

Role Phytochemicals play in the Disease Prevention

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Abstract:

Plant materials have medicinal effects due to the combination of subordinate products present in them, which are known as phytochemicals. These are the chemical compounds that are biologically active in nature found in the fruits, vegetables and grains. These compounds are not essential for body but they play a role in promoting the health and preventing from diseases. Phenolic acids, Saponins, Lignans, Stilbenes, Tannins, Alkaloids, Flavonoids, Terpenoids and Sterols are a few phytochemicals. These phytochemical compounds also have the properties of anti-inflammatory and antioxidant activity as an excessive production of oxidant in the organism develops the chronic diseases like, cardiovascular disease (CVD), different types of cancer etc. These antioxidant compounds weaken the level of oxidative pressure of living organisms. This review present different sources of phytochemicals that display a beneficial role in the treatment and preventionof the diseases. By their bioactive properties, it suppress and treat the different types of diseases.

Keywords: *Phytochemical, Antioxidant, Diseases.*

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Introduction

Longevity, youthfulness and health are the desires of every human. In living organism, the level of functional or metabolic efficiency comes under the health. Every single person has the capability to face mental, physical and social challenges. According to World Health Organization (WHO), health is described as 'a state of complete mental, physical and social well-being and not merely the absence of disease or infirmity' (Venkatalakshmi, Vadivel, and Brindha, 2016).

For manufacturing the drugs and perfumery products, aromatic and medicinal plants are the vital origin. Their raw supplies are used for the production. The natural medicine that are derived from these plants are harmless than the synthetic substitutes used for therapeutic advantages and more inexpensive treatment.

Plants with a medicinal value play a vital part in healing and curing human diseases because of the biochemical constituents, known as phytochemicals or phyto constituents. Phyto chemical constituents are found in leaves, vegetables, roots of the medicinal plants that work as the the nutrients and fibers form an integrated part of security structure against numerous infections and strain condition.

Phytochemicals have mainly two groups as per their functions in plant metabolics.

- **Primary Constituents:** It contains common sugars, amino acid, protein and chlorophyll etc.
- **Secondary Constituents:** It contains terpenoids, alkaloids, flavonoids and steroids etc. In which terpenoid have numerous phytochemical actions such as anti-cancer, anti-inflammatory, anti-malarial, anti-bacterial, inhibition of cholesterol synthesis and anti-viral activities (Thilagavathi *et al.*, 2015).

Screening of Phytochemicals

For synthetic drugs, medicinal plants have many bio resources of drugs, modern medicine, pharmaceutical intermediates and chemical entities. So, there is necessary to extract these sources from the plants by the extraction methods. Extraction is generally a separation of bio resources which are medicinally active form the plants tissues using particular solvents by standard methods. The main purpose of standard method is to attain the therapeutically desired portions with the removal of

unwanted materials using a selective solvent called menstrum. After the extraction, the obtained extract is used as tincture, or fluid extract or in the form of tablet or capsules which consists of a mixture of various valued medicinal plant constituents like lignans, glycosides, alkaloids, terpenoids and flavonoids. There are many technique for the extraction of the valued medicinal plant extracts: percolation, infusion, maceration, decoction, countercurrent extraction, digestion, micro-wave assisted extraction, hot continuous extraction (Soxhlet), aqueous-alcoholic extraction by fermentation etc.

The production of composites with precise activities to treat numerous health illnesses and prolonged disease can be estimated by the correlation between plant's phytochemicals and plant's bioactivity. To know the significant values of any medicinal plant, there is need of the screening of phytochemical in plant. Screening, a significant step in the recognition of bioactive principles or origins in the medicinal plants. A standard method is followed to screen the phytochemicals for the detection of flavonoids, tannins, saponins, phenolics, alkaloids, steroids and cardiac glycosides presence. In screening, different types of tests are performed to know the presence of these compounds such as Gelatin Test for Tannins, Ferric Chloride Test for Phenol etc.

Sources of Phytochemicals

Many global health problems like chronic diseases (cardiovascular diseases, diabetes, and cancers) that cause disability and death to zillions of people. Against the development of these chronic diseases, many fruit, grains and vegetables give a defensive outcome attributed to the presence of phytochemical in them. More than 10,000 phytochemicals have been identified in which triterpenoids, flavones, steroids, alkaloids, tannins and saponins are some phytochemicals. Phytochemicals work on the basis of their antioxidant activity. There are two kinds of antioxidant phytochemicals: Polyphenols and Carotenoids.

Polyphenols: In phytochemicals extract of different fruits, total phenolic content has a direct relationship with total antioxidant activity as when fruits have stronger antioxidant activity with a high phenolic contents.

Carotenoids: A set of phytochemicals are accountable for the colors of food. The main

carotenoids in food and human body are alpha-carotene, Beta-carotene, lutein, lycopene and cryptoxanthin. In human diet, vegetables and fruits are the chief sources of carotenoids.

Prevention of Antioxidant Phytochemicals form several Chronic Diseases

Human body may get imbalanced and result in to oxidative rapture to larger biomolecules such as lipid, proteins, and DNA due to excessive production of oxidants. From these damage, several human diseases such as cardiovascular disease, some types of cancers and aging of the body occurs. In this case, antioxidant phytochemicals play a vital role in prevention in both cases: in vivo and in vitro. Antioxidant activities may be due to the chemical and synergistic effects of phytochemicals in vegetables and fruits. High content of antioxidant phytochemicals fruits and vegetable consumption escalate the antioxidant capability of plasma and serum.

