

***BUAHINIA RACEMOSA (KACHNAR): A REVIEW OF ITS
MEDICINAL PROPERTIES*****Tripti Sahu* and Jyoti Sahu**

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Author****Tripti Sahu**Shri Rawatpura Sarkar
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Kumhari Durg (C.G.)**ABSTRACT**

An herbal medicine is crude drugs obtained from vegetable or plant which are the origin of herbal drugs utilized for the treatment of disease states, often of a chronic nature or to attain or maintain a condition of improved health. When conventional medicine fails to treat chronic disease efficaciously and without adverse event, many people seek unconventional therapies including herbal medicine. This article contains brief review of medicinal properties of plant *Buahinia racemosa* family Caesalpineaceae is which an important herb of tropical India in Ayurvedic system of medicine. *B. racemosa* contains several important Phytoconstituents which synthesizes primary and

secondary metabolites which have medicinal value such as flavones (flavonoids), Phenanthraquinon (glycoside), phenolic compound, triterpene, carbohydrates, and non reducing carbohydrate. Some of the constituents are accounted for some pharmacological activities of the herb. The plant exhibits various pharmacological activities such as antidiabetic, Chemo protective antitumor, Hepatoprotectivity, antinociceptive, anti-inflammatory, antimutogenicity, anticancer, antioxidant, antihyperlipidemic etc. Many species are widely planted in the tropics as orchid trees, particularly in India, Sri Lanka, Vietnam and south-eastern China. Other common names include mountain ebony and *Kachnar* (India and Pakistan). In the United States of America, the trees grow in Hawaii, coastal California, Texas, Louisiana, and Florida.

KEYWORDS: *Buahinia racemosa*, Phytoconstituents, Pharmacological activity.

INTRODUCTION: The products which are obtained from the natural source such as plants, microorganisms, animals or minerals is the basic needs of making drugs used for the treatment of disease which are synthesized now a days for the making of a novel drugs.^[1]

Bauhinia is a genus of more than 200 species of flowering plants of the large flowering plant family *Fabaceae*, with a pantropical distribution. The genus was named after the *Bauhinia* brothers, Swiss French botanists. Many species are widely planted in the tropics as orchid trees, particularly in northern India, Vietnam and southeastern China like *B. purpurea*, *B. tomentosa*, *B. vestita*, *B. ovate*, *Bauhinia acuminata* etc. Other common names include Mountain Ebony and Kachnar (India and Pakistan).^[4] Orchid tree flower appears on the Hong Kong flag and Hong Kong Airlines uses 'Bauhinia' as its radio call sign in air traffic communication.^[5] In the ancient time the herbal medicines is the only source which are used for the treatment of most of the disease and today also in many places it have been using for healthcare purpose so we can say that the herbal medicines remedy is an traditional system of medicine which are used in medical practices since from antiquity.^[1]

Botanical Name: *Bauhinia racemosa lam.*

Local Name: English (Burmese Silk Orchid), Gujarati (Apto), Hindi (Kachnar), Kannada (Aapta, Aralukadumandara), Sona Patti.

Kingdome- Planate

Division - Angiosperms

Class- Eudicots

Order- fabales

Family- Fabaceae

Subfamily- Caesalpinoideae,^[2]

Genus- *Bauhinia*

Species -*B. racemosa*.^[3]

