ISSN No: 0976-5921
Published online at https://ijam.co.in

International Journal of Ayurvedic Medicine, Supplement of International Conference on Ayurveda-Yoga-Nathpanth - 2025

Pharmacological and Traditional Applications of Medicinal Plant *Clerodenderum phlomidis (Agnimantha)*: A Comprehensive Review

Review Article

Anjali Rai[1], Sunil Kumar[1*], Ramachandra Reddy K[2]

1. Department of Biotechnology, Faculty of Allied Health Sciences, Mahayogi Gorakhnath University Gorakhpur, Arogya Dham, Balapar Road, Sonbarsa, Gorakhpur-273007, Uttar Pradesh, India.
2. Department of Rasa shastra and Bhaishajya Kalpana, Faculty of Ayurveda, Institute of Medical Sciences, Banaras Hindu University, Varanasi-221005, UP, India.

Abstract

The World Health Organization (WHO) reports that approximately 80% of the population in developing countries depends on traditional herbal remedies for their primary healthcare. *Clerodendrum phlomidis* or Agnimantha in Ayurveda belonging to the Lamiaceae family, is a crucial ingredient in the Ayurvedic formulation Dashamoola, a blend of ten roots that enhances vitality and promotes overall health. Traditionally, various parts of this plant—roots, stems, leaves, and flowers—are used in Indian and Chinese medicine to treat ailments such as inflammation (Shotha), diabetes (Prameha), fevers (Jwara), gonorrhoea (Upadamsha), and obesity (Sthaulya). Research has focused on isolating its chemical constituents, leading to the identification of 283 compounds, including monoterpenes, sesquiterpenes, diterpenoids, flavonoids, and glycosides, which exhibit a wide range of pharmacological activities, including anti-inflammatory, antimicrobial, antioxidant, anticancer, hepatoprotective, hypoglycemic, and neuroprotective effects.The roots and leaves are traditionally used as astringents, stimulants, and antibacterial agents, treating conditions such as fever, cold, headaches, asthma, and allergies. Agnimantha includes two main types: Laghu Agnimantha (*Premna integrifolia*) and Brihat Agnimantha (*Clerodendrum phlomidis*), both of which hold significance in modern and traditional medicine.Overall, this review underscores the plant's substantial medicinal value, consolidating its importance in health and wellness based on traditional knowledge and contemporary research findings.

Keywords: *Agnimantha,* Medicinal value**,** Phytochemical constituents, Pharmacological activity, Ayurveda, Traditional medicine.

Introduction

Throughout history, medicinal plants have been central to healthcare practices, particularly in developing regions where modern medicine may not always be accessible. The World Health Organization (WHO) reports that about 80% of people in these areas still rely on traditional plant-based medicines for their primary healthcare needs (1). Among these medicinal plants, *Clerodendrum phlomidis* from the family Lamiaceae holds a special place in Ayurvedic medicine**.***Clerodendrum phlomidis* is a key ingredient in "Dashamoola," a revered Ayurvedic formulation that has been used for centuries to promote vitality and well-being (2,3). Traditionally, various parts of the plant—such as the roots, leaves, stems, and flowers—have been employed to treat a broad range of ailments, including inflammation, arthritis, diabetes, digestive issues, and respiratory disorders. Its therapeutic potential has long been acknowledged in both Indian and Chinese systems of medicine (2).Recent scientific studies have begun to validate many of these traditional uses. Phytochemical investigations have uncovered over 283 bioactive compounds in *Clerodendrum* species, including monoterpenes, flavonoids, diterpenoids, and glycosides (4). These compounds have demonstrated powerful pharmacological properties, such as anti-inflammatory, antioxidant, antimicrobial, and antidiabetic activities, making the plant a valuable subject for modern research (5).

In Ayurveda, *Clerodendrum phlomidis* is revered as "Agnimantha," known for its ability to balance the Kapha and Vata doshas, which are thought to be responsible for a variety of physical and mental health conditions. Despite the presence of substitutes like *Premna integrifolia* and *Premna mucronata*, *Clerodendrum phlomidis* remains the preferred species in many traditional formulations due to its wide range of therapeutic actions (6).

As scientific interest in ethnopharmacology grows, the potential for *Clerodendrum phlomidis* to be incorporated into modern medicine is becoming increasingly clear. This review explores the botanical characteristics, chemical composition, and medicinal properties of this important plant, compiling both

*** Corresponding Author:**

Sunil Kumar
Professor & Dean, Department of Biotechnology
Faculty of Allied Health Sciences,
Mahayogi Gorakhnath University Gorakhpur,
Arogya Dham, Balapar Road,
Sonbarsa, Gorakhpur-273007, Uttar Pradesh, India.
Email Id: sunilsbt@gmail.com

traditional knowledge and modern research findings to offer a comprehensive look at its role in human health.

Regional names of *Clerodendrum phlomidis*

The plant *Clerodendrum phlomidis* is known by various names across different Indian languages. In Sanskrit, it is referred to as *Agnimantha, Gandhapushpa, Nadeyi, Jayanti, and Tarkari*. In Marathi, it is called *Arani, Arni, Airanamula, Takalimula, and Tekar*, while in Hindi, it is known as *Arni, Piran, Pirun, and Urni*. The Tamil language uses names like *Takkari, Thalangi, Thalludhalai, Sayandi, Taludalai, Tirugdalai, and Vadamadakki* for the plant. In Telugu, it is called *Nelli, Taluki, Takko-lamu*, and *Tekkali*. Malayalam names for the plant include *Munja, Peruvelum, and Tirutalai*, whereas in Bengali, it is known as *Arni, Ganiyari, and Goniari*. In Kannada, the plant is called *Taggi and Taggi-Beru*, while in Gujarati, it is referred to as *Aranimula, Arni, and Irun*. In Oriya, the plant is called *Hontari and Ganiary,* while in Santali, it is known as *Panjot*. In Sindhi, it is called *Gharyat*, and in Las Bela (Balochistan), it is referred to as *Tankar*. (7–11)

Botanical description of *Clerodendrum phlomidis*

The anatomy of *Clerodendrum phlomidis* reveals significant features across its various parts.

