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Traditional Uses and Pharmacological Activities of Agnimantha (Clerodendrum Phlomidis)

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ABSTRACT

Clerodendrum phlomidis (Linn.)- commonly known as Agnimantha in Ayurveda is a medicinally important shrub of the family Lamiaceae, widely distributed in tropical and arid regions of India and neighboring countries. Traditionally, various parts of the plant have been utilized in indigenous systems of medicine for treating ailments such as diabetes, inflammation, asthma, rheumatism, fever, and urinary disorders. The plant forms an essential component of the Ayurvedic formulation Dashmoola, valued for balancing Vata and Kapha doshas. Phytochemical investigations reveal the presence of diverse bioactive compounds, including flavonoids, terpenoids, sterols, glycosides, and alkaloids, contributing to its broad pharmacological profile. Experimental studies confirm its antioxidant, anti-inflammatory, analgesic, antimicrobial, antidiabetic, antiarthritic, anti-asthmatic, antihepatotoxic, and immunom, odulatory properties. Morphological and histochemical analyses further differentiate Clerodendrum phlomidis from substitute species such as Premna serratifolia and Premna mollissima. This comprehensive review highlights the ethnomedicinal relevance, phytochemical diversity, and pharmacological potential of Clerodendrum phlomidis, supporting its continued exploration as a source of novel therapeutic agents.

Keywords:- *Clerodendrum phlomidis antimicrobial agent, Calms Kapha and Vata Doshas, Analgesic effect*

INTRODUCTION

Medicinal plants are valuable natural resources widely used in traditional and modern medicine. Due to increasing microbial resistance to antibiotics, researchers are exploring plant-based antimicrobials as alternative therapeutics. Many pharmaceutical industries depend on plants for bioactive compounds. Clerodendrum phlomidis (family Lamiacea**e**) is a common shrub found in tropical and arid regions, including India**,** Pakistan**,** Sri Lanka**,** and parts of South and East Asia**.** In India, it is distributed across Andhra Pradesh, Karnataka, Madhya