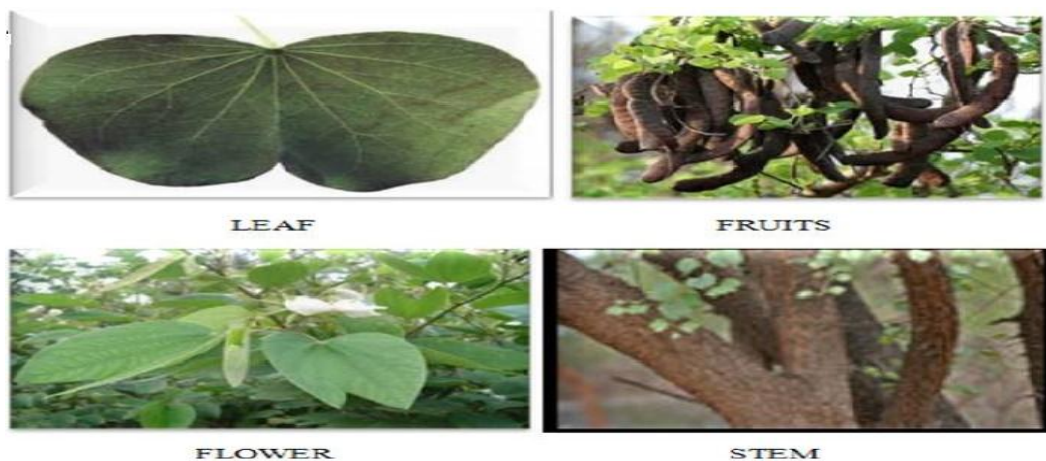


Figure-1: Useful parts of *Bauhinia racemosa lam.*^[30]

Habitat and Distribution: It is veining and evergreen plant which is having vigorous growth needing sturdy support. It is Very common in foothills up to 1000m. There Global Distribution India and Sri Lanka Indian Distribution State - Kerala, Tamil, Maharashtra etc.^[6] Throughout India, except Jammu & Kashmir, Himachal Pradesh, Sikkim, Arunachal Pradesh, Assam, Nagaland, Meghalaya, Manipur, Tripura, Mizoram. In the United States of America, the trees grow in Hawaii, coastal California, Texas, Louisiana, and Florida. A large shrub or small deciduous tree grows up to 5 meters in height. Leaves compound with 2 leaflets, connate for about two third up, flowers white, axillary racemes, fruits flat dehiscent pods, containing 5-10 seeds.^{[6], [5]}

DISCRIPTION: Trees, deciduous, small, to 15 m tall. Bark blackish, rough; branches spreading or pendulous, zigzag, slender, glabrous. Stipules caducous; petiole 0.8–1.2 cm; leaf blade broadly orbicular, 1.5–4 × 2.2–6 cm, 7–9-veined, leathery, a axially pubescent or glabrous, ad axially glabrous, base cordate, apex bifid to ca. 1/3, lobes rounded at apex. It's Inflorescence a lateral or terminal raceme, ca. 20-flowered; peduncle short; bracts and bracteoles linear. Flower buds obovoid, puberulent, apex protruding. Hypanthium turbinate is short. Calyx split spathaceously at a thesis. Petals yellowish subequal, oblanceolate, 8–10 mm, subsessile. Fertile stamens 10, unequal; filaments 6–7 mm; anthers small, ca. 3 mm. Ovary stalked, glabrous; stigma subsessile, peltate, small. There Legume linear-cylindric, 15–20 × 1.8–2.2 cm; valves woody, glabrous. Seeds 12–20, dark brownish, ellipsoid, 8–10 mm in diam. Fl. Apr–May, fr. Jun–Aug. Bauhinia trees typically reach a height of 6–12 m and their branches spread 3–6 m outwards. The lobed leaves usually are 10–15 cm across.^[7] The five- petaled flowers are 7.5–12.5 cm diameter, generally in shades of red, pink, purple, orange, or yellow, and are often fragrant. The tree begins flowering in late winter and often continues to flower into early summer.^[3]

CULTIVATION: Propagation of *Bauhinia* species is from seeds or cuttings. They prefer acidic soils and do not tolerate salty conditions. Full sun exposure is preferred but they can be grown under partial sun. Generous watering is needed during summer; moderate moisture required in winter.

Light: Prefers full to part sun and blooms best with good sunlight.

Moisture: Water moderately and regularly, keeping it evenly moist. Need more water during hot seasons and less in cooler climate. During establishment it can tolerate drought condition also.

