

A mini review on chemistry and biology of *Hamelia Patens* (Rubiaceae)

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ABSTRACT

Hamelia patens Jacq. Commonly known as “redhead,” “scarlet,” or “firebush” belongs to the Madder family (Rubiaceae), different parts (leaves, stem, flower, root, seeds and even whole plant) of *Hamelia patens* used. It is a perennial bush, and grow in full sun and in shade. It grows to about 6 feet. Neotropical shrub *Hamelia patens* Jacq has been cultivated as an ornamental in the United States, Great Britain, and South Africa. *Hamelia patens* have contained pentacyclic oxindole alkaloids: isopteropodine, rumberine, palmirine, maruquine and alkaloid A, B and C, other chemical constituents are apigenin, ephedrine, flavanones, isomaruquine, narirutins, pteropodine, rosmarinic acid, narirutin, seneciophylline, speciophylline, and tannin. In last few decades several Indian scientists and researchers have studied the pharmacological effects of steam distilled, petroleum ether, chloroform, ethanol & benzene extracts of various parts of *Hamelia* plant on immune system, reproductive system, central nervous system, cardiovascular system, gastric system, urinary system and blood biochemistry.

Key words: *Hamelia patens*, alkaloids, Traditional uses

INTRODUCTION

Plants are one of the most important sources of medicines. Today the large numbers of drugs in uses are derived from plants. The genus *Hamelia patens* (family-Rubiaceae) commonly known as “bayetilla,” “trompetilla,” “coralillo,” or “hierba coral. These two last names are related to the red color of some of its organs.^[1-2] The genus *Hamelia* (family Rubiaceae) consists of 16 species of shrubs or small trees native to lowland neotropical areas ranging from southern Florida, the West Indies, and Mexico to Brazil and Argentina.^[3] *Hamelia patens* was named a Texas Superstar by Horticulture Department at Texas A&M. University because of its excellent performance during the hot dry Texas summers, it is recommended as a low maintenance native shrub in Florida.^[4] and has been promoted as an attractant for hummingbirds and butterflies to gardeners throughout the southern U.S. as a perennial or annual.^[5] *Hamelia patens* has been introduced and cultivated for at least

250 years, with six species grown in England in 1839.^[6-7] It grows as a tree in the Atlantic tropical lowland of Costa Rica.^[8] It is a reliable tropical plant that has found its way into many a landscape because of its proven drought and soil tolerance that basically can grow anywhere. Firebush should be planted in full sun or part shade in well-drained soil beginning in mid-May and on into the summer. Firebush can tolerate many types of soils from heavy clays to high alkaline as long as it has good drainage. *Hamelia patens* does not have pest or disease problems that plague so many of the tropical. To the delight of organic growers, this plant is a prize, because it requires no pesticides, Use a complete fertilizer at planting and then once a month with soluble nitrogen to continue a strong blooming show. The show continues for into the fall when the foliage changes to a striking blood-red color.^[9] But it can easily be killed when overwatered.^[10] The species can be propagated from seeds, but most commercial ornamentals are produced from cuttings, monthly production may simply be a direct result of seasonal changes in the physical environment.^[11] A more complicated level of control would be an adjustment in fruit ripening rate to match changes in fruit removal rates.^[12] Firebush flowers throughout the year. It is a hummingbird-pollinated plant.^[13] The flowers are also visited by butterflies.^[14] *Hamelia patens* in India shows considerable variation in floral morphology, pollination and fruit set in different seasons. *Hamelia patens* at Agra, in order to compare

