



Phytochemical Study and Pharmacological Effects of *Dolichandrone falcata* Seem

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Abstract

Dolichandrone falcata Seem synonym *Markhamia falcata* belonging to family Bignoniaceae. Malawi, Tanzania, South Africa, and India are all home to the vine. Rajputana, Bundelkhand, Bihar, Deccan, Mysore, and Maharashtra are among the Indian states where it can be found. The plant is mainly used for diabetes, anti-inflammatory, anxiolytic, analgesic, antiestrogenic, antimicrobial, antinociceptive, antibacterial, and immunomodulatory activities. The leaves are also used in the treat of leukemia and menorrhagia. *Dolichandrone falcata* Seem contains alkaloids, flavonoids, sugars, saponins, phenolic, terpenoids, cardiac glycosides, steroids, and amino acids. Therefore, this survey conducted, present was aimed to study the phytochemical study and pharmacological effects of *Dolichandrone falcata* Seem.

Keywords: *Dolichandrone falcata*; *Markhamia falcata* Bignoniaceae; Medhshingi; Mesasinghi

Taxonomical Classification

Common name: Medhshingi, Meshsa-sringi

Synonym: *Bignonia falcata*, *Bignonia spathacea*, *Markhamia falcata*

Biological source: It is a small dediduous tree.

Family: Bignoniaceae

Kingdom: Plantae

Order: Lamiales

Clade: Tracheophytes

Clade: Eudicots

Clade: Asterids

Genus: *Dolichandrone*

Species: *D. falcata*

Parts of plant used: Leave, fruit, root, bark, flower

Geographical region: Rajasthan, Maharashtra, Karnataka

System of medicine used in: folk medicine, ayurveda, siddha, sowa-rigpa

Substance class: Structurally diverse

Source: Organism

Source material type: Plant

Author: (Wall. Ex DC.) SEEM

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Record status: Validated

Introduction

Dolichandrone falcata Seem synonym (*Markhamia falcata*) belonging to Bignoniaceae [1-3]. The plant is also called 'medhshingi' in Hindi and 'mesasinghi' in Sanskrit [1-3]. In Ayurveda it is

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also used as mesha-shringi [1-3]. *Dolichandrone falcata* Seem has a long history of use by indigenous and tribal peoples all over the world, including India, for medicinal purposes and various pharmacological effects [1-3]. The medicinal value of leaves and bark is also mentioned in Ayurveda as meshsa-sringhi [1,2]. The bark decoction is also given in the treatment of nodules [4]. For the treatment of antidote leaves juice is taken orally [4]. The plant is used to treat liver disorders and anti-snake venom activity [5]. In Ayurveda *Dolichandrone falcata* Seem is used as mesh-shingi for madhuka bite also used as Rasayana drugs [5]. An aqueous extract of the fruit is used for abortion and bark is used as a fish poison [6]. Infusion of powder is given internally in the treatment of acute rheumatism [7]. The bark paste is applied for bone fractures and fruit paste for scorpion [2,3,8]. Leaves are also used for scrub swelling [2,3,6]. In Ayurveda, the stem bark of *Dolichandrone falcata* Seem is used to cure ulcers, pain, and epilepsy. Menorrhagia and leucorrhoea are treated with bark juice [2,3,6].

Material and Methods

Plant Collection and authentication

Plant *Dolichandrone falcata* Seem aerial parts were collected from Savitribai Phule Pune University, Ganeshkhind Pune. The herbarium was produced and authenticated in the botanical survey of India, Pune.

Morphology

Dolichandrone falcata Seem synonym *Markhamia falcata* belonging to family Bignoniaceae. It is medium size tree 0.15 cm high with dense foliate and profuse flowering. It is highly scented, creamish white flowers it is highly scented, creamish white flowers bloom in the evening and falls in the morning ripe fruits of the previous year remain on the tree when the flowers of next year are in bloom. Leaflets are opposite, 1.3 to 3.8 by 1.1 cm to 3.8 cm, suborbicular or obovate, punscent or glabrous, base cuneate or rounded, generally unequal-sided, main nerves around pairs, prominent beneath; petiolules of lateral leaflets 0-w.5 mm long. Flowers in terminal few-flowered racemes; pedicels 1.3 cm long. Calyx is pubescent and has a short stout mucro at the apex. Corolla white, 2.5 cm long or longer; tube very narrow at the base, about 2.5 mm wide, gradually widening upwards; limb lobes obovate oblong with crisped undulate margins. Flat, falcate curved capsules, 25 cm to 45 cm long by 2 cm high, glabrous. Seeds are rectangular and winged at both ends, measuring 2.5 cm long by 6 mm wide. The bark is dark brown in color and very high in length. It is cylindrical and used as the treatment of fish poison and snake bite. The bhil tribes of Rajasthan use a bark decoction to treat nodules. It is the most powerful part of the plant [1].