Root

It showcases an exfoliating cork with 10-15 layers of tangentially elongated, thin-walled cells. The secondary cortex is composed of round to oval parenchymatous cells, some containing rhomboidal crystals of calcium oxalate. The secondary phloem consists of isodiametric, thin-walled parenchyma, with distinct phloem rays made of radially elongated cells. The secondary xylem is broad, featuring lignified elements, and vessels that occur both singly and in groups, alongside xylem parenchyma with simple pits and abundant starch grains measuring 6-17 µm in diameter (12).

Leaf

The leaf structure is dorsiventral, with one to three layers of palisade cells and both glandular and non-glandular hairs. Stomata are of the cruciferous type (13).

Flower

The flower is moderately sized, fragrant, and arranged in small dichotomous axillary cymes that form a rounded terminal panicle. The bracts are either obovate or lanceolate and acute. The calyx measures over 1 cm in length and is divided halfway down into ovate segments that are acutely acuminate and veined. The corolla is either white or pinkish, with a tube length of 2-2.5 cm, slightly pubescent on the outside and glabrous inside. The lobes are nearly equal and exceed 6 mm in length. The filament is slightly pubescent below, and both the ovary and style are glabrous (11).

Stem

The stem is characterised as straight, unbranched, cylindrical, measuring 9 cm in length and 2.5 cm in diameter, with an uneven surface marked by irregularly interconnected, axially elongated ridges (14).

Distribution

Clerodendrum phlomidis is a common shrub of arid plains, low hills and tropical deserts. They are distributed throughout the drier parts of India (Andhra Pradesh, Uttar Pradesh, Diu Island, Delhi, Gujarat, Haryana, Karnataka, Madhya Pradesh, Maharashtra, Bihar, Orissa, Punjab, Rajasthan, Tamil Nadu, Uttar Pradesh and West Bengal) , Pakistan (Sindh, Baluchistan and north-western provinces), Sri Lanka, Myanmar (7,11,15,16).

Propagation and cultivation

It can be propagated through seeds and root suckers and thrives in various soil types. In its natural habitat, it typically grows in wastelands, along riverbanks, and beside railway tracks (13).

Substitutes

In the Ayurvedic pharmacopeia of India, *Clerodendrum phlomidis* Linn. is recognized as Agnimantha, while *Premna integrifolia* Linn. and *Premna mucronata* Roxb. are regarded as substitutes (17).

Chemical constituents

- **Root :** β-sitosterol, γ-sitosterol, ceryl alcohol, clerodin (C24H34O7), clerosterol (C29H48O) and clerodendrinA (C27H26O17)7 . α-L-rhamnopyranosyl- (1→2)-α-D-glucopyranosyl-7-O-naringin-4′-O-α-D-glucopyranoside-5- methyl ether (C34 H44 O19) (18).
- **Stem :** D-mannitol, β-D-glucoside of β-sitosterol, β-sitosterol and ceryl alcohol (19).
- **Aerial parts:** Lup-20 (29)-en-3-triacontanoate ($C_{60}H_{108}O_2$), tetratriacontanol and 24β-ethylcholesta-5, 22E,25-triene3β-ol were reported isolated from aerial parts (9).
- **Leaves:** A crystalline non-glucoside bitter principle ($C_{17}H_{16}O_6$), ceryl alcohol, β-sitosterol, γ-sitosterol, palmitic acid, cerotic acid and an unidentified sterol ($C_{28}H_{48}O$)11. Scutellarein (5,6,7,4′-tetrahydroxy flavones), pectolinaringenin (6,4′-dimethoxy scutellarein) and a flavanone. A chemotaxonomic marker of the genus, (24S)- ethylcholesta-5,22,25-triene-3β-ol ($C_{29}H_{46}O$) was isolated from the leaf (13). Chalcone glycoside (4,2′,4′-trihydroxy-6′-methoxychalcone-4,4′α-D-diglucoside m.p.186— 188 °C, $C_{28}H_{34}O_{15}$), pectolinarigenin, 7-hydroxy flavone and 7- hydroxy flavanone 7-O-glucoside (18).
- **Flowers:** 6,4′-dimethyl-7-acetoxyscutellarein, pectolinarigenin, hispidulin, apigenin and luteolin15 . Chalcone glycoside (4,2′,4′-trihydroxy-6′-methoxychalcone-4,4′α-D-diglucoside, $C_{28}H_{34}O_{15}$), pectolinarigenin, 7-hydroxy flavone and 7-hydroxy flavanone 7-O-glucoside (18).
- The stem, leaf and flower parts were reported positive for alkaloids, saponins and tannins (20).

ISSN No: 0976-5921
Published online at https://ijam.co.in
International Journal of Ayurvedic Medicine, Supplement of International Conference on Ayurveda-Yoga-Nathpanth - 2025

- **Leaf oil** : terpinen-4-ol (25.92%); caryophyllene (26.71%) and beta-bisabolene (18.10%) as the major and phytol (5.08%) as the minor constituent (21).

Ethnomedicinal uses of parts of *Clerodendrum phlomidis*

Clerodendrum phlomidis, commonly known as Arni, holds significant ethnomedicinal value, particularly in Ayurvedic and traditional medicinal systems. Indigenous communities have long used various parts of this plant to treat a range of ailments. The roots, stems, and leaves are known for their therapeutic properties, being used in remedies for ailments such as fever, inflammation, digestive disorders, and respiratory issues.Some of them are given in Table 1.

