
**PHYTOCHEMICAL PROFILE AND PHARMACOLOGICAL
POTENTIAL OF THE FAMILY RUBIACEAE: A REVIEW**

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ABSTRACT

Rubiaceae, the coffee family¹ is considered to be one of the largest families of Angiosperms comprising 606 genera and about 10,000 species of trees, shrubs, lianas and herbs, sometimes anti inhabited, epiphytic or aquatic. The leaves are simple and usually entire and flowers are typically regular and bisexual with 4-5 fused petals. Members of Rubiaceae are distributed more widely all parts of the earth. All the genus of the family are economically important. The most economically important genus of the family is Coffea, the source of coffee; other members are important medicinally or as ornamentals. Some are used as a source of dye. A detailed general survey of the chemical constituents of the species of Rubiaceae family and the pharmacological activity of the members of Rubiaceae is presented in Table-1 and Table-2 respectively.

TABLE-1**PHYTOCHEMICALS REPORTED**

Species of Rubiaceae	Phytochemicals Reported
<i>Paveta owariensis</i> ²⁻⁵	Proanthocyanidins, (+) atechins and chlorgenic and ferulic acid esters, proantho cynadin, pavetannin B-1, B-2, B-3, B-5 and B-6 and acetylated trimeric proanthocyanidins.
<i>Hamelia patens</i> ⁶	5, 7, 2', 5'- tetrahydroxy flavanone 7-rutinoside, narirutin and rosmarinic acid.
<i>Hintonia patens</i> ⁷	3-O-β-D-glucopyranosyl-23,24-dihydro- cucurbitacin F and 5-O-β-D-galactopyranosyl-4'-hydroxy-7-methoxy-4-phenyl coumarin.

<i>Coutarea hexandra</i> ^{8,9}	3'-OH, 5, 7, 8, 4'-OMe-4-phenyl coumarin and 8,3'-di-OH, 5,7,4'-trimethoxy-4-phenyl coumarin and 8,3'-diOH, 5,7,4'-triOMe-4-Phenyl coumarin.
<i>Paeonia tenuifolia</i> ¹⁰	Kaempferol, quercetin, hyperin and rutin.
<i>Rubia oncotricha</i> ¹²	Anthraquinones, naphtha quinines and naphthohydro quinines.
<i>Mussanenda arcuata</i> ¹³	Astragalin, isoquercitrin, kaemferol 3-O-β-D-rutinoside and rutin.
<i>Mitragyna speciosa</i> ¹⁴	Ursolic acid
<i>Rubia peregrina</i> ¹⁵	Ursolic acid
<i>Gardenia Jasminode</i> ¹⁶	Zhizinin-a flavones with four hydroxyl and two methoxy groups
<i>Galium heldreichii</i> ¹⁷	Diosmetin 6-O-glucoside, esculetin, quercetin 3-O-galactosid, chlorogenic acid, rutin and quercetin-3-O-glucoside.
<i>Xeromphis uliginosa</i> ¹⁸	7-O-(β-D-apiofuranosyl (1 to 6) -β-D-glucopyrnosyl)-6-methoxy coumarin and scopoletin.
<i>Hedyotis chrysotricha</i> ¹⁹	Asperuloside, ursolic acid, betulic acid, oleanic acid, β-sitosterol hexa decyl palmitate and dotriacontanoic acid.
<i>Faramaea guianensis</i> ²⁰	5,7,4'-tri-OH-flavan, 5,7-dihydroxy-4'-methoxy flavan.
<i>Coffea arabica</i> ^{21,22}	Proanthocyanidins and chlorogenic acid.
<i>Morinda citrifolia</i> ^{23,24}	Carotenoids, trisaccharide fatty acid ester, rutin and asperulosidic acid.
<i>Pavetta indica</i> ²⁵	Quercetin, caffeic acid, chlorogenic acid and 3-epi-ursolic acid.
<i>Timonius timen</i> ²⁶	10-Deoxy secogabioside- a new iridoid glycoside.
<i>Moringa morindoides</i> ^{27, 28}	Quercetin, quercetin-7,4'-dimethyl ether, luteolin 7-glucosides, quercetin 3-rhamnoside, kaemferol 3-rhamnoside, quercetin 3-rutinoside, kaemferol 3-rutinoside, chrysoeriol 7-neohesperidoside, kameferol 7-O-rhamnosyl sophoroside, kameferol 7-O- (α-rhamnopyranosyl- (1 to 6)-β-D-glucopyranosyl (1 to 2)-β-D- glucopyranoside.
<i>Uncaria hooks</i> ²⁹	Isocorynoxine N-Oxide, Anti-isorhynchophylline-N-Oxide, physcion and ursolic acid.
<i>Hedyotis dichotoma</i> ³⁰	Isovitexin and ursolic acid.
<i>Morinda elliptica</i> ³¹	2-formyl-1-hydroxy anthraquinone.
<i>Hedyotis diffusa</i> ³²	3-O-(2''-O-(6''-O-feruloyl)-β-D-lucopyranosyl)-β-D-galactopyranoside.
<i>Canthium gilfianil</i> ³³	Phenyl propanoid glycosides and geniposidic acid.
<i>Canthium schimperianum</i> ³⁴	Cyanogenic glycoside esterified with an Iridoid glycoside.