Soil: Fertile humus soil with a mix of sand that can retain water, yet well-drained soil.

USEFUL PART OF PLANT: The parts which are traditionally used of these *B. racemosa* plants are leaves, flowers, seeds, fruits, bark and roots. These parts contain some active ingredient which is responsible for giving particular pharmacological activity. It is used in traditional medicine for the treatment of various ailments. The stem bark of the plant is an astringent and is used in the treatment of headache, fever, skin diseases, and tumors, diseases of the blood, dysentery and diarrhoea.^[8] Pharmacological studies of the plant revealed that the ethanol extract of leaves of *B. racemosa* presented analgesic, antipyretic, anti-inflammatory, antispasmodic,^[9] and antimicrobial activity.^[10] The fresh flower buds of this plant showed antiulcer activity.^[11] Cytotoxicity against CA-9 KB in cell culture, hypotensive, and hypothermic activities were also reported from the hydroalcoholic extract of *B. racemosa*.^[12]

Table-1: Part of *Bauhinia racemosa lam.* Used for medicinal purpose.

Sr. No.	Parts of Plant	Medicinal Properties
1	Stem Bark	Astringent, headache, fever, Skin disease & tumor, Disease of the blood, Dysentery and diarrhoea, anthelmintic, antidiabetic, antineoplastic
2	Leaves	Antipyretic, analgesic, anti-inflammatory, antispasmodic and antimicrobial activity
3	Flower	Antiulcer activity, Cytotoxicity, hypotensive and hypothermic activity, Haemorrhages.
4	Seeds	Antibacterial and antimicrobial activity.

PHYTOCONSTITUENTS: Every plant contains several Phytoconstituents in its different parts showing various pharmacological activities and toxicities, like wise *Bauhinia racemosa lam.* It was showing many pharmacological activities due to the presence of medicinally active compounds.

Several phytochemical constituent of *B. racemosa* have been isolated and chiefly include flavonoids (kaempferol and quercetin), coumarins (scopoletin and scopolin),^[13] triterpenoids (β -amyrin), steroids (β -sitosterol),^[14] and stilbenes (resveratrol).^[15] Plant derived natural products such as flavonoids, terpenoids, and steroids etc have received considerable attention

in recent years due to their diverse pharmacological properties including antioxidant. Dibenzoepin derivative, pacharin, was isolated from the heartwood.^[16]

Table-2: Active constituent present in part of *B. racemosa lam*

S.No.	Parts of plant	Phytoconstituents
1	Leaves	Flavonol (kaempferol & Quercetin) and coumarins (Scopoletin & scopolin).
2	Stem Bark	B-sitosterol and β -amyrin.
3	Hard wood	stilbenes (resveratrol), Dibenzoepin
4	Flower	Flavonoids, terpenoids, and steroids.

UTILIZATION

Traditional uses: Lodhas use dried root bark powder plant as vermicide and they prescribe stem bark decoction with that of GaraRatan (*Terminalia Arjuna*) in the treatment of throat diseases.^[18] They give this gum along with long pepper decoction (1:1) to patient in brain tumours. Decoction of leaves is taken in the treatment of malarial fever. Santhals give root bark decoction with paste of black peppers (3:1) to epileptic patients.^[19, 20]

They rear fine fibres from the stem bark and use it for stitching of deep cuts on animal body. Oraons use fresh leaf paste as a remedy for urinary diseases. Some ethnic communities give stem bark extraction with cow milk (3:2) as cure of glandular inflammation.