Table 1: Ethnomedicinal uses of different parts of *Clerodendrum phlomidis*

PARTS	ETHNOMEDICINAL USES	Ref.
Root (22)	• 12 to 24 gas decoction is used in Sotha (inflammation, swelling), Pandu (jaundice), Arsa (haemorrhoids, piles), Vibandha (constipation), Agnimandya (slowness of digestion, dyspepsia), Adhmana (swelling of the body), Gulma (a chronic enlargement of the spleen or any glandular enlargement in the abdomen), Mutrakrcchra (painful discharge of urine, a class of urinary affections) and Mutraghata (urinary disease). • Used as bitter tonic, antidote, analgesic, anti-asthmatic; for inflammatory diseases and in rheumatism. • Used as bitter tonic, for nervous disorder and in debility	11, 23, 24
Root Bark	• Used in cough, asthma, cold, anaemia, oedema and nervous disorders	22, 25
Root and Root Bark	• Used as alterative, bitter tonic, and is given in the convalescence of measles by natives of Western India	10, 16
Root decoction	• Used as aromatic, astringent and as demulcent in gonorrhea	10, 24
Root juice	• Used to reduce over-corpulence.	26
Whole plant	• Used as hypoglycemic	27, 28
Whole plant	• Used for ailments involving swellings, joint pains and inflammation • The properties are quoted same as those of Premna integrifolia but *Clerodendrum phlomidis* is considered better in inflammation. • The tribes "Santals" rub the plant over their bodies in dropsy. • The tribals "Sahariya" use the plant in fever, postnatal complaints, dyspepsia, colic and anthrax. • Used in colic, body-ache, diarrhoea, cholera, dysentery, dyspepsia, fever, headache, post natal fever, stomach ache, during convalescence from measles and specially used for mental diseases	29 - 31
Whole plant decoction	• Used to treat diabetes	32
Whole plant and root	• Used as bitter tonic and for neglected syphilitic complaints	8
Leaf	• Used as a remedy to treat diabetes in southern parts of India especially tribals of Nilgiris • Used in fever due to sunstroke and malaria • Grinded leaves are given in stomach pain, digestive disorders, eye complaints, lung diseases, rheumatism, asthma, inflammatory diseases • Locally tied for the treatment of Guinea worms	24, 33-35
Leaf juice	• Used to treat mental tension in Tamil Nadu	36
Leaf and Leaf juice	• Used as bitter tonic, alternative and prescribed in neglected syplitic complaints in dose of half an ounce or twice daily in southern India	10, 22, 37
Leaf decoction	• Used for inflammation, and is effective in treating bronchitis, headache, weakness, drowsiness and digestive problems.	10
Leaf and Root	• Used for body-ache, headache and unconsciousness.	38
Aerial parts	• The tribals "Sahariya" apply the paste on body joints for about a month to reduce pain or stiffness of joints.	39

Pharmacological actions of *Clerodendrum phlomidis* according to Ayurvedic Science

Dosha Karma: *Clerodendrum phlomidis* possesses *Ushna Virya* (hot potency), making it effective in pacifying Kapha and Vata doshas. Consequently, it is recommended for treating conditions arising from these doshas.

Systemic Actions (Sansthanika Karma):

- **External Application (Bahya)**: Due to its hot potency, it alleviates edema (*Shotha*) and pain (*Vedana*), making it suitable for managing external swelling and discomfort (40)
- **Digestive System (Pachana Sansthana)**: Its *Ushna Virya* properties enhance digestion (*Dipana*), promote digestion of toxins (*Pachana*), and aid in regulating bowel movements (*Anulomana*). It is thus indicated for conditions like loss of appetite (*Agnimandya*), toxin buildup (*Amadosha*), and constipation (*Vibandha*) (40)
- **Circulatory System (Raktavaha Sansthana)**: *Agnimantha* acts as a blood purifier (*Raktashodhaka*), cardiac stimulant (*Hridayottejaka*), and anti-inflammatory (*Shothahara*), making it beneficial for treating blood disorders (*Raktavikara*), cardiac weakness (*Hridaya Daurbalya*), and edema (40).
- **Respiratory System (Shwasana Sansthana)**: Its Kapha-pacifying properties make it useful in treating Kapha-related respiratory conditions (40).
- **Urinary System (Mutravaha Sansthana)**: It acts as a remedy for urinary disorders, including diabetes (*Pramehaghna*), and is used in the treatment of urinary diseases such as *Prameha* (diabetes) (40).
- **Antipyretic Action (Tapakrama)**: Known for its antipyretic properties (*Jwaraghna*), *Agnimantha* is used to manage fevers (*Jwara*) (40).
- **Rejuvenative and Restorative (Satmikarana)**: Due to its *Katu Pausthika* (pungent and nourishing) properties, it is recommended for post-fever recovery, general weakness, and anemia (*Pandu*) (40).

Parts Used: The juice from leaves (*Patra Swarasa*), bark (*Twak*), root (*Moola*), and root bark (*Moola Twak*) are utilized for medicinal purposes.

Dosage:

- Leaf juice: 10-20 ml
- Powder (*Churna*): 1-3 grams
- Decoction (*Kwatha*): 50-100 ml

Types (Bheda): There are two types of *Agnimantha*: *Kshudra Agnimantha* and *Brihat Agnimantha (40).*

Pharmacological actions of *Clerodendrum phlomidis* according to Modern science

Antiinflammatory activity

Aerial Parts

In the carrageenin-induced paw edema model, the aerial parts of *Clerodendrum phlomidis* at doses of 200 and 400 mg/kg significantly reduced paw edema by 34.02% and 26.80%, respectively, 4 hours after carrageenin administration. The study demonstrates that the chloroform extract of *Clerodendrum phlomidis* exhibits a notable anti-inflammatory effect in albino rats, with results comparable to the standard drug phenylbutazone (41,42).

Leaves

In a cotton pellet-induced granuloma model, the ethanol extract of *Clerodendrum phlomidis* at 100, 200, and 400 mg/kg inhibited granuloma formation by 22.29% , 33.03%, and 48.07% respectively. Hexane and chloroform extracts did not show significant inhibition (43)

In adjuvant-induced arthritis, *Clerodendrum phlomidis* ethanol extract reduced foot swelling and redness in a dose-dependent manner, inhibiting arthritic swelling by 51.71%, 57.58%, and 62.48% at 100, 200, and 400 mg/kg, respectively ($p < 0.005$). Indomethacin showed 68.75% inhibition. Treated animals also showed a dose-dependent increase in body weight over 28 days. The extract reduced lysosomal enzymes (acid phosphatase and cathepsin D) and plasma protein-bound carbohydrates while lowering proinflammatory cytokine levels and serum marker enzymes significantly, compared to adjuvant control animals. (43)

In a carrageenan-induced inflammation model, hexane and chloroform extracts of *Clerodendrum phlomidis* showed moderate inhibition of edema at 400 mg/kg by 30.66% and 36.23% at the third hour, increasing at the fifth hour Ethanol extracts at 100, 200, and 400 mg/kg demonstrated stronger inhibition, with up to 53.31% at the third hour and 65.15% at the fifth hour. The reference drug inhibited edema by 60.27% and 71.42% at the third and fifth hours, respectively) (43)

