
FLAVONOIDS FROM *EUPHORBIACEAE* -A REVIEW

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The *Euphorbiaceae* represents¹ almost all habits of growth, and exhibits a high degree of adaptability to varying environments. The species of this family are distributed all over the world, except in Arctic and Antarctic regions. About half of the species (4000) inhabit equatorial America; they are much rarer in temperate America. In the old world they are more abundant in the Mediterranean region and in temperate Asia than between the tropics. The members of the family² secrete a very acrid milky juice, varying in strength with the species, the organ of the plant and the climate. The latex present in many of the species is of particular importance in the genus *Hevea* and a number of other rubber producing genera. In some, the milky juice is one of the most deleterious of poisons and in others its acidity is so far neutralized by mucilage and resins as to reduce it to a simple purgative and diuretic. Some species are slightly narcotic- acrid others aromatic. The Albumin usually contains fixed bland oil, without the acidity which is found in the embryo and the integuments of the seed. It is to a liquid resin and a volatile principle that all the properties of the spurge-worts are due. They are thus the strongest in alcoholic tinctures, but are dissipated by the application of heat. *Manihot* offers a remarkable example. There is scarcely a more poisonous juice than this yet the action of fire converts the plant into very wholesome food. A general survey of phytochemicals in *Euphorbiaceae* has been given in Table.1.

TABLE-1 PHYTOCHEMICALS REPORTED

Species of Euphorbiaceae	Phytochemical reported
<i>Sapium eugniaefolium</i> ³	6-hydroxy kaempferol-7-O-rutinoside
<i>Macaranga vedeliana</i> ⁴	Macarangin (6-E-3'', 8''-dimethyl-2'',7- octadienyl) kaempferol
<i>Phyllanthus spp</i> ⁵	Quercetin-3-O-β-D-glucopyranosyl (1 to 4)-α-L-rhamnopyranoside and 3,5,7,4'-tetrahydroxy flavone
<i>Euphorbia ebracteslata</i> ⁶	Quercetin-3-O-glucoside, querceti-3-O- rutinoside, kaempferol-3-O-rutinoside and quercetin-3-O-(2''-O-galloyl)-β-D-glucoside.
<i>Acalypha australis</i> ⁷	Gallic acid,Protocatechuic acid, caffeic acid, rutin, isoquercitrin, corilagin,furosin and geraniin.
<i>Phyllanthus sellowianus</i> ^{8,9}	4', 4''-dimethylcupressuflavone, scopoletin isofraxidin.
<i>Phyllanthus ussuriensis</i> ¹⁰	Phloroglucinol, gallic acid and rutin.
<i>Manihot utilissima</i> ¹¹	Rutin
<i>Macaranga pleiostemona</i> ¹²	Four antibacterial flavonones (three are prenylate flavonones)
<i>Jatropha gossypifolia</i> ¹³	Lignans and gossypifans
<i>Sapium japonicum</i> ¹⁴	Rutin, geranin, isoquercetin, quercetin, afzelin and trifolin.
<i>Securinega suffruticosa</i> ¹⁵	Gallic acid, corilagin,tecatin, geraniin, bergenin,norbergenin, (+) catechin, gallocatechin, isoquercitrin and rutin.
<i>Euphorbia aleppica</i> ¹⁶	Kaempferol, 4-hydroxy benzoic acid and its methyl ether.
<i>Antidesma membranaceum</i> ¹⁷	Benzopyranones and ferulic acid derivatives
<i>Phyllanthus virgatus</i> ¹⁸	Galangin-8-sulfate, galangin-3-O-β-D- glucoside-8-sulfate and kaempferol-8- sulfate
<i>Euphorbia orbiculata</i> ¹⁹	Kaempferol and quercetin
<i>Securinega leucopyrus</i> ²⁰	Kampferol-3-O-glucoside, Kaempferol-3-O-rutinoside, aminoacids, sugars,alkaloids.
<i>Croton membranaceus</i> ²¹	Alkaloids, Kampferol
<i>Croton lechleri</i> ²²	Proanthocyanidins, (+)-Catechin, (-)- epicatechin, (+)-gallocatechin,(-)- epigallocatehins & dimeric proanthocyanidins.
<i>Clutia Abyssinia</i> ²³	5-methyl coumarins
<i>Croton draconoids</i> ²⁴	(+)-gallocatechin, (-)-epigallocatechin & (-)-epi-3,5,7,3',5' pentahydroxy flavan.
<i>Gelonium multiflorum</i> ²⁵	7,4'-O-dimethyl scutellarein-6-O-β-D-glucopyranoside, 7,4'-O-dimethyl scutellarein-6-O-α-L- rhamnopyranonyl-β-D-glucopyranoside &6-O-β-D-Xylopyranosyl-β-D-glucopyranoside.
<i>Securinega suffruticosa</i> ²⁶	Gallic acid, corilagin, helioscopinin-B, geraniin,bergenin, norbergenin, 11-O- galloyl nor

