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PHARMACY AND BIO SCIENCES****IMPACT FACTOR 4.018\*\*\*****ICV 6.16\*\*\*****Pharmaceutical Sciences****Review****Article.....!!!****APPLICATIONS AND MEDICINAL USES OF FLAVONOIDS**

Dr. S. Senthilkumar

Karur, Tamilnadu, India.

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Antiviral, Anti cancer,  
flavonoids, Hepato-Protective,  
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**FOR CORRESPONDENCE:****Dr. S. Senthilkumar\*****ADDRESS:**

Karur, Tamilnadu,  
India.

**ABSTRACT**

Flavonoids are the low molecular weight polyphenolic secondary metabolic compounds, universally distributed in green plant kingdom, located in cell vacuoles. Flavonoid play a variety of biological activities in plants, animals and bacteria. In plants, flavonoids have long been known to be synthesized in particular sites and are responsible for color, aroma of flowers, fruit to attract pollinators consequently fruit dispersion, help in seed, spore germination, growth and development of seedling, flavonoids protect plants from different biotic and abiotic stresses and act as unique UB-filter function as signal mole cures, allelopathic compounds, phytoalexins, detoxifying agents, antimicrobial defensive compounds. Flavonoids have roles against frost hardiness, drought resistance and may play a functional role in plant heat acclimation and freezing tolerance.

**INTRODUCTION:**

Flavonoids are the important groups of secondary metabolites in plants, and also the good sources of natural antioxidants in human diets. Hence, flavonoids are known to play an important role in the control of different human diseases. The flavonoid have polyphenolic strcture, that makes it responsible for the variety of pharmacological activities. Functional hydroxyl groups in flavonoids show their antioxidant effects by scavenging free radicals or by chelating metal ions. This helps in the prevention of radical generation that damage the biomolecules leading to oxidative stress and many diseases. Flavonoids make security against the diseases such as cancer, cardiovascular and respiratory disorders, arthritis and early ageing. They contribute to the antioxidant defense system of the human body and also induce protective enzyme system.

**MEDICINAL AND APPLICATION OF FLAVONOIDS:****1. FUNCTIONS OF FLAVONOIS IN PLANTS:**

Flavonoids play a variety of significant roles in plants. Flavonoids act as signalmolecules, phytoalexins, defoxifying agents, stimulant for germination of spores, play a significant activities in seeds germination, act as UV filters, flavonoids in temperature acclimation and in drought resistance, pollinator attractants and allelochemical agents.

**2. ANTI VIRAL ACTIVITY:**

Since the 1940 s and many reports show that naturally occurring flavonoids exhibit a remarkable anti-viral activity. They help in the inhibition of various enzymes associated with the life cycle of viruses. Flavon-3-01 was found to be more effective than flavones and flavonones in selective inhibition of HIV-1 & HIV-2 and similar immunodeficienly virus causing infections. The different study shows that querception, hesperetin, and naringin also possess anti-dengue activity.

**3. ANTI CANCER ACTIVITY:**

Many polyphenolic compounds such as flavonoids, phenolic acids, anthocyanidins, and tannins possess a broad spectrum of pharmacological activity including anti-cancer activities. Due to their multiple molecular mechanisms of action, flavonoids have been proved for their potential applications in anti-cancer therapies.

**4. ANTI-INFLAMMATORY ACTIVITY:**

Generally, the essential role a flavonoids on inflammation involved diseases such as leukemia, sepsis, asthma, sclerosis, atherosclerosis, psoriasis, allergic rhinitis, rheumatoid arthritis etc has been proposed. Flavonoids also inhibit phosphor-esterases involved in cell activation.

**5. ANTI-BACTERIAL ACTIVITY:**

Apigenin, galangin, flavone and flavonol glycosides, isoflavones, flavanones and chalcones have been proved to possess potent antimicrobial activity. Lipophilic flavonoids may also disrupt bacterial membranes. Plants can synthesize flavonoids in response to microbial infection and hence they are very effective antimicrobial substances against a wide variety of microorganisms.

**6. ANTI-OXIDANT ACTIVITY:**

Flavonoids are one of the best phytochemicals that act as antioxidants and thus inhibit the factors of disease-causing. Antioxidant activity depends on the arrangement of function groups in the flavan nucleus.

## 7. SPECIAL CHARACTERSTICS OF FLAVONOIDS:

Flavonoids are one of the most essential non-nitrogenous plant pigments. It is responsible for flower coloration by producing yellow or red/blue pigmentation in shoots, leaves, buds, petals and fruits. This pigmentation is to attract pollinators to the flowers. In some types of plants, flavonoids are involved in UV filtration, symbiotic nitrogen fixation and floral pigmentation.

## 8. HEPATO-PROTECTIVE ACTIVITY:

Different chronic diseases such as diabetes and metabolic disruptions, may lead to development of hepatic clinical manifestations. Flavonoids in form of C3G treatment and silymarin have been reported to lower hepatic lipid peroxidation and stimulate liver regeneration respectively.

## CONCLUSION:

Flavonoids, occurring virtually in all plant parts, particularly photo-synthesizing plant cells are a major coloring component of flowering plants. They are an integrated part of human and animal diet. Flavonoids are generally responsible for prevention of fat oxidation, and protection of vitamins and enzymes, they by contributing in protection against diseases. Flavonoids have extensive biological properties that promote human health and reduce the risk of diseases. Flavonoids are such phytochemicals that play a significant role in enhancing the human health benefits. They are good sources of natural antioxidants in human diets. Flavonoids neutralize the harmful effects of free radicals in best of ways, and thus help in prevention of diseases.

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