The study aimed to assess the anti-inflammatory and anti-arthritic activities of *Clerodendrum phlomidis* leaves, traditionally used for treating these conditions. Bioactivity-guided fractionation led to the isolation of a novel compound, 3-hydroxy, 2-methoxy-sodium butanoate. This compound significantly reduced paw edema in carrageenan and FCA-induced arthritis models. It also lowered lysosomal enzymes, protein-bound carbohydrates, and plasma acute phase proteins, while decreasing pro-inflammatory cytokines (TNF, IL-1, IL-6) in the joints in a dose-dependent manner. Histopathological data supported its anti-arthritic potential. This is the first report of this bioactive compound (44)

Carrageenan-induced paw edema is a widely used model for screening anti-inflammatory activity, involving the release of proinflammatory mediators like histamine, serotonin, kinins, and prostaglandins in a biphasic response. The first phase (60 min) releases histamine and serotonin, while the second phase is mediated by prostaglandins and kinins. Oral administration of petroleum ether (200 and 400 mg/kg), ethyl acetate, and alcoholic extracts (400 mg/kg) significantly reduced paw edema in rats at 1, 2, 3, 4, and

ISSN No: 0976-5921
Published online at https://ijam.co.in
International Journal of Ayurvedic Medicine, Supplement of International Conference on Ayurveda-Yoga-Nathpanth - 2025

6 hours compared to controls in carrageenan, serotonin, and histamine-induced edema models (45)

Root Bark

Clerodendrum phlomidis (CP) exhibited moderate anti-inflammatory activity, with the intermediate dose (21.6 ml/kg) showing the most significant effects. In the pedal inflammation model, this dose reduced oedema by 132.48 ± 4.99, significantly lower than the vehicle control (157.43 ± 13.59, $p < 0.05$), and was comparable to standard drugs like aspirin and DA. While no dose-dependent trend was observed, the intermediate dose consistently performed better than the low and high doses. Additionally, CP significantly reduced granuloma formation at the intermediate (50.38%) and high doses (46.83%, $p < 0.01$), with a greater reduction than aspirin (40.78%) and DA (41.73%), though not statistically significant (46)

Antiarthritic activity

Leaves

The anti-arthritic effects of orally administered ethanolic extract of *Clerodendrum phlomidis* were evaluated in Wistar albino rats with Freund's adjuvant-induced arthritis. Treatment with the extract at doses of 250 and 500 mg/kg corrected the weight loss associated with arthritis. Paw swelling during the secondary lesion phase was significantly reduced by the extract, a finding supported by radiographic analysis. Additionally, changes in Hind Limb Bone Mass (HLBM) were measured using a photo densitometer and aluminium step wedge, revealing a significant reduction in HLBM with both doses of the extract, comparable to the effect of the standard drug Indomethacin (10 mg/kg) (47)

The study evaluated the antiarthritic activity of *Clerodendrum phlomidis* leaf extracts on FCA-induced arthritis in rats. Petroleum ether (PECP), ethyl acetate (EACP), and alcoholic extracts (ACP) were administered orally at doses of 100, 200, and 400 mg/kg from day 13 to 21. Key parameters such as body weight, arthritic score, paw volume, and ankle diameter were assessed. Significant improvements, including increased body weight and reductions in arthritic score, paw volume, and ankle diameter, were observed in the PECP (200 and 400 mg/kg), EACP, and ACP (400 mg/kg) groups.Hematological results further confirmed the antiarthritic activity, showing improved Hb and RBC counts, and reduced WBC, ESR, CRP, and TNF alpha levels. The findings suggest that *Clerodendrum phlomidis* leaves have significant antiarthritic effects in rats (48)

Antioxidative activity

Leaves

The antioxidant activity of the methanol leaf extract was evaluated using the DPPH free radical scavenging assay at doses of 31.25, 125, 500, and 1000 µg/mL. The extract exhibited significant antioxidant activity, with an IC50 value of 71.64 µg/mL. GC-MS analysis revealed several compounds in the extract, many of which are known for their medicinal properties, including antioxidant activity (49)

The study aimed to isolate antioxidant compounds from the methanol extract of *Clerodendrum phlomidis* leaves. Nine compounds were isolated and characterized using various techniques. Among them, compound 6 (3,6,7-trihydroxy-2-(3-methoxyphenyl)-4H-chromen-4-one) and compound 9 (isopropyl linoleate) exhibited strong antioxidant activity, with IC50 values of 63.16 µg/mL and 61.13 µg/mL, respectively, as determined by the DPPH free radical scavenging assay. These results suggest significant antioxidant potential in these isolated compounds (50)

Root

The study aimed to estimate the total phenolic and flavonoid content and evaluate the in-vitro antioxidant activity of various extracts from the root of *Clerodendrum phlomidis*. The ethanolic extract demonstrated the most significant free radical scavenging activity compared to other extracts, with higher amounts of phenols and flavonoids. The antioxidant activity was concentration-dependent. Ongoing research is focused on isolating constituents from the extract and exploring their biological activities (51)

Acetylcholinesterase inhibitory activity

Leaves

Clerodendrum phlomidis (CP) leaf extracts were studied for their phytochemical composition, antioxidant properties, and acetylcholinesterase (AchE) inhibition. Leaf powder was prepared, and alcoholic and hydroalcoholic extracts were analysed using gas chromatography. In vitro assays showed that the extracts scavenge free radicals, with FRAP assay results of 215.20 µg/ml (alcoholic) and 288.70 µg/ml (hydroalcoholic), and DPPH results of 167.70 µg/ml (alcoholic) and 347.19 µg/ml (hydroalcoholic). AchE inhibition was dose-dependent, with inhibition observed at 250 µg/ml. These findings suggest CP extracts may help reverse cholinergic deficits in neurological diseases (52)

Hepatoprotective activity

Leaves

The study found that SGOT, SGPT, ALP, and Serum Bilirubin levels significantly decreased in animals treated with *Clerodendrum phlomidis* (CP) extracts (Leaves>Root >Stem) and CCl_4 compared to those given CCl_4 alone, indicating reduced liver damage. Histopathological studies confirmed hepatic damage in CCl_4-treated animals, showing centrizonal necrosis, focal necrosis, and ballooning. In contrast, animals treated with CP extracts exhibited only mild ballooning and binucleate cells, indicating liver regeneration. The leaves of CP were the most effective in providing hepatoprotection. These findings suggest that CP has antioxidant and hepatoprotective properties against CCl_4-induced liver damage in rats (53)

Crude extract

The antihepatotoxic activity of chloroform, petroleum ether, and methanol fractions of *Clerodendrum phlomidis* whole plant was evaluated through biochemical parameters and histopathological studies against carbon tetrachloride-induced toxicity. Histopathological analysis of the liver in CCl_4-treated rats revealed swelling and necrosis of hepatocytes. Treatment with the various plant fractions significantly reduced hepatocyte necrosis and swelling. The biochemical parameters further confirmed the significant antihepatotoxic effects of these fractions (54).