Microscopy

The epidermis lined with cuticle was visible in the transverse section of a *Dolichandrone falcata* Seem leaflet. A dorsiventral structure was visible in the transverse region. The epidermal cell was observed in a single layer covered with a thick cuticle. Unicellular trichomes interrupted the epidermis. Amphistomatic stomata is included in anomocytic stomata. The cuticle upper epidermis was made up of spherical cells measuring 15 to 22 22 to 30 micrometers in diameter. Spherical cells measuring 15 to 22 22 to 30 micrometers in diameter made up the cuticle upper epidermis. Palisade cells and spongy tissues are present in the mesophyll. Palisade cells were thin-walled elongated cells with a diameter of 22 to 30 52 to 220 micrometers that were found just beneath the upper and lower epidermis in a single layer just beneath the upper and lower epidermis. Spongy

parenchymas tissues showed a 9 to 12-layer present at the lower side having a polygonal shape. Patches of sclerenchymas cells measuring 10 to 15 × 10 to 15 micrometres were found on the vascular bundle's outer side. The vascular bundle was arranged in a ring of xylem with phloem surrounding it [1].

Crude drug extraction

Aerial parts of *Dolichandrone falcata* Seem were washed and shade dried at room temperature and powdered in the domestic mixer. The coarsely powdered drug was extracted in soxhlet extraction different solvent methanol, alcohol, ethylacetate, water, acetone extract, and petroleum ether extract. The extracts were concentrated in a rotary evaporator under vacuum and stored at 2°C to 4°C in the refrigerator.

Phytochemical screening

2.0 gm of plant extract was dissolved in 10 ml double D/W and filtered with Whatman filter paper, as defined in standard reference books with a minor modification, and then used for phytochemical screening [9].

Physical characteristics

The preliminary phytochemical screening of leaf extracts reveals that alkaloids are present in petroleum ether, ethanol, and water extract. Saponins glycosides, flavonoids, ethanol and water extract also contain carbohydrates and proteins. Petroleum ether extract contains oils and steroids [10].

The presence of alkaloids in methanol, alcohol, and ethyl acetate extracts is revealed by preliminary phytochemical screening of bark extracts. Saponins are present in aqueous and alcohol extract. The terpenoids are obtained in aqueous, methanol, acetone, and ethyl acetate extracts. Tannins are found in aqueous, methanol, alcohol, and ethyl acetate extracts. Steroids are absent in all extracts. Cardiac glycosides are present in all extracts except water. Flavonoids are found in aqueous, methanol, alcohol, and acetone extracts [10]. The presence of alkaloids in methanol and alcohol extracts is revealed by preliminary phytochemical screening of fruit extracts. Aqueous, tobacco, and ethyl acetate extracts all contain saponins. Aqueous and ethyl acetate extracts also contained terpenoids. Tannins can be extracted from plants using methanol, alcohol, or ethyl acetate extracts. Methanol and acetone extract both contain steroid compounds. Except for water, all extracts contain cardiac glycosides. Aqueous, methanol, and acetone extracts all contain flavonoids [10].

Medicinal Uses

1. The plant has numerous medicinal uses like antiallergic, anti-inflammatory, antioxidant, antiestrogenic, anxiolytic, anticonvulsant, antiparasitic [2-4].
2. The plant is also used in curing anemia, bloody diarrhea, anthelmintic, analgesic, antiviral, and antifungal agents [2-4].
3. The plant is used to treat snake venom and also used in the treatment of liver disorder [2-4].

Pharmacological Actions

Anxiolytic

Anxiolytic effects were studied by elevate pulse maze test and marble burying test assay in animals. The DFBM and DFBEA crude dried extracts were prepared in doses of 100, 200, and 400 mg/kg, respectively, and the DFB compound was prepared in doses of 50, 100, and 200 mg/kg and administered orally to mice for anxiolytic

activity evaluation various *Dolichandrone falcata* extracts and isolated compounds. The stem-bark extract appeared to have substantial anxiolytic effects, while the DFBA extract had extremely significant activities [8].

