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Review Article

Current trends and future prospect of medicinal plants derived nutraceuticals: A review

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ABSTRACT

Nutraceuticals has great health benefits, as it is used in the treatment of many diseases, in addition to acting as a preventative from many diseases. They are natural, biologically active compounds found in foods, nutritional supplements, and herbal plants. Their importance is due to the fact that they contain active chemical compounds. It is distinguished from the use of medical drugs in that it has no side effects compared to medical drugs. In addition, it has a positive effect on promoting the health of the heart and the immune system. Because of its importance, the Indian government has passed the Food Safety Act and standards to regulate the nutrient industry. The use and enjoyment of herbs and spices has become widespread all over the world. Because of their great benefits, they will have a distinguished and prestigious position in the future.

1. Introduction

In the past, herbal plants were used with a wide scope in the treatment of many diseases and the prevention of others, especially in the ayurvedic system ancient in India. Among the most famous herbal plants that have been used over time are cloves, cinnamon, ginger, garlic, pomegranate and mint. Nutraceuticals are those active compounds found in foods and herbal plants[1] Nutraceuticals are categorized based on their applications. There is significant overlap between types of Nutraceuticals due to the similarity of chemical compounds among each other. Classification of nutraceuticals appear in Figure 1.[2]

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1.1. Functional foods

In addition to providing us with nutrients, it also contains antioxidant compounds that prevent diabetes 2.[3]

1.2. Carotenoids

They are pigmented compounds such as α-carotene, β-carotene, β-cryptoxanthin. These compounds have antioxidant and anti-inflammatory properties, used to improve vision, prevent cancer and strengthen the immune system.[4]

1.3. Collagen hydrolysate

It is the most important human protein secreted from skin, bone, cartilage, and tendons. It has multiple medicinal properties[5]

1.4. Dietary fibers

They are non-starchy, poorly digestible vegetable carbohydrates found in vegetables, fruits, wheat bran and oats.[6]

Diets rich in fiber have a positive effect on the digestive system, as it reduces Crohn's disease and ulcerative colitis.[7]

1.5. Fatty acids

They are those compounds that are found in vegetable oils such as olive oil.[8]

1.6. Phytochemicals

They are active compounds that work on balance inside the body, and nervous activity, so they decrease the cancer. One of the most important of these compounds is lutein and lycopene.[9]

1.7. Herbs

They are plants that do not have a wooden bowl. These plants have antioxidant properties, for example, garlic extracts, ginger, which is used in the treatment of cholesterol, wound healing, and anti-ulcer.[10]

1.8. Probiotics

Microbes are considered to have many uses in the medical field and human health. They are found in milk products, and they have antioxidant properties, in addition to being regulating the movement of the digestive system. They work to regulate the growth of gut microbiota.[11]

1.9. Dietary supplements

Tablets are dietary supplements that are taken from different sources.[12]

Fig. 1: Classification of nutraceuticals

1.10. Medical benefits of nutraceuticals

Nutraceuticals play a role in supporting human health, and it is assumed that they extend life expectancy by delaying aging and preventing chronic diseases.[13] They had a positive effect on obesity, heart disease, type 2 diabetes, and cancer. Benefits of Nutraceuticals were summarized in Figure 2[14]

1.11. Anti-cancer effect of nutraceuticals

These nutraceuticals have a preventive and curative role against cancer, as studies have proven the importance of some nutrients as anti-cancer. These compounds have different pathways of activity and encouragement of autophagy. Studies have proven its effectiveness in treating many types of cancer.[15] The cancer has spread recently, especially in developing countries, where the number of infections reached 15 million new cases in 2020. A healthy diet may help prevent cancer. Carotenoids are phytochemical compounds that have an effective role in preventing cancer.[15] Citrus fruit contains flavonoids that have an antioxidant effect and thus work on the prevention of cancer. Soybean has a protective effect against breast, lung, colon, and prostate cancer.[16] Saponins have an anti-cancer effect for different types, found in tomatoes, potatoes, alfalfa, and spinach. Tannins are used as an anti-cancer, so it is used in the treatment of many types of cancer. Pectin works on Prevention of prostate cancer. In addition to the phenolic substances found in curcumin, they have an anti-cancer effect. The sulfur compounds in garlic reduce atherosclerosis, activate the immune system, and reduce cancer.[17]