Hypoglycemic activity

Root Bark

The study examined the effect of hydroalcoholic bark extract of *Clerodendrum phlomidis* (CPE) on blood glucose levels (BGL) in diabetic rats. The diabetic control group (DCG) showed a significant increase in BGL compared to the normal control group (NCG). Treatment with 200 mg/kg of CPE significantly reduced BGL at various time intervals with the maximum effect observed at 4 hours post-dosing, indicating prolonged glycemic control. However, 100 mg/kg of CPE did not significantly reduce BGL, and the hypoglycemic effect was not dose-dependent. The results suggest that 200 mg/kg of CPE effectively controls blood sugar in diabetic rats (55).

Stems

The methanolic and ethyl acetate extracts of *Clerodendrum multiflorum* stems were evaluated for their in-vitro alpha-amylase inhibitory activity and hypoglycemic effects through oral administration at varying doses in rats. Both extracts demonstrated strong alpha-amylase inhibitory activity compared to the standard drug acarbose. Additionally, oral administration of the extracts at a dose of 200 mg/kg body weight showed significant hypoglycemic effects in normal rats and antihyperglycemic activity in alloxan-induced diabetic rats (56).

Antifeedant, larvicidal and growth inhibitory activities

The study demonstrated that chloroform extract fractions from *Clerodendrum phlomidis* exhibited significant antifeedant and larvicidal activities, effectively reducing the adult emergence of *Earias vittella*. These findings suggest that the active fraction from the chloroform extract has potential for developing a novel pesticidal formulation for insect pest management programs. (57)

Anti-obesity activity

Roots

The roots of *Clerodendrum phlomidis* are traditionally used in Dibrugarh, Assam, to treat obesity. This study evaluated the anti-obesity effects of methanolic extract of *Clerodendrum phlomidis* (MECP) in models of cafeteria diet (CD) and progesterone-induced obesity. In the CD model, MECP (400 mg/kg) suppressed weight gain, reduced fat storage, and lowered triglyceride and cholesterol levels while increasing HDL cholesterol. MECP also improved hyperglycemia, hyperinsulinemia, dyslipidemia, and fat cell hypertrophy. In the progesterone model, MECP reduced hyperphagia in a dose-dependent manner. The anti-obesity effects are likely due to β-sitosterol, saponins, and flavonoids in MECP, which suppress appetite and inhibit fat absorption. This is the first report showing *Clerodendrum phlomidis* can ameliorate insulin resistance and visceral obesity (58)

Anti-amnesic activity

Root Bark

Clerodendrum phlomidis root bark was studied for its nootropic potential in mice. Aqueous extracts (100 and 200 mg/kg) were administered for 6 days, and memory was assessed using behavioral models. The extract significantly improved short- and long-term memory, reversing amnesia induced by scopolamine, diazepam, and aging. It also reduced brain acetylcholinesterase levels, suggesting enhanced cholinergic function. These findings indicate that *C. phlomidis* bark may be useful in treating cognitive disorders like amnesia and Alzheimer's disease (59)

Antimicrobial activity

Leaves

The n-hexane and dichloromethane extracts of *Clerodendrum phlomidis* were found to reduce the mean fluorescence intensity in Bacillus licheniformis, indicating a disruption of membrane potential. This suggests that the antibacterial mechanism involves damaging the membrane integrity. Among the two extracts, the dichloromethane extract was more potent in disrupting the membrane potential, providing significant evidence of its stronger antibacterial activity (60)

Among the 15 fungal strains which were Fluconazole and Clotrimazole resistant, seven were susceptible to the petroleum ether and ethyl acetate extracts. Petroleum ether extract showed the highest zone of 13±0.00 mm against Trichophyton rubrum, followed by ethyl acetate which showed a zone of inhibition of 11±0.00 mm and 10±0.25 mm against A. niger and Scedosporium sp. respectively. The study concludes that petroleum ether and ethyl acetate extracts of *Clerodendrum phlomidis* leaves are potent sources of antimicrobial compounds effective against multidrug-resistant organisms (61).

Root

Clerodendrum phlomidis has demonstrated significant antibacterial activity, particularly in its ethyl acetate and ethanol root extracts, which are effective against *Staphylococcus aureus* and *Bacillus subtilis*. The ethanolic extract showed the highest activity against all tested bacteria, including *Klebsiella pneumoniae*, though petroleum ether and aqueous root extracts lacked antibacterial properties (62)

The ethanol extract at 106.66 µg/ml demonstrated significant antimicrobial activity against *Escherichia*

ISSN No: 0976-5921
Published online at https://ijam.co.in
International Journal of Ayurvedic Medicine, Supplement of International Conference on Ayurveda-Yoga-Nathpanth - 2025

coli, showing the highest sensitivity with a 15.33 mm zone of inhibition. The chloroform extract also exhibited strong activity against *Staphylococcus aureus* with a 14.67 mm inhibition zone. Among the isolated compounds, Ethyl-2-hydroxy-4-methyl benzoate showed superior antimicrobial activity compared to 3,6,7-trihydroxy-2- (3-methoxyphenyl)-4H-chromen-4-one and phenyl acetic acid, particularly against *Staphylococcus pyogenes* and *Candida albicans*, with a 9 mm zone of inhibition at 60 µg/ml (63)

Stem and Leaves

Methanolic and acetone extracts from combined stems and leaves were tested against five Gram-positive bacteria, seven Gram-negative bacteria, and three fungi using the agar diffusion method. While the acetone extract showed no activity, the methanolic extract inhibited the growth of *Citrobacter freundii* and *Staphylococcus epidermidis*. Additionally, ethyl acetate and hexane extracts of leaves and stems, at a concentration of 1 mg/ml, were evaluated against human and plant pathogens using the poison plate technique. The hexane leaf extract exhibited greater activity than the stem extract against both types of pathogens (64)

