence of dementia, Alzheimer's disease is lower in educated people.

SUPPLEMENTS TO BOOST THE IMMUNITY

Immunity- boosting: vitamins, minerals

To support immune system, one can eat immunity supporting foods. Rich in vitamins like citrus fruits, spinach. It will be helpful to supplement with key vitamins and minerals. Like vitamin C, vitamin B, vitamin D and zinc¹⁸.

Vitamin D

It is a fat soluble nutrient essential to health and functioning of immune system. Vitamin D regulates a protein which kill infectious agents, including bacteria and viruses. Low vitamin D levels may increase upper respiratory tract infections, including influenza and allergic asthma. Supplementing with

vitamin D will improve immune response and protect against respiratory tract infections. Depending on blood levels, between 1000 and 4000 IU of supplemental vitamin D per day is sufficient¹⁹.

Vitamin C

Increases blood levels of antibodies and helps to differentiate lymphocyte (white blood cells) helps the body, to determine what kind of protection is needed. Higher levels of vitamin C (at least 200mg) may reduce the duration of cold symptoms. Vitamin C combination foods are: oranges, green peppers, broccoli, cooked cabbage and cauliflower. Vitamin C is most popular supplement taken to protect against infection. Because of its important role in immune health. Vitamin C enhances the ability of immune cells to protect against infections. It acts as a powerful antioxidant, protecting against damage by oxidative stress, occurs by accumulation of reactive molecules known as free radicals. The limit for vitamin C is 2000mg supplement doses of range 250 and 1000mg is required daily.

Vitamin B complex

B vitamins, (B12 and B6) are important for healthy immune response. The deficiency may negatively affect immune health.

Vitamin A

Beta carotene gets converted in to vitamin A. It is essential for strong immune system. It will make the antibodies to respond against toxins and foreign substances. Sources of beta carotene include sweet potatoes, mangoes, carrots, spinach, broccoli, squash and cantaloupe.

Zinc

It helps the immune system to grow and differentiate²⁰. Sources of zinc include beans, fortified, cereals, nuts, seeds, crab, wheat germ, dark meat poultry and yogurt. Zinc is a mineral that is commonly added to supplements and other health care products like lozenges. That will boost the immune system. It is needed for developing immune cell communication and has importance in inflammatory response. Deficient of this, significantly affect the immune system's ability and increase risk of infection and disease, including pneumonia²¹.

Selenium

It is a mineral essential for immune health. Selenium supplements will enhance antiviral defense against influenza strains.

Garlic

Garlic (*Allium sativum*) has a powerful anti-inflammatory and antiviral properties. It will enhance immune health by stimulating protective white blood cells like Nk cells and macrophages.

Ginger

Ginger (*Zingiber officinale*) ingredients include gingerol, shogaol, and paradols will prevent various cancers. Ginger treats a number of degenerative disorders (arthritis and rheumatism) digestive health (indigestion, constipation and ulcers), cardiovascular disorders (atherosclerosis and hypertension), vomiting, diabetes mellitus, inflammatory and antioxidative properties. And it helps in treating infectious diseases.

Licorice

Licorice (*Glycyrrhiza glabra*) contains many substances, including glycyrrhizin. Helps to protect against viral infections. According to Test -tube research, glycyrrhizin exhibits antiviral activity against severe acute respiratory syndrome- related to corona virus (SARS- COV).

Curcumin

It is the main active compound in turmeric. It has a power of anti-inflammatory properties and it may help to improve immune function.

Elderberry

Elderberries consist, full of nutrients including minerals like phosphorus, potassium, iron, copper and vitamins like A, B and C. Proteins and dietary fibre. It has antibacterial and antiviral qualities, that helps to fight cold and influenza²².

Proteins

Apart from above supplements, proteins are a key building blocks for immune cells and antibodies.

Sources of protein are:- fish, poultry, milk, yogurt, eggs, bits, beans, seeds probiotics and prebiotics also boosts the microbiome health. Which supports our immune system. Sources include:- whole grains, onions, bananas, garlic, leeks, asparagus and beans²³.

Preventive measures

Drink warm water

Practice meditation, yogasana and exercise.

Increase intake of turmeric, coriander and garlic.

