

A note on the Flavonoid content of some medicinal plants

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ABSTRACT

Flavonoids are the phytochemicals found in all plants. About 4000-6000 phytochemicals that have been isolated belongs to the flavonoid group. Flavonoids are secondary metabolite products formed in the biosynthetic pathway. Due to their physical and biochemical properties play a very important role in plants.

Key words:

INTRODUCTION

The word 'flavonoid' is derived from the Latin word *flavus* meaning yellow and many flavonoids are indeed yellow in colour. However, many others are white and the special flavonoid-related anthocyanins are red, blue or purple. Flavonoids are also present in leaves, where they are said to protect the plant tissue against the damaging effects of ultraviolet radiation. Flavonoids are polyphenolic plant secondary metabolites. They are synthesized by the polypropanoid pathway with phenylalanine as a start-up molecule. Flavonoids are derived from a chalcone precursor. They have been classified into six subgroups as Flavones, Flavonols, Flavanones, Flavan-3-ols, Isoflavones and Anthocyanidins. Flavonoids play very important role in plant biochemistry. Some of the important functions played by this class in plants are:

Interaction between plant and micro-organism:

Flavonoids play role as signal molecules, phytoalexins, detoxifying agents, and stimulants for germination of spores.

They may have defensive or stimulant role depending on the micro-organisms role in the plant.

Pigments:

Anthocyanins are the important class of plant pigments that give the colors of flowers, fruits, and leaves of plants.

Flavor:

Flavonoids are the important group of chemicals in plants that give the rich taste of plant products. The flavor may act as repellent or attractant to microorganisms or pests or pollinators.

Antioxidants and scavengers:

Flavonoids are powerful antioxidants and scavengers of free radicals. Free radicals cause cellular, and DNA damage in our body and consequently induce age-related diseases such as dementia and cancer.

The Flavonoids of Genus Acacia:

The genus acacia belongs to the Mimosaceae family. There are near about 1300 species of genus Acacia found throughout the world. Most of the species of genus acacia are native to India, Pakistan, Australia, Africa and America [1]. Acacia trees dominate in many parts of the arid and semi - arid parts of Sub-Saharan Africa and reported multiple uses. These include use in food, medicine, fodder aside from being resistant to diseases and harsh climatic conditions [2]. (+) - Mollisacacidin [(+) - 7,3'.4' - trihydroxy - 2,3 - trans - flavan - 3,4 - trans - diol, leucofisetinidin] is the predominant monomeric heartwood component of the black wattle, *Acacia mearnsii*. The isomeric leucofisetinidins (2, 3) ((±) - Molisacacidin) have been isolated and fully characterized by S.E.Drewes and A.H. Ilesley [3].

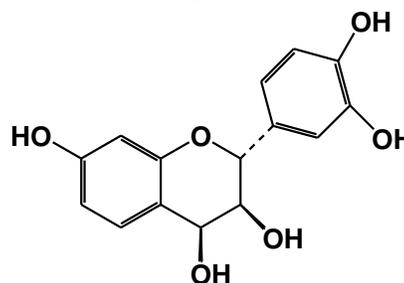
The Flavonoids of genus Merremia:

The genus *Merremia* comprises about 60 species. This genus shows its importance in folk medicine. The genus *Merremia* presents interesting phytochemical features such as the Occurrence of Terpenoids, phenolic, flavonoids and alkaloids. Tropane and pyrrolidine alkaloids from the genus have shown significant biological activities.

Flavonoids, an important class of phenolics featuring the linkage of two benzene rings by a chain of 3 carbon atoms so as to form pyran or pyrone ring, play a predominant role in plant physiology and serve as light screens, antioxidants, enzyme inhibitors, precursors of toxic substances, and pigments [4]. Flavonoids have been isolated from the aerial parts of the plant of *Merremia* genus, species *Merremia tridentata* (L.) Hallier.f. which include diosmetin(4), luteolin-7-o-β-d-glucoside(5), luteolin(6), diosmetin-7-o-β-d-glucoside(7) [5].