Aerial Parts

The aerial parts of the plant were successively extracted using petroleum ether, chloroform, ethyl acetate, and methanol, in order of increasing polarity. The dried extracts were tested for anthelmintic activity against *Pheretima posthuma* (earthworms), with their paralysis and death times compared to the standard drug albendazole. Both the ethyl acetate and methanol extracts demonstrated anthelmintic activity comparable to albendazole (65)

Anti-asthmatic activity
Leaves

The ethanol extract of *Clerodendrum phlomidis* leaves significantly reduced contractions at 100 mg/ml in isolated guinea pig ileum, inhibiting histamine-induced bronchoconstriction. At a dose of 400 mg/kg (orally), it notably extended the latent period of convulsions after exposure to histamine aerosol, offering 59.04% protection at the 4th hour, compared to 65.04% protection provided by the standard drug chlorpheniramine maleate at 1 mg/kg orally (66)

Immunomodulatory activity
Roots

Oral administration of methanol extracts from *Clerodendrum phlomidis* and *Premna integrifolia* roots (300 mg/kg for 7 days) in mice prior to immunization with Sheep Red Blood Cells (SRBC) resulted in a significant increase in haemagglutinating antibody titre, plaque-forming cell assay, and delayed-type hypersensitivity to SRBC. *C. phlomidis* exhibited stronger specific immune activity compared to *P. integrifolia*. Both plants also enhanced non-specific immune responses in the carbon clearance test and demonstrated significant immunoprophylactic effects against *E. coli*-induced abdominal sepsis. While *C. phlomidis* showed a higher response in specific immune activity, both roots exhibited nearly equal responses in non-specific immune activity (67)

Anti-diarrhoeal activity
Leaves

(1)The methanolic extract, at doses of 200, 400, 600, and 800 mg/kg, was tested in albino rats (Wistar strain, 180-200 g, both sexes) for its effects on castor oil-induced diarrhoea, gastrointestinal motility, and prostaglandin E2-induced enteropooling. At doses of 600 and 800 mg/kg, the extract significantly reduced defecation frequency and slowed the propulsion of the charcoal meal through the gastrointestinal tract. Additionally, it showed significant inhibition of prostaglandin E2-induced enteropooling at nearly all dose levels (68)

Conclusion

Clerodendrum phlomidis, an integral plant in traditional medicine, particularly in Ayurveda, has demonstrated significant therapeutic potential. Revered as Agnimantha, it is a key ingredient in the renowned Ayurvedic formulation Dashamoola and has been used for centuries to treat a wide range of ailments, including inflammation, diabetes, fevers, and digestive disorders. Modern pharmacological studies have validated many of these traditional uses, revealing its anti-inflammatory, antimicrobial, antioxidant, hepatoprotective, and antidiabetic properties.The plant's diverse chemical profile, consisting of flavonoids, terpenoids, glycosides, and other bioactive compounds, underpins its broad-spectrum pharmacological actions. Its ability to alleviate conditions associated with Kapha and Vata doshas, as well as its systemic benefits for the digestive, circulatory, and respiratory systems, further highlight its medicinal significance. Additionally, *Clerodendrum phlomidis* shows promise in contemporary healthcare for treating lifestyle disorders such as diabetes and cardiovascular conditions.

Given the extensive use of *Clerodendrum phlomidis* in folk medicine and its growing relevance in modern pharmacological research, this plant holds vast potential for the development of novel therapeutics. Further studies focusing on its phytoconstituents, clinical efficacy, and potential adverse effects will be instrumental in harnessing its full medicinal potential. *Clerodendrum phlomidis* stands as a bridge between traditional knowledge and modern science, offering immense value in the quest for effective, plant-based remedies for today's health challenges.

References

1. Ekor M. The growing use of herbal medicines: Issues relating to adverse reactions and challenges in monitoring safety. Vol. 4 JAN, Frontiers in Neurology. 2014.
2. Raja MKMM, Mishra SH. Isolation, characterization and thin-layer chromatography method development of clerosterol palmityl ester: A

chemical marker for standardization of leaves of *Clerodendrum phlomidis*. Journal of Chinese Integrative Medicine. 2012;10 (1).