Bhils of Rajasthan use the plant bark in diarrhoea and dysentery and eat the fruits.^[22,23]

Stem bark is used for dysentery and diarrhoea and as an astringent. Leaf is used for malaria and headache. The fibre is used to stitch wounds. The plant is also used to cure skin diseases like leprosy and leucoderma. The gum is used medicinally in South India.^[24]

Industrial Uses: Medicinal plants are the richest bio resource of drugs for traditional systems of medicine, modern medicines, nutraceuticals, food supplements, folk medicines, pharmaceutical intermediates and chemical entities for synthetic drugs. The first step in the value addition of medicinal bio resources is the production of herbal drug preparations, using a variety of methods from simple traditional technologies to advanced extraction techniques. The extract is further processed to be incorporated in any dosage form such as tablets and capsules. With the increasing demand for herbal medicinal products, nutraceuticals, and natural products for aceuticals, and natural products for health care all over the world, medicinal plant extract manufacturers and essential oil producers have started using the most

appropriate extraction technologies in order to produce extracts and essential oils of defined quality with the least variations from batch to batch.^[25]

PHARMACOLOGICAL ACTIVITY: *Bauhinia racemosa* shows various pharmacological activities like Chemoprotective antitumor activity, antidiabetic activity, Hepetoprotective, anti-inflammatory activity, Antimutagen activity, antidiabetic activity, Antinociceptor, antioxidant, antihyperlipidemic activity etc due to its presence of various active constituent all over the parts of plant.

By considering the ethno medicinal background and it has been concluded that this plant carries some phytochemical constituents which are responsible for various activity which has been reported such as, various pharmacological activity.

ANTI-DIABETIC ACTIVITY: Diabetes is a metabolic disorder where in human body does not produce or properly uses insulin, a hormone that is required to convert sugar, starches, and other food into energy. Diabetes results in abnormal levels of glucose in the bloodstream.^[26] Alloxan induced hyperglycaemic rats showed a significant decrease ($p < 0.05$) in body weight on days 10, 15, 20 of the experiment. Daily oral Treatment with both extracts showed significant increase ($p < 0.05$) in body weight at the end of the experiment as compared to diabetic control group. The present study shown the treatment of alloxan induced rats with both methanol and aqueous extracts of *Bauhinia racemosa* for 20 days could restore the normal biotransformation by shifting the balance of carbohydrate metabolism. Improved pancreatic exocrine activities can be ascribed to insulin secretion from existing residual Beta-cells of islets or due to enhanced transport of blood glucose to peripheral. The rats were divided in to seven groups and each group consists of six animals. The serum was analyzed for blood glucose level (GOP-POD method).^{[27], [31]}

Analgesic Activity: The present study was carried out to evaluate the analgesic activity of the stem bark of the *Bauhinia racemosa* plant in rats.^[29] Aqueous & alcoholic extracts of dried stem bark of *Bauhinia racemosa* Lam. @ 100, 200mg/kg body weight were used in the present study. The study was conducted as per the “Tail Immersion Method” described by Ghosh M.N., (1984.) Aqueous extract of *Bauhinia racemosa* Lam stem bark @ 200mg/kg body weight produced significant analgesic activity whereas 100mg/kg dose did not produce significant results when compared with control. ($P < 0.01$) The result of analgesic activity of

alcoholic extract produced significant results at both the doses ($P < 0.01$). The findings indicated the analgesic activity of the stem bark of the plant.

Antiulcer Activity: The antiulcer activity of aqueous and alcoholic extracts of the stem bark of *Bauhinia racemosa* Lam was observed as per the method described by Sahani et al, (1990).^[32] To study the antiulcer activity, the ulcer no. and ulcer score were calculated and analyzed for the significant reduction towards normal. There was significant reduction in the ulcer no. on administration of aqueous (200mg/kg body weight) and alcoholic extracts (100 and 200mg/kg body weight) of *Bauhinia racemosa* ($P < 0.01$), when compared with control group.^[33]