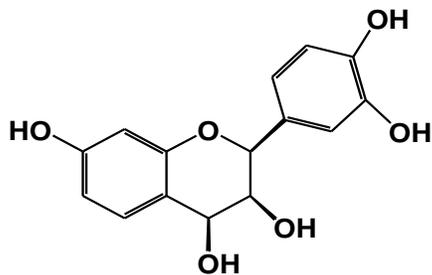
Medicinal importance of Flavonoids:

Flavonoids are well known for their antioxidant activity. Antioxidants are compounds that protect cells against the damaging effects of reactive oxygen species. An imbalance between antioxidants and reactive oxygen species results in oxidative stress, leading to cellular damage [6]. Medicinally important flavones Luteolin which acts as antioxidant, free radical scavenger, anti-inflammatory agent, immune system modulator and cancer prevention agent. Flavonol quercetin is the most active of the flavonoids. Many medicinal plants owe their activity to their high quercetin content. An important anthocyanin pigment cyanidin found in many in many fruits such as berries, apples, plums and red cabbage. It exerts antioxidant, anti-inflammatory and anticancer effects. It may have an important role in future cancer treatment [7].



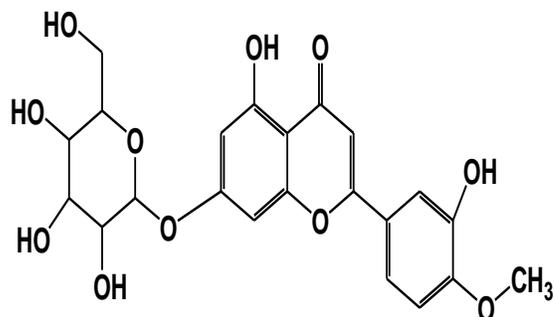
2R:3S:4S

(2) (+) -2,-3-trans-3,4-cis Leucofisetinidin

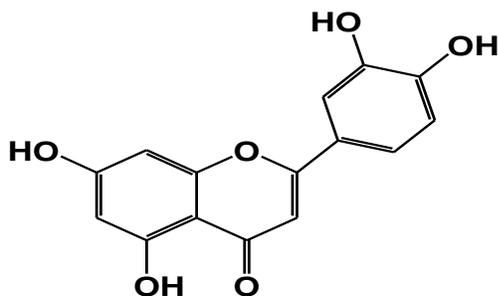


2S:3S:4S

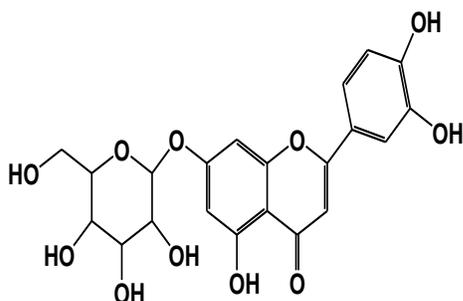
(3) (+) -2,-3-cis-3,4-cis Leucofisetinidin



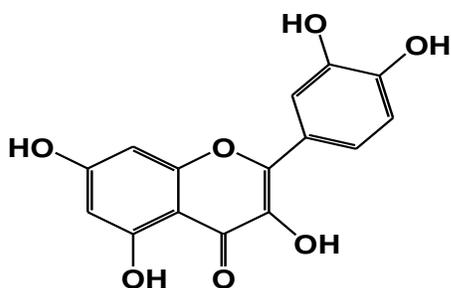
(7) Diosmetin-7-O-Beta-D-glucoside



(4) Diosmetin



(5) Luteolin 7-O-beta-D-glucoside



(6) Luteolin

CONCLUSION

Flavonoids are power full agents against oxidative stress, inflammation, allergies, microbes and cancer. The Merremia genus shows its importance in folk medicine. The plants of the genus are traditionally used as diuretic and for cough, head ache, neuralgia and rheumatism .In vitro antioxidant and antimicrobial activities of plants was observed because this genus has very high flavonoid and phenol content.

The economic importance of the genus Acacia is also observed because they are widely used as a source of timber and the gum Arabic, as well as ornamentals and animal fodder. Bark of some of the species of genus Acacia acts as astringent, demulcent,anthelmintic, anti-dysenteric, anti-inflammatory - used in stomatitis, ulcers, swollen gums, dental cares, bronchitis, skin diseases. Essential oil from the pods of the genus acts as direct muscle relaxant, cardiac depressant and sedative. The some of the plant species as a whole are useful as various plant parts are used in insanity, epilepsy, delirium and convulsion also as an antiseptic agent for curing sores, gums and loose teeth. These medicinal activity of the plants are observed due the presence of diverse chemicals including the flavonols.

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