TABLE-2

PHARMACOLOGICAL ACTIVITY REPORTED

Species of Rubiaceae	Pharmacological activity reported
<i>Pavetta owriensis</i> ³⁵ ,	Bark extract was used as antiviral agents and antibacterial agents.
<i>Coutarea latiflora</i> and <i>Exostemacariaeum</i> ³⁶	Stem bark extract showed in vitro anti- malarial activity.
<i>Coffea Arabica</i> ³⁷	Coffee fed to albino rats led to decrease in serum total cholesterol.

<i>Paederia foetida</i> ^{38,39}	Butanol extract of leaves decrease liver GPT, GOT, acid phosphatase and AT pase activities in rats and also a potent anti-inflammatory agents.
<i>Vitex negundo</i> ⁴⁰	Leaf extract is used in the treatment of arthritis.
<i>Coutarea hexandra</i> ⁴¹	Showed significant anti-edematogenic activity.
<i>Urcaria callophylla</i> ⁴²	Gambirine isolated from this plant exhibited cardiovascular responses in the normotensive rats.
<i>Alibertia macrophylla</i> ⁴³	The aqueous alcoholic extract showed anti-fungal activity against <i>Aspergillus niger</i> , <i>cladosporium sphaerospermum</i> .
<i>Rubia cordifolia</i> ⁴⁴⁻⁴⁶	Bicyclic hexapeptides isolated showed anti tumour activity. Alcoholic leaf extract showed anti allergic activity. Pharmacognonostical studies of this plant (used more than 60 Ayurvedic formulations) was carried out.
<i>Morinda luida</i> ^{47,48}	Anti malarial activity, Aqueous root extract showed hypoglycaemic activity in both nosmoglycemic and alloxan-induced diabetic mice by oral administration.
<i>Diodia scandens</i> ⁴⁹	Petroleum ether extract showed anti oedema and analgesic actions in rats and mice.
<i>Uncaria rhynchophylla</i> ⁵⁰	Rhynchoychylline isolated showed inhibitory effect on platelet aggregation and thrombosis.
<i>Gardenia & Gardenia turgid</i> ^{51,52}	Methanol extract of fruits showed anti oxidant activity and the leaves are used for fish poisoning by tribals of southern Rajasthan.
<i>Moringa morindoides</i> ⁵³	Quercetin, quercetin and rutin isolated showed invitro anti complementary activity.
<i>Rubiaceae spp.</i> ⁵⁴	Chlorogenic acid isolated showed protective effects on paraquat induced oxidative stress in rats.
<i>Canthium schimperianum</i> ⁵⁵	Cyanogenic glycoside isolated showed weak growth retarding activity towards neonate larvae of <i>spodoptera littoralis</i> .
<i>Nauclea latifolia</i> ⁵⁶	Effect of MeOH extract of leaves and roots on the cardiovascular system in rats.
<i>Anthocepharus chinensis</i> ⁵⁷	Myrietin-O-(4''-acetyl)- α -fucoside and its aglycone from this plant acts as an inhibitor of aldose reductase and sorbitol.
<i>Alberta magna</i> ⁵⁸	Enolic irido lactone and other iridoids from this plant showed short term mosquito repellent effect.
<i>Palicourea demissa</i> ⁵⁹	Anti inflammatory and anti viral activity.
<i>Rhodiola sacra</i> ⁶⁰	Active-oxygen scavenging activity of traditional nourishing tonic herbal medicines.
<i>Faramea salicifolia</i> ⁶¹	The chalcone-3,4,2'-trihydroxy-4'-methoxy chalcone (calythrpsin) is assessed for inhibition of growth of human cancer cell lines and was found to be active.
<i>Uncaria tomentosa</i> ⁶²	Aqueous extract is used in the treatment of chemotherapy induced leucopenia in roots.
<i>Hedyotis diffusa</i> ⁶³	Flavonol glycosides from this plant were tested for antioxidant effects on xanthine oxidase inhibition, xanthine –xanthine oxidase cytochrome C and TBA-MDA systems.

The review provides a comprehensive overview of the phytochemical constituents and pharmacological activities reported in various species of the Rubiaceae family. By consolidating existing scientific evidence, the article highlights the therapeutic potential and chemical diversity of this important plant family.

The compiled information is expected to serve as a valuable reference for researchers and scientists, encouraging further exploration, systematic investigation, and global recognition of Rubiaceae species for drug discovery and development. Additionally, the review may aid in identifying research gaps and promoting future studies on underexplored species within the family.

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