Anti-HIV-1 Activity: *B. racemosa* extracts were minimally toxic and showed anti-HIV-1 activity. Ethyl acetate fraction from methanol (80%) extract of *B. racemosa* had a greater cytotoxic effect. It was significantly different from that of the other extracts.^[36] The anti-HIV-1 activity assay was performed by syncytia formation. These results may be explained by the presence of the following phytochemical in the methanol extract; tannins, flavonoids, carbohydrates, terpenes and coumarins. These phytochemical results are similar to those obtained by Prakash and Khosa, (1976) and Kumar et al. (2007), isolated from different parts of the plant such, as β -sitosterol and β -amyrin were from the stem bark two flavonols (kaempferol and quercetin) and two coumarins (scopoletin and scopolin) from the leaves of the plant. Stilbene (resveratrol) was separated from the heart wood of *B. racemosa*.^[37]

Antibacterial Activity: Antibacterial profile, maximum inhibitory effect of the Petroleum ether extract observed only on *Staphylococcus epidermidis*, *Staphylococcus aureus*, *Salmonella typhi* and moderate antibacterial against *Escherichia coli*, *Pseudomonas aeruginosa*, *Enterobacter aerogenes*, *Salmonella typhimurium* but mild inhibitory effect on *Proteus vulgaris*.^[34] Chloroform extract showed strong antibacterial effect against *Staphylococcus epidermidis* and *Staphylococcus aureus* and moderate antibacterial against *Proteus vulgaris*, *Escherichia coli*, *Enterobacter aerogenes*, *Salmonella typhi* and *Salmonella typhimurium* but mild effect on *Pseudomonas aeruginosa*. Ethyl acetate extract showed maximum inhibitory effect on *Staphylococcus epidermidis*, *Staphylococcus aureus*, *Escherichia coli*, *Pseudomonas aeruginosa*, *Enterobacter aerogenes* and *Salmonella typhimurium*, but moderate effect on *Proteus vulgaris* and *Salmonella typhi*.^{[34],[35]} Methanol extract showed maximum inhibitory effect on *Staphylococcus aureus*, *Proteus vulgaris*,

Staphylococcus epidermidis, *Pseudomonas aeruginosa*, *Salmonella typhi*, *Salmonella typhimurium*, but moderate inhibitory effect on *Escherichia coli*, *Enterobacter aerogenes*.

CONCLUSION

An herbal medicine is crude drugs obtained from vegetable or plant which are the origin of herbal drugs utilized for the treatment of disease states, often of a chronic nature or to attain or maintain a condition of improved health. Herbal medicine uses are based on historical medicinal practices. India is richly endowed with a wide variety of plants having medicinal value. The term “herbal drugs” denotes plants or plant parts that have been converted into phytopharmaceuticals by means of simple processes involving harvesting, drying, and storage.^{[38],[39]} The plant processing encompasses drying, mechanical disruption, and solvent extraction such as aqueous or organic solvent, e.g., ethanol, and will influence the final quality of the herbal product. Analytical procedures can be used to determine the active constituents that are present in herbal substances.^[40] Herbal medicine uses are based on historical medicinal practices. Historical practices determine the way herbal medicines are formulated and used. In some cases e.g. China, there are well-defined procedures that are well documented in pharmacopoeias dating back nearly 2000 years and other monographs.

The *Bauhinia* genus has more than 200 species. *Bauhinia racemosa* Lam is widely used in the medicinal purpose. *Bauhinia racemosa* are widely cultivated in Kerala and its leaves are also used in vegetable. The *Bauhinia racemosa* Lam plants are widely used either directly as folk remedies or indirectly as pharmaceutical preparation of modern medicine. *Bauhinia racemosa* has a variety of traditional medicinal uses, which sometimes require that it be blended with other plant or natural ingredients. By considering the ethnomedicinal background and several research articles on *Bauhinia racemosa* Lam, it has been concluded that this plant carries some important phytochemical constituents showing various pharmacological activities such as Anti-inflammatory activity, Chemoprotective Antitumor activity, Antiulcer activity, Antidiabetic activity, Antinociceptive activity, Antihyperlipidemic activity, Antioxidant activity etc.

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