3. Jameel M, Ali A, Ali M. Extraction and isolation of new compounds from traditional herbal medicine; *Clerodendrum phlomidis* Linn. Futur J Pharm Sci. 2017;3 (2).
4. Mohan Maruga Raja MK, Mishra SH. Comprehensive review of *Clerodendrum phlomidis*: A traditionally used bitter. Vol. 8, Journal of Chinese Integrative Medicine. 2010. p. 510–24.
5. Wang JH, Luan F, He XD, Wang Y, Li MX. Traditional uses and pharmacological properties of Clerodendrum phytochemicals. Vol. 8, Journal of Traditional and Complementary Medicine. 2018.
6. Rabb UN. Critical review on Agnimantha (*Premna integrifolia* Linn and *Clerodendrum phlomodis* Linn).. 2022;
7. Premila MS, Conboy L. Ayurvedic Herbs: A Clinical Guide to the Healing Plants of Traditional Indian Medicine. The Journal of Alternative and Complementary Medicine. 2007;13 (8).
8. Shafi MS, Ashraf MY, Sarwar G. Wild Medicinal Plants of Cholistan Area of Pakistan. Pakistan Journal of Biological Sciences. 2000;4 (1).
9. Pandey R, Kaur R, Malasoni R, Gupta MM. Lupeol ester from *Clerodendrum phlomidis* L. Indian Journal of Chemistry - Section B Organic and Medicinal Chemistry. 2008;47 (3).
10. Nadkarni K NA. . Indian Materia Medica . 1976;1:799. Vol. 1976;1:799. Popular Prakashan Pvt. Ltd., Bombay; 1976.
11. Dr. Kirtikar KR and Basu BD. Indian Medicinal Plants. Edn 2. Vol. Vol. III. Deharadun: International Book Distiributors; 1975.
12. The Ayurvdic Pharmacopoeia of India. 2nd ed. Vol. Part-2, Vol 1. New Delhi: Govt. of India, Ministry of Health & Family welfare; 2007. 4.
13. Yelne MB DTBKCB. Database of Medicinal Plants Used in Ayurveda, Vol. 7. Central Council for Research in Ayurveda and Siddha. 2005:452-75. . Central Council for Research in Ayurveda and Siddha. 2005;7 (:452-75.).
14. Kumar M HSAQKKSL. Ethnobotanical Study Of The Wild Edible Plants From Odisha_ India 2013 Jul 1;41:13-. Life Sciences Leaflets. 2013 Jul; (1;41:13).
15. Pandey R et al. Lupeol ester from *Clerodendrum phlomidis* L. Indian J Chem. 2008; (47B (3) : 470-472).
16. Watt G. A dictionary of the economic products of India. Vol 2. Calcutta: 1889: 374. . Vol. Vol 2. Calcutta: The Superintendent of Government Printing.; 1889.
17. The Ayurvedic Formulary of India . Edn 2,Part 1. Vol. 3. New Delhi: Govt. of India, Ministry of Health and Family welfare; 2000.
18. Anam EM. Novel flavanone and chalcone glycosides from Clerodendron phlomidis (Verbanaceae) . Indian J Chem. 1999; (38B (10) : 1307-1310):1307–10.
19. Gupta SK et al. Chemical examination of *Clerodendron phlomidis* . Indian J Pharm. 1967; (28 : 102).
20. Hungund BL et al. A survey of plants in Gujarat, India, for alkaloids, saponins and tannins. 1971; NE-201: 1-11. USDA Forest Service Research Paper. 1971; (NE-201: 1-11.).
21. Katekhaye SD et al. Identification of constituents of the essential oil isolated from leaves of *Clerodendrum phlomidis* Linn. by GC-MS. . International Journal of Phytothearpy Research. 2012; (2 (1):14-28).
22. Khare CP. Indian Medicinal Plants. New York: Springer. 2007: 169. . Springer. 2007;169.
23. The Ayurvedic pharmacopoeia Of India. New Delhi Government of India. 2001: 3-4. The Ayurvedic pharmacopoeia Of India. . Government of India 2001: 3-4. Part 1. Vol 3. (2001: 3-4.).
24. Katewa SS CBJA. Folk herbal medicines from tribal area Of Rajasthan, India. J Ethnopharmacol. 2004; 92 (1) : 41-46. . India J Ethnopharmacol 2004; 92 (1) : 41-46. 2004;92 (1) :41-46.
25. Singh VP SSKVS. Medicinal plants from Ujjain district, Madhya Pradesh — part 2 Indian drugs Pharma Ind. 1980; 15 (5) : 7-12. Indian drugs Pharma Ind. 1980;15 (5) (2):7–12.
26. Manohar M. Ayurveda for all: effective Ayurvedic self-cure for common and chronic ailments. New Delhi: Pushtak Mahal Publishers. 2005 : 84 85. . NewDelhi: Pushtak Mahal Publishers.; 2005. 84–85 p.
27. Marles RJ FNR. Antidiabetic plants and their active constituents. Phytomedicine. 1995;2 (2):137–89.
28. Krishnamurthy KH. Botanical identification of Ayurvedic medicinal plants: a new method of pharma- colinguistics. A preliminary account. Indian J Med Res. 1971;59 (1):99–103.
29. Krishnamurthy KH MPGN. The nature of the confusion in the botanical identity of Agnimantha and pharmacology of one claimant viz. , *Clerodendron phlomides* L. . J Res Indian Med. 1972;7 (1):27-36.
30. Nair R V. Controversial drug plants. Hyderabad. Hyderabad: Orient Longman Pvt Ltd.; 2004. 8–9 p.
31. Puri HS. Indian medicinal plants used in elixirs and tonics. . Pharma Biol. 1970;10 (2):1555–66.
32. Mishra LC DSMMRNSB. Scientific basis for Ayurvedic therapies . . Florida: CRC Press; 2003. 105–106 p.
33. Dhanabal SID MMRNSB. Antidiabetic activity of *Clerodendron phlomoidis* leaf extract in alloxan-induced diabetic rats. Indian J Pharm Sci. 2008; (70 (6)):841–4.
34. Pandey CN RBMSSH. Medicinal plants Of Gujarat. Gandhinagar Ecological Education and Research (GEER) Foundation. 2005 : 156 . . Ecological Education and Research (GEER) Foundation. 2005;156.
35. Anonymous. The useful plants of India. New Delhi: Publication and Information Directorate, CSIR; 1992. 132 p.