Many antioxidant phytochemicals have anti-inflammatory action that cure the chronic inflammation. The mechanism: inhibition of prostaglandin making and nuclear factor- κ B action, enzyme inhibition and growth in the cytokine production can diminish the inflammation. There are some phytochemicals such as resveratrol, anthocyanins and curcumin, help in reducing the inflammation. Generally, Antioxidant phytochemicals have different activities such as free radical scavenging skills as well as an anti-inflammatory action that helps in the other bioactivities and health advantages.

Advantageous roles of phytochemicals: low cost, low toxicity, easy availability, biological and antineoplastic properties. These biological properties includes anti-microbial effects, antioxidant activities, stimulation of the immune system, modulation of hormone metabolism, modulation of detoxification enzymes, and decrease of platelet aggregation. Phytochemicals are not so important for the life but play an important in fighting some disease by their properties.

Review of Literature

Prakash, Gupta and Sharma (2012) proposed the medicinal plant have a long history because of the use of their phytochemical constituents that prevent human from many diseases. The proper choice of food ingredients can make human healthy. The

exciting opportunity is hold by the plant extracts in future.

Wadood *et al.* (2013) Studied on the ten medicinal plants and concluded that these medicinal plant play a vital role in preventing diseases. Different types of activities antidiuretic, antianalgesic, anti-viral, anti-cancer, anti-bacterial, anti-fungal and anti-malarial activities are seen in these plant because of the occurrence of secondary metabolites terpenoids, flavonoids, alkaloids, phlobatannins and reducing sugars. The analysis in previous years and in recent time have a same result due to the presence of phytochemical constituents.

According to Belobrajdic and Bird (2013) a limited benefit of cereal's phytochemical component is seen in preventing oxidative stress and in the development of T2D. Also discussed that a straight role of phytochemicals in improving the fitness would be in the whole food and diets.

Kumar *et al.* (2013) screened the plant *Holoptelea integrifolia* and *Celestrus emarginata*. They used only the leaf extract and stated that secondary metabolites of phytochemicals can be used in pharmaceutical industries in the form of drugs that will react against the pediculosis and help in increasing male sex vigour.

Raina *et al.* (2014) studied about the anticancer activity of phytochemicals on in vitro and concluded that the mechanism of phytochemicals contribute to their anticancer nature as kill the dividing cancer cells. Antitumor ability was also observed that inhibit the abnormally expressed growth factors. The medicinal plants help in the treatment of cancer and tumors.

Zhang *et al.* (2015) proposed that chronic diseases are treated by the antioxidant phytochemicals. These phytochemicals have many health benefits and biological activities i.e., anti-inflammatory action, anti-aging, anti-cancer, antioxidant and free radical scavenging skills etc. Fruits, vegetables, grains and medicinal plants are sources of the antioxidant phytochemicals. They also discussed that more antioxidant phytochemicals should be separated and identified in food and medicinal plants. The adverse effects of the phytochemicals should be noticed in human beings.

Thilagavathi *et al.* (2015) analyzed or screened the five medicinal plant and concluded that these medicinal plants have high therapeutic value in

pharmaceutical field. These plants have different biologically active constituents and secondary products. They also stated that these secondary product are very valuable and should be analyzed and evaluated in future for more benefits.

Nyamai DW *et al.* (2016) studied that 80% of the world population trusts on medicinal plants for their good health. These plants are easily available, cheap and do not have adverse effect. Hence, the development of new drugs entities are possible by these phytochemicals.

Venkatalakshmi, Vadivel and Brindha (2016) concluded that the antioxidants phytochemicals have a relationship with immunomodulation in animal and human beings. Significant antioxidant activities of many indigenous plants help in the immunomodulation by targeting oxidative stress or boosting the endogenous levels of antioxidants for the management of diseases and developed the immunity.

Shoghil *et al.* (2017) concluded that the phytochemicals play an essential role in preventing chronic diseases like diabetes, coronary heart disease, cancer etc. the sources of phytochemical in India are cereals, pulses, oils and spices. Indian food and diet have more scope for these phytochemicals in protecting against chronic diseases.

Meybodi *et al.* (2017) stated that carcinogenesis process is complex and heterogenous. In this case phytochemicals in fruits and vegetables would be effective that help in preventing form cancer. Different group of phytochemicals that are used in chemoprevention are as phenolics, carotenoid, alkaloids, organosulfur, and nitrogen containing compounds. By different mechanism, they make possible in stopping or postpone or reserve the carcinogenesis activity in the body.

Conclusion

Phytochemicals present in the plants are natural chemical compound that have different bioactive action in prevention and treatment of diseases. The different sources like fruits, vegetables, grains as well as the dietary product also have these phytochemicals. This review study shows the importance of phytochemicals because they have a different activities as anticancer, antitumor, anti-inflammatory etc. due to the presence of secondary products such as alkaloids, flavonoids, terpenoids. Ant carcinogenic agents are also made from these products for the treatment of cancer. The proper food can prevent from the chronic diseases such as cardiovascular disease, cancer, tumor etc. The secondary products have more scope due to their bioactive actions. With the benefits of phytochemicals, there is need to detect any side effects of them.



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