Antioxidant

The aqueous extract of *Dolichandrone falcata* Seem to possess significant antioxidant activity when investigated by using the DPPH scavenging test and reducing powder method. Chrysin found in plant have shown to have antioxidant in laboratory animals [11].

Antimicrobial

Pseudomonas aeruginosa, *Bacillus subtilis*, *Candida albicans*, *Vibrio cholerae*, and *Salmonella typhi* were tested in an antimicrobial assay using *Dolichandrone falcata* Seem leaf, fruit, and bark extracts. The fruit extract is active against *Vibrio cholerae*, *Candida albicans*, and *Pseudomonas aeruginosa*, but not against *Salmonella typhi* and *Bacillus Albicans*, according to the findings. *Salmonella typhi*, *Vibrio cholera*, *Candida albicans*, and *Pseudomonas aeruginosa* were all killed by the bark extract, but *Bacillus subtilis* was not. Only *Salmonella typhi* and *Candida albicans* are susceptible to the leaf extracts. Except for *Bacillus subtilis*, the fruit and bark extract demonstrates a strong zone of inhibition against all test species [10].

Anti-inflammatory

Carrageenan-induced paw animal models were used to test the anti-inflammatory effects of methanol and ethyl acetate extracts of *Dolichandrone falcata* Seem fruits. Both extracts were used to make formulations that were tested in anti-inflammatory assays at doses of 100, 200, and 400 mg/kg. The findings show that the extracts have a substantial anti-inflammatory effect [12].

Antinociceptive

Methanol and ethyl acetate extracts of *Dolichandrone falcata* have antinociceptive efficacy. Animal models tend to bear fruit. The crude extract was used to make formulations that were tested in antinociceptive assays at doses of 100, 200, and 400 mg/kg. The findings show that the extracts have potent antinociceptive properties that are dose-dependent. The highest level of achievement [12].

Anti-diabetic

The anti-diabetic efficacy of *Dolichandrone falcata* Seem extracts were investigated pharmacologically by measuring blood glucose levels in rats. The anti-diabetic efficacy of the extract was investigated in rats using low doses of 200 mg/kg, medium doses of 400 mg/kg, and high doses of 600 mg/kg. Glibenclamide 10 mg/kg body weight was used as a standard guide for anti-diabetic activity against alloxan-induced diabetes. In diabetic rats, the aqueous extract significantly reduced blood glucose levels. It was discovered that the anti-diabetic activity was substantial and dose dependent [13].

Antimycobacterial

The antibacterial efficacy of *Dolichandrone falcata* aqueous and alcoholic extracts the MDR isolates DKU-156 and JAL-1236 of *Mycobacterium tuberculosis*, as well as the reference susceptible strain *Mycobacterium tuberculosis* H37Rv and the fast-growing mycobacterial pathogen *M. fortuitum*, were tested against Seem stem bark and leaves. The antimicrobial assays were performed using Lowenstein Jensen medium and Middlebrook 7H9 broth in the BACT/ALERT 3D process. The results of this study clearly showed that the aqueous extract of stem bark was effective as compared to aqueous and leaf extracts, as well as alcoholic stem bark and leaf

extracts [14].

Antifertility

The present study was undertaken to analyze the antifertility and estrous cycle effect of *Dolichandrone falcata* Seem leaves. The alcoholic and aqueous leaf extracts had a high abortifacient effect at doses of 200 mg/kg and 400 mg/kg body weight, respectively. The leaf extract of *Dolichandrone falcata* Seem was found to significantly prolong the estrous cycle, especially the diestrous period [15].

Hepatoprotective

The hepatoprotective function of an aqueous extract of *Dolichandrone falcata* Seem's stem-bark against a Carbon Tetra Chloride-intoxicated hepatitis model. At doses of 200 mg/kg and 400 mg/kg of aqueous extract, CCL4 caused a P=0.01 increase in serum SGOT, SGPT activity, and bilirubin level, indicating hepatotoxicity to be able to afford aqueous extract of *Dolichandrone falcata* stem-bark Seem [16].

Conclusion

It can be concluded that with its vast and diversified phytochemical constituents and pharmacological potentials *Dolichandrone falcata* Seem has a strong future in the world market. The plants are now well-acclimatized in different parts of the country and enjoy the strong export potential for the phytochemical constituent extracted from them. The plant scope for its diversified pharmacological activities.

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