Medicinal Importance of *Clerodendrum Phlomidis L.* (Arni)

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Abstract

Clerodendrum is a genus of flowering plants formerly placed in the family Verbenaceae but now considered to belong to the Lamiaceae (mint) family. Its common names include glory bower, bag flower, and bleeding-heart. Clerodendrum phlomidis is a small herbal plant common in India and Sri Lanka. It is used in the Indian and Chinese systems of medicine. Flowers are rounded and small white or pinkish. Root, stems, and flowers are used to treat various health disorders. Its roots are a bitter tonic and given in convalescence of measles. Juice of its leaves is used in syphilis.(Chopra and Nayar,1986) The root of the plant is also used in gonorrhea. Further, a decoction of Clerodendrum phlomidis is also found to be used in gastric problems. Dash mool a very powerful combination of ten different roots contains Clerodendrum phlomidis which improves body vigor and maintains good health. In the present communication, an attempt has been made to discuss the medicinal use of Clerodendrum phlomidis.

Introduction

Clerodendrum phlomidis is a valuable herb as far as medicinal use is concerned. It is used in the Indian and Chinese systems of medicine. It is a small herb common in India and Sri Lanka. Previously *Clerodendrum phlomidis* is known to be a member of the family Verbenaceae, but now it is placed in the family Lamiaceae. It has ovate, opposite, deltoid, and hairy leaves with small rounded terminal white or pinkish flowers. The flowers have specific fragrances and bloom from August to February. *Clerodendrum phlomidis* is a medicinal plant with high demand as the leaves and roots of the plant are used in Ayurveda, Siddha, Chinese and Unani medicines. It is sold as "Amimul"(leaf and root). In India plant is known as 'Arni', In Sanskrit is known as 'Agnimantha'. While the genus Clerodendrum is derived from a Greek word Klerodendron, (klero means chance and Dendron means tree i.e chance tree) may bring good luck or may not bring good luck. *Clerodendrum* is a very large and diverse genus having a total of 580 species of the genus so far identified and recorded. Molecular systematic studies based on chloroplast and nuclear DNA also indicate the polyphyletic origin of the genus (Steane *et al.* 1999). On the basis of morphological variations like the length of corolla tube, size of leaves, and type of inflorescence, some authors have classified the genus into two major subgenera as Clerodendrum and Cyclonema (Steane *et al.* 1999). *Clerodendrum phlomidis* is widely used to treat several inflammatory diseases and arthritis in the Indian traditional system and folk medicine (Babu *et al.* 2011).

According to the Indian ancient system of medicine, In Ayurveda

Dash mool a very powerful combination of ten different roots contain Clerodendrum phlamidis (Arni) root (Ministry of Health and Welfare Department, 2001). It improves body vigor and maintains good health. Many studies have reported the biological activities of *Clerodendrum phlomidis*.A number of investigations have been found to report its activity on inflammation, diabetes, nervous disorder, asthma, rheumatism, digestive disorders, urinary disorders, etc. The alcoholic and aqueous extracts were reported active as an analgesic, antidiarrhoeal, antiplasmodial, hypoglycemic, minor tranquilizers, anti-asthmatic, antifungal, nematicidal, and antiarthritic (Muthu Kumardas *et al*. 2010). The pulp obtained from the crushing of the leaves is applied externally on swelling. The leaves of the plant are used for rheumatism and anti-microbial activities. The leaf extracts are effective in treating inflammation, arthritis, weakness, gastric problems. It is also reported to have diuretic, antidiabetic, antidiarrhoeal, antimicrobial, antioxidant, antiasthmatic, and hepatoprotective activity. The plant shows diversified activities in agriculture and veterinary practices. A number of studies revealed the medicinal significance of *Clerodendrum phlomidis*

Phytochemistry

The main constituents isolated from *Clerodendrum phlomidis* are steroids, terpenes, and flavonoids. These constituents are isolated from different parts of the plant like root, stem, and flowers. The stem leaf and flower reported positive for alkaloids (Hungund *et al* 1971). Various researchers

isolated steroids and flavanoids from flowers. The main constituents isolated are ceryl alcohol, B-sitosterol, y- Sitosterol, palmitic acid, cerotic acid from the leaf (Bhakuni *et al*.,1962). Scutellarein, Pectol naringenin, and flavanone have been isolated from the leaf by Subramanian *et al.* (1972). Chalone glycoside (4,2,4-trihydroxy 6methoxychalcone-4, 4 a- D - diglucoside), pectolinarigenin, 7-hydroxyl flavones, and 7 hydroxy flavone 7-0-glucose have also been isolated from the flower and leaf (Roy, *et al*.1994; Anam, E.M 1999).