36. Murugesan T SKLSRGTK. Evaluation Of psychopharmacological effects Of *Clerodendrum phlomidis* Linn. extract. Phytomedicine. Vol. 8 (6). 2001. 472–476 p.
37. Anjaria J PMBGKR. Nature heals: a glossary Of selected indigenous medicinal plants of India. . Ahmedabad; 2002. 21 p.
38. Patil MV PDA. Ethnobotany of Nasik district, Maharashtra. . Daya Books: Daya Books.; 2006. 112 p.
39. Anis M SMIM. Herbal ethnomedicine of the Gwalior forest division in Madhya Pradesh, India. Pharma Biol. 2000; 38 (4): 241-253. Pharma Biol. 2000;38 (4):241–53.
40. Rajendran R, Krishnakumar E. Anti-arthritic activity of *Premna serratifolia* Linn., wood against adjuvant induced arthritis. Avicenna J Med Biotechnol. 2010;2 (2).
41. Vijayamirtharaj R, Vincent S, Senthilkumar N. Anti-inflammatory activity of chloroform extract of aerial part of *Clerodendrum phlomidis* Linn. Res J Pharm Biol Chem Sci. 2011;2 (1).
42. Mohan Maruga Raja MK, Mishra SH. Comprehensive review of *Clerodendrum phlomidis*: A traditionally used bitter. Vol. 8, Journal of Chinese Integrative Medicine. 2010. p. 510–24.
43. Babu NP, Pandikumar P, Ignacimuthu S. Lysosomal membrane stabilization and anti-inflammatory activity of *Clerodendrum phlomidis* L.f.; A traditional medicinal plant. J Ethnopharmacol. 2011;135 (3).
44. Prakash Babu N, Saravanan S, Pandikumar P, Bala Krishna K, Karunai Raj M, Ignacimuthu S. Anti-inflammatory and anti-arthritic effects of 3-hydroxy, 2-methoxy sodium butanoate from the leaves of *Clerodendrum phlomidis* L.f. Inflammation Research. 2014;63 (2).
45. Patel RV JRBJO. Evaluation of antinociceptive and anti-inflammatory activity of crude extracts of *Clerodendrum phlomidis* (L.) leaves in laboratory animals. Bull. Env. Pharmacol. Life Sci. 2020 Sep 10;9:49-59. Bull Env Pharmacol Life Sci. 2020 Sep;10;9:49-59.
46. Parekar RR, Dash KK, Marathe PA, Apte AA, Rege NN. Evaluation of Anti-Inflammatory Activity of Root Bark of *Clerodendrum phlomidis* in Experimental Models of Inflammation. Int J Appl Biol Pharm. 2012;3 (2).
47. Kilimozhi D, Parthasarathy V, Amuthavalli N. Effect of *Clerodendrum phlomidis* on adjuvant induced arthritis in rats - A radiographic densitometric analysis. Int J Pharmtech Res. 2009;1 (4).
48. Ravi V. Patel1 RJ and JOBSmtNMP. Antiarthritic Activity of crude extract of *Clerodendrum phlomidis* (l.) Leaves in FCA induced arthritis in rats ,pharmacy college.
49. Kumaradoss M, Maruga Raja M, Jainab NH, Mohan MK, Raja M. In Vitro Cytotoxic, Antioxidant and GC-MS Study of Leaf Extracts of *Clerodendrum phlomidis*. Article in International Journal of Pharmaceutical Sciences and Research. 2017;8 (10).
50. ANTIOXIDANT STUDY OF ISOLATED CHEMICAL CONSTITUENTS FROM METHANOL EXTRACT OF THE *CLERODENDRUM PHLOMIDIS* LEAF . World J Pharm Res. 2017 Jan;6 (12):1122-1133 (10.20959/wjpr201712-9784).
51. Sathish M, Tharani CB, Niraimathi V, Kumar DS. In-vitro antioxidative activity of phenolic and flavonoid compounds extracted from root of *Clerodendrum phlomidis* (linn.). Int J Pharm Pharm Sci. 2012;4 (1).
52. Marimuthu S, Gurav AM, Prasad GP. Phytochemical Identification of *Clerodendrum phlomidis* Linn. by GC-MS Analysis and its Acetylcholinesterase Inhibitory Activity. Pharmacognosy Res. 2022;14 (2).
53. Kondalkara SA KAPAK. Preliminary study on antioxidant and hepatoprotective activity of *Clerodendrum phlomidis* (L) against CCl. 2014;
54. Verma A, Ahmed B. Anti-hepatotoxic activity of *Clerodendrum phlomidis*. Int J Pharmtech Res. 2009;1 (4).
55. Anis S SR. Evaluation of Hypoglycemic Activity of Bark Extracts of *Clerodendrum phlomidis*.
56. Sneha JACS. Alpha-Amylase Inhibitory and Hypoglycemic Activity of Clerodendrone Multiflorum Linn.Stems . Asian Journal of Pharmaceutical and Clinical Research ER. 2011 Apr 1;4:99–102.
57. Muthu C, Baskar K, Ignacimuthu S. Antifeedant, larvicidal and growth inhibitory activities of fractions from *Clerodendrum phlomidis* Linn. F. against bhendi fruit borer Earias vittella Fab. Archives of Phytopathology and Plant Protection. 2015;48 (6).
58. Chidrawar VR, Patel KN, Shiromwar SS, Kshirsagar AD. Exploiting anti-obesity mechanism of *Clerodendrum phlomidis* against two different models of rodents. International Journal of Green Pharmacy. 2011;5 (3).
59. Joshi H, Megeri K. Antiamnesic evaluation of C. phlomidis Linn. bark extract in mice. Revista Brasileira de Ciencias Farmaceuticas/Brazilian Journal of Pharmaceutical Sciences. 2008;44 (4).
60. Sirohi P YASN. Inhibitory mechanism of n-hexane and dichloromethane leaf extracts of *Clerodendrum phlomidis* linn. On food born pathogen bacillus licheniformis Journal Of Plant Development Sciences Vol. 2019;11 (9):501-10. Journal Of Plant Development Sciences. 2019;11 (9):501-10.
61. Hepsibah AH, Mala M, Jothi GJ. ANTIMICROBIAL ACTIVITY AND TLC PROFILING OF *CLERODENDRUM PHLOMIDIS* LINN. F LEAF EXTRACT AGAINST MULTI-DRUG RESISTANT CLINICAL PATHOGENS. Int J Pharm Pharm Sci. 2017;9 (9).
62. Suple VD. Evaluation Of Antibacterial Activity In *Clerodendrum phlomidis* Linn. And *Clerodendrum Infortnatum* Linn.

63. Sathish M, Priyadarsini R, Sunitha PG, Saraswathy T. Antimicrobial activity of the extracts and isolated compounds of *Clerodendrum phlomidis*. Int J Pharm Pharm Sci. 2013;5 (4).
64. Anitha R, Kannan P. Antifungal activity of *Clerodendrum inerme* (L). and *Clerodendrum phlomidis* (L). Turkish Journal of Biology. 2006;30 (3).
65. Vincent S, Vijayamirtharaj R, Wilson P, Saravanan B, Jeevanatham P, Ramesh R. Anthelmintic potential of aerial part of *Clerodendrum phlomidis* linn. Res J Pharm Biol Chem Sci. 2011;2 (2).
66. Shareef U, Prakash P. A COMPREHENSIVE REVIEW OF *CLERODENDRUM PHLOMIDIS*. Certified Journal | Shareef et al World Journal of Pharmaceutical Research [Internet]. 2023;12 (11):1125. Available from: www.wjpr.net
67. R. H. Gokani et al. Evaluation of Immunomodulatory Activity of *Clerodendrum phlomidis* and *Premna integrifolia* Root International Journal of Pharmacology 2007;3 (4):352-356. International Journal of Pharmacology 2007;3 (4):352-356. 2007;3 (4):352-356.
68. Rani S, Ahamed N, Rajaram S, Saluja R, Thenmozhi S, Murugesan T. Anti-diarrhoeal evaluation of *Clerodendrum phlomidis* Linn. leaf extract in rats. J Ethnopharmacol. 1999;68 (1–3).

*****