1.12. Anti-Inflammatory activity of nutraceuticals

Nutraceuticals acts as an anti-inflammatory, so it is used in the treatment of chronic inflammatory disorders. An example is curcumin, which reduces inflammation. Also, lycopene, a food compound found in tomatoes, protects the heart and prevents atherosclerosis. Ginger, cinnamon, and peppermint reduce inflammation.[18]

1.13. Antioxidant activity of nutraceuticals

Oxidative stress appears due to free radical accumulations, which leads to the many diseases.[19]

Phenolic antioxidants, vitamin E and C are able to remove free radicals.[20]

1.14. Anti-lipid activity of nutraceuticals

Minerals and Vitamins play an important role in treating high cholesterol, as plant sterol foods helped reduce cholesterol and triglyceride levels.[21] Curcumin, liposomal berberine and fermented red rice have a strong effect on lowering blood lipid levels.[22]

1.15. Effect of nutraceuticals on allergy

Allergy is defined as a hypersensitivity of the immune system. The reaction occurred as a result of the immune system's reaction and sensitivity to harmless substances due to the activity of white blood cells, especially mast cells and basophils responsible for secreting immunoglobulin E. It results in infections ranging in severity from slight to severe symptoms.[23] Quercetin works to protect blood vessels from the accumulation of low-density lipoprotein (LDL-C) as it is an antioxidant and protects against free radicals. Therefore, quercetin is preferred by diabetics who have a high level of vascular damage due to the effect of oxidative stress.[24]

1.16. The effect of nutraceuticals on alzheimer's disease

Alzheimer's is one of the most common types of dementia, because there is no cure for it, and some cases result in death. Alzheimer's is more common in people over 65 years of age, and it is twice as common in women as men. Curcumin, lutein, lycopene, turmeric and β-carotene have an anti-oxidative effect, so they are used in the prevention and control of Alzheimer's disease.[25]

1.17. Nutraceuticals and cardiovascular disease

The prevalence of CVD is increasing and includes vascular insufficiency, hypertension, and heart failure. Scientific research has shown that eating low amounts of vegetables increases the rates of death from vascular insufficiency.[26]

Also, the flavonoids found in onions, pomegranates, grapefruits, apples, grapes work in the prevention of CVD care.[27,28]

Zingiber officinalis has a positive effect in protecting against cardiovascular diseases. Ginger acts as an antioxidant and anti-inflammatory, so it protects against heart disease.[29]

1.18. The effect of nutraceuticals on diabetes

Type 2 diabetes patients mostly depend on the presence of obesity. Scientific experiments have proven that there are some herbs that contribute to lowering the rate of diabetes.[30] Isoflavones are phytoestrogens, which are similar to estrogen and reduce mortality due to diabetes and heart disease. Omega-3 fatty acids reduce blood glucose. Lipoic acid acts as an antioxidant that works in the treatment of neuropathy in diabetic patients.[31]

Fig. 2: Medical benefits of nutraceuticals

1.19. Toxicological potential of nutraceuticals

Many people believe that due to the importance of these compounds, they do not have side effects. However, scientific research has proven that these natural nutrients have side effects if used in an unstudied manner, but these effects are much less compared to medical drugs.[32]

2. Conclusion

Nutraceuticals are physiological substances that play an important role in the treatment and prevention of many diseases. It works to protect health, respond to aging, increase life expectancy, and treat many diseases such as allergies, Alzheimer's, heart disease, diabetes and obesity. Currently, nutraceuticals are very important due to their nutritional properties.

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4. Conflict of Interest

None.

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