Pectolinaringenin D-mannitol, a ß-D glucoside of ß sitosterol, ß sitosterol, and ceryl alcohol were also isolated from the stem by Gupta *et al.*(1967). ß sitosterol, y-Sitosterol, ceryl alcohol, sclerostin, cleresterol, and clerodendrin were isolated from the root by Joshi *et al.* (1979). Anam (1999) Isolated a-L-rhamnopyranosyl-(1-2)-a-D-glucopyranose-7-0-naringin-4-0-a-D glucopyranoside-5-methyl ether from the root. The flavonoids are the compounds that are mainly present in *Clerodendrum* species and it is also responsible for biological activities.

Ethnomedical Uses

Ethno-medical importance of various parts of *Clerodendrum phlomidis* has been reported in various systems of medicines. It is used to treat several inflammatory diseases and arthritis in the Indian traditional system and folk medicine, (Babu 2011). The leaves of *Clerodendrum phlomidis* are used along with other plants for inflammation and are effective in treating bronchitis, headache, weakness, drowsiness, and digestive problems. Roots and leaf extracts of *Clerodendrum phlomidis* roots have been reported as a tonic, diuretic, febrifuge, anti-diabetic, anti-inflammatory, antidiarrheal, and antitussive. (Nadkarni *et al.* 1982., Chaturvedi *et al*. 1983., Rani *et al*. 1999).

Anti-Inflammatory Activity

A decoction of leaves of *Clerodendrum phlomidis* is used along with other plants for inflammation. The aqueous and alcoholic leaf extract shows a decrease in the size of the swelling caused due to inflammation. In the Indian traditional system and folk medicine *Clerodendrum phlomidi*s is used to treat several inflammatory diseases. Various studies have shown the anti-inflammatory activity of *Clerodendrum phlomidis.* Surendra Kumar (1988) reported a significant decrease in paw edema induced by carrageenan in rats at a dose of 1g/kg. The aqueous and alcoholic leaf extract-treated group showed a decrease in the size of the swelling following certain initial fluctuations and reduction in suppuration especially in speed of general drying up of pus. (Krishnamurthy *et al.* 1972).
Hepatoprotective activity:

Ethyl acetate extract of aerial parts of *Clerodendrum phlomidis* showed a significant hepatoprotection against paracetamol-induced hepatotoxicity in the albino rat. The extract of aerial parts in ethyl acetate was found to reduce serum total bilirubin, SALP, SGPT, and SGOT levels and liver homogenate LPO, SOD, CAT, GPX, GST, and GST levels. The treated animal group clearly showed normal hepatic cells and central veins in histological observations (Vineet *et al*.2011). The reversal of activity of various key enzymes biochemically towards normal values indicates the

protective role of *Clerodendrum phlomidis* against manganese toxicity in rats reported by Prakash (2012). *Gokani et al. (2011)* reported inhibition of lipid peroxilation in the liver homogenate by extract of *Clerodendrum phlomidis* root.

Anti-Arthritic Activity

The anti-arthritic activity of *Clerodendrum phlomidis* has been studied by Killmozhi *et al* (2009). They have shown an ethanolic extract of Clerodendrum phlomidis and indomethacin significantly suppressed the swelling of the paws of rats. Verma (2011) reported the action of Clerodendrum phlomidis to stabilize the lysosomal membrane and to cure arthritis in rats.