	bergenin, gallocatechin and rutin.
<i>Macranga peltata</i> ²⁷	Ellagic acid, lutetolin, diosmetin, luteolin-7-O- β -D-glucoside and diosmetin-7-O- β -D-glucoside.
<i>Euphorbia perkinensis</i> ²⁸	Isoquercetin, quercetin, astragalin, afzelin, prunin, rutin, kaempferol-3-O-rutinoside, quercetin-3-(2''-O-galloyl)- β -D-glucoside and quercetin-3-O-(2''-O-galloyl)- α -L-rhamnoside. Kaempferol, quercetin, kaempferol-3-O-(2''-O-galloyl)- β -D-glucoside, quercetin-3-O-(2''-O-galloyl)-rutinoside, ellagic acid and acetonyl geranin.
<i>Phyllanthus sellowianus</i> ²⁹	Triterpene: lupa-1,20(29)-dien-3-one, (glochidene), gallic acid ethyl ester and quercetin-3-O-rutinoside.
<i>Marihot esculenta</i> ³⁰	Kaempferol-3-O-rutinoside and quercetin-3-O-rutinoside.
<i>uphorbia microphylla</i> ³¹	Apigenin-7-O- β -D-glucopyranoside, β -sitosterol- β -D-glucopyranoside
<i>Bridelia ferruginea</i> ³²	Gallo-catechin (4'-O-7)-epigallocatechin and a biflavonoid.
<i>Euphorbia ebracteolata</i> ³³	Nine hydrolysable tannins and five flavonoids and 5-O-caffeoyl quinic acid, kaempferol-3-O-(2''-O-galloyl)- β -D-glucoside)
<i>Dorstenia mannii</i> ³⁴	Geranylated and prenylated flavonoids
<i>Macaranga schweinfurthii</i> ³⁵	Geranyl flavones
<i>Acalypha indica</i> ³⁶	Flindersine and sitosterol
<i>Phyllanthus urinaria</i> ³⁷	10-galloyl-3,6-O-HHDP-2,4-O-dihydroxymethyl-chebuloyl- β -D-glucopyranose, pyrogallol, caffeic acid and brevifolincarboxylic acid
<i>Mallotus apelta</i> ³⁸	Courmarino lignoids: acquillochin, cleosmicosin A and 5-dimethylaquillochin
<i>Chrozophora prostrate</i> ³⁹	7-hydroxy-5-methyl-2-acetonyl-6-C-glucopyranosyl chromone-2''-O-glucoside.
<i>Chrozophora spp</i> ⁴⁰	Biflavonoids and triflavonoids
<i>Chrozophora oblongifolia</i> ⁴¹	Terpenes.
<i>Chrozophora oblique</i> ⁴²	Three dolabellane diterpenoid glucoside, dolabellane diterpenoid. 14 novel dolabellane diterpenoid naturally acylated at the C-16 hydroxy group with 3-hydroxy-3-methyl glutaric acid.

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