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these data of cultivated plants with those obtained within its area of natural distribution.^[15] *Hamelia patens* has been studied chemically. It is known to contain pentacyclic oxindole alkaloids,^[16-17-18] and also contains a new glycoside, 5, 7, 2', 5'-tetrahydroxyflavanone 7-rutinoside, together with narirutin and rosmarinic acids were isolated from the aerial parts of *Hamelia patens*.^[19] Firebush contains 17.5 percent crude protein and has an *in vitro* digestibility of 61.6 percent,^[20] and has a sugar content of approximately 9%, although significant variation exists both within and among trees.^[21] *Hamelia patens* is commonly used as a treatment for wound in central America.^[22] The important advantages claimed for therapeutic uses of medicinal plants in various ailments are their safety besides being economical, effective and their easy availability, Because of these advantages the medicinal plants have been widely used by the traditional medical practitioners in their day to day practice. In Mexico it is used for 42 different medicinal purposes, especially to stop bleeding, healing sores, and in menstrual disorders,^[23-24] Pimples, malaria, sore^[25], skin disease, blisters, eczema, stomachache^[26], athlete's foot, relieve pain, skin lesions, rash, insect bites, itching headache, asthma, burn, scurvy, inflammation, rheumatism, nervous shock, post partum pain, uterine and ovarian afflictions, in scant, expel intestinal worms and dysentery.^[1-27-28-29-30-31]

SYNONYMS

Hamelia erecta Jacq., *Hamelia coccinea*, *Hamelia pedicellata* Wernh, *Hamelia latifolia* Reichb. ex DC.

Common names

Hindi: *Hamelia*

English: Scarlet bush, Fire bush, Hummingbird bush, Polly red head, Texas firecracker, Red head va

Span: Sanalo-todo, Pata de pajaro

Mayan: Ix-canan

PLANT MORPHOLOGY

This species is bush or small tree, 1.4-3.0 m but sometimes reaches 7 m in height tall, trees produce flowers and fruits throughout the year.^[12] the fruits are also eaten by birds which disburse the seeds.^[32] Plants may have single or multiple stems. The twigs are orange to purple. Leaves are opposite or grouped in threes or fours, and finely hairy to glabrous. The leaves have petioles 1 to 3.5 cm long and blades that are mostly ovate-elliptic to obovate-elliptic with an acute or acuminate tip. The lateral and especially the mid veins are red or pink. In temperate areas, as the

temperatures turn cool in the fall, the foliage turns to a brilliant red, hence the common name. The inflorescence is terminal, a modified dichasium with flowers that are tubular, 12 to 22 mm long, and orange to red in color. The fruit is a berry, spherical to elliptical, 7 to 10 mm long, turning red and then black at maturity. The seeds are orange-brown, 0.6 to 0.9 mm long.^[33] firebush has a tap and lateral root system with abundant fine roots. Stem bark is gray and smooth and the inner bark is light green.^[34] *Hamelia patens* should be planted in full sun or part shade in well-drained soil beginning in mid-May and on into the summer. It can tolerate many types of soils from heavy clays to high alkaline but mostly prefers loamy or clayey soil, Propagation is by soft wood cuttings in spring or by seed.^[10]

TAXONOMY

Kingdom: Plantae

(Unranked): Angiosperms

(Unranked): Eudicots

(Unranked): Asterids

Order: Gentianales

Family: Rubiaceae

Genus: *Hamelia*

Species: *Hamelia patens*

Botanical name: *Hamelia patens* Jacq.

CHEMICAL CONSTITUENTS

Hamelia patens is rich in active phytochemicals including alkaloids and flavonoids. It contains several of the same oxindole alkaloids as Cat's Claw (*Uncaria tomentosa*) including pteropodine and isopteropodine; both have been highly studied and even patented as effective immune stimulants. These two chemicals have also recently shown to have a positive modulating effect on brain neurotransmitters (called 5-HT₂ receptors) that are targets for drugs used in treating a variety of conditions including depression, anxiety, eating disorders, chronic pain conditions and obesity. Three new oxindole alkaloids have also been discovered in *Hamelia*

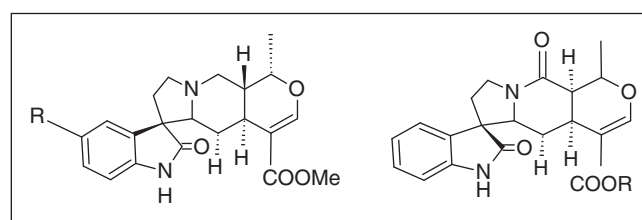


Figure 1

Isopteropodine, R = H

Rumberine, R = OH

Palmirine, R = OMe

Maruquine, R = H

Alkaloids A, R = Me

Oxindole Alkaloids from *Hamelia patens* methanol extract of the Leaves Determined by GC-MS.^[1]

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