Anti-Oxidant Activity

Powder of dried root drug (200g) was extracted using methanol and methanolic extract of the roots was evaluated for its in-vitro antioxidant activity. Gokani *et al*. (2011) reported remarkable antioxidant activity of the extract in all the assays. Satish *et al* (2012) reported antioxidant activity of the root of *Clerodendrum phlomidis.*

Analgesic Activity

Methanolic and ethyl acetate extract of *Clerodendrum phlomidis* at the dose of 200mg/kg exhibited significant analgesic activity in mice, it has been reported first time by Vijayamirtharaja *et al.* (2011). An ethanolic extract of leaves of *Clerodendrum phlomidis* was evaluated for analgesic activity in albino mice (Srinivasan *et al.* 2007).

Anti-Asthmatic Activity

Leaves extract and aqueous extract of *Clerodendrum phlomidis was f*ound beneficial in the treatment of asthma and related conditions, (Vadnere *et al.,* 2007). The root bark was also reported useful in asthma (Singh,1980). Anti-microbial activity:

A number of species from the genus Clerodendrum were documented in ancient text for their microbial action. Pectolinarigenin and chalcone glucoside isolated from the leaf of *Clerodendrum phlomidis* showed antifungal activity (Roy *et al.*, 1995). The ethyl acetate and hexane extracts of leaves of *Clerodendrum phlomidis* showed antifungal activity against plant and human pathogens and it is found more effective in plants (Anita *et al.* 2006).

Antimalarial Activity

Because of the presence of a bitter principle, studies with different parasites have shown antimalarial activities of *Clerodendrum* The alcoholic extract of *Clerodendrum phlomidis* showed antimalarial activity against *Plasmodium falciparum* with an IC value of 48µg/ml (Simonsen *et al.* 2001).

Anti-Diabetic Activity

Clerodendrum phlomidis have been reported to have anti-diabetic activities, a decoction of entire *Clerodendrum phlomidis* plants has been reported to have anti-diabetic activity (Chaturvedi *et al.* 1983). They reported a dose of 1g/kg showed antidiabetic effects in epinephrine and alloxan-induced hyperglycemia in rats and it also showed antihyperglycemic activity in human adults at a dose of 15-30g/day. Significant lowering of fasting blood sugar and improvement of polydipsia and polyuria were reported by Chaturvedi *et al*. (1983) in a 70-year-old diabetic patient. *Clerodendrum phlomidis* might be a good hypoglycemic agent. The hypoglycemic

activity in *Clerodendrum phlomidis* has been recorded by Pande (1978).

Other biological activities of *Clerodendrum phlomidis*

Besides the aforesaid role in a number of pathological and diseased conditions, *Clerodendrum phlomidis* also plays an important role in a number of different conditions. It shows nematicidal activity against a root-knot nematode (Sharma *et al*., 2002). A methanolic extract of roots was evaluated by Gokani, *et al* .(2007) for specific immune responses in albino mice. A high immune response has been observed in the study. Studies have revealed that alcoholic leaf extract works variously as analgesic, antidiarrhoeal, antiplasmodial. The aqueous extract has anti-asthmatic, antifungal, and anti-arthritic activities. As it is bitter and pungent, it is reported to cure Kapha and Vata dosa (Chaturvedi *et al*. 1983). *Clerodendrum phlomidis* is also reported to be used in agriculture, the root is mentioned in the application of various tree disorders (Nene 2006). *Clerodendrum phlomidis s*hows antihypertensive, and sedative properties (Singh *et al*. 1980). *Clerodendrum phlomidis* is also used in veterinary practices to cure diarrhea, worms in cattle, and swelling of the stomach (Kirtikar *et al,*1975, Watt G., 1889, Anjana *et al*., 2002). Extract of leaves is also used to kill lice in domestic animals. *Clerodendrum phlomidis* has been proven in systems of health care for the treatment of a variety of disorders. *Clerodendrum phlomidis* also acts as a tranquilizer, depressant, muscle relaxant in experimental mice and rats .Moreover, psychopharmacological effects of *Clerodendrum phlomidis* have also been observed in experimental mice and rats (Murugesan *et al*. 2001). Clerodendrum phlomidis is used in the treatment of gonorrhea and as an astringent (Rani *et al,* 1999). The plant has been tested on various models, no ill effects have been recorded so far, (*Murugesan et al. 2001). Clerodendrum phlomidis* is used in the treatment of gonorrhea and as an astringent (Rani *et al,* 1999). Studies on plants have shown no ill effects so far.

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