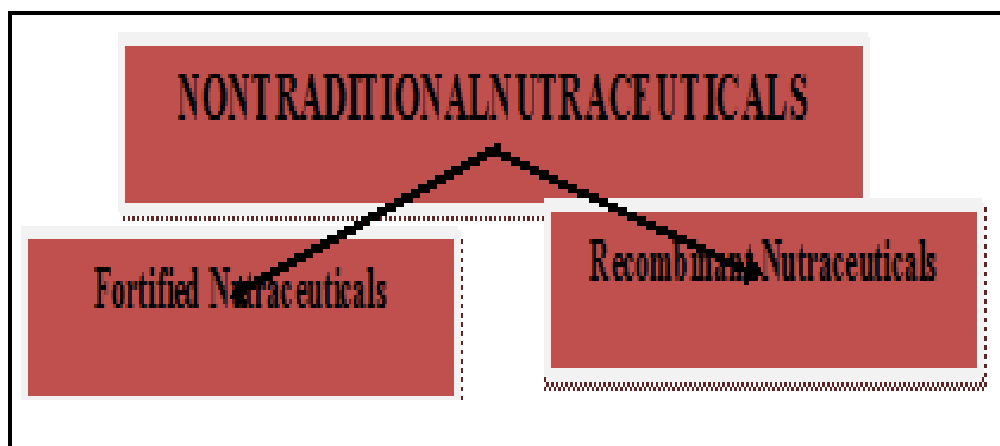
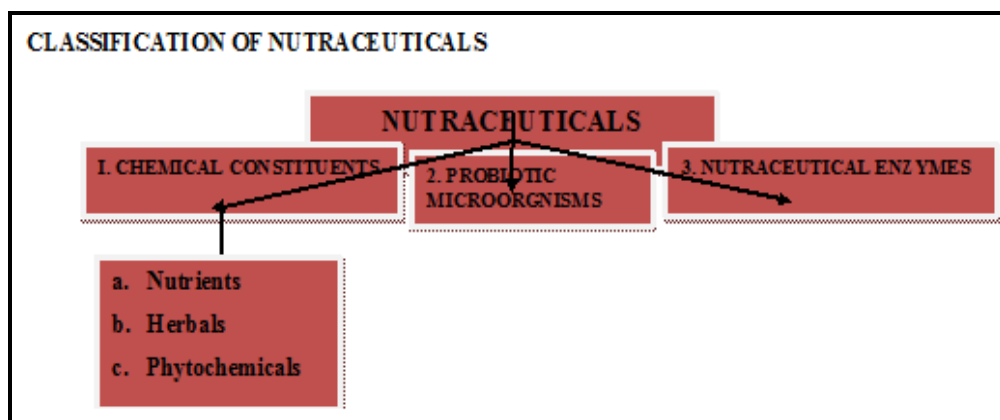
Drink herbal tea or decoction of cinnamon, black pepper, dry ginger.

Avoid sugar and replace it with jaggery.

Sit in the sunlight.

Make a habit of taking aloe vera, ginger, neem leaves powder, turmeric, fenugreek before breakfast.

S.No	ROLE OF NUTRACEUTICALS IN DISEASE PREVENTION	
	Nutraceuticals	Disease Prevention
1	Flavonoids, Flavones, Quercetin in onion, cruciferous vegetables, Black Berries, Cherries, Berries, Apples and Allicin	Cardio Vascular Diseases
2	Ginseng, Beta Carotene, Sulfur compounds in Garlic	Cancer
3	Soya Isoflavones, omega 3 fatty acid, lipoic acid, catechins, spices like Fenugreek and cinnamon, Bitter Melon, Pomogranate	Diabetes Mellitus
4	Conjugated Linoleic acid, capsaicin, psyllium, herbal nutraceuticals like chitosan, caffeine, fenugreek, vitamin-c, green tea, curcumin, black gram, bottle guard.	Obesity
5	Diacerin, Banana, Ginger, Green tea, pomegranate, Boswellia, oxaceprol, tipi, willow bark, curcumin, avocado, soyabean, collagen hydrolysate, chondroitin sulphate and glucosamine.	osteoarthritis
6	Odontoneutraceuticals, gren tea, grapes, coca seed extracts rich in polyphenols, flavonoids and proanthocyanidins	Oral diseases
7	Curcumin, lutein, lycopene, Lavandula, beta carotene, folic acid and vitamin B-12	Alzheimers disease
8	Plant poly phenols, stilbenes, soyabean and other phytoestrogens, vitamin-C, vitamin-D, Vitamin-E, Coenzyme Q10, Unsaturated fatty acid, brahmi and inosine	Parkinsons disease
9	Leutin, DHA, green tea carotenoids, flavonoids, vitamin-E, Coenzyme Q10, zeaxanthi, melatonin, spirulina, flavonoids, ascorbic acid, to chopherol, carotenoids, caffene, pyruvate.	Eye disorders
10	Adaptogens (ashwagandha, rodhiola, L-theanine, ginseng)	Stress management





CONCLUSION

Nutraceuticals are used available in the form of isolated nutrients and specific diets to genetically engineered foods, Herbal products and processed foods. They play a vital role in developing immunity in trating various infectious diseases. However, although these supplements may offer benefits for immune health. They should not and cannot be used as a replacement for a healthy lifestyle. To maintain a healthy life, one should get habituated to do regular physical activity, getting enough sleep and maintain a balanced diet, to keep our immune system healthy and to reduce infections and diseases.

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CONFLICT OF INTEREST

We declare that we have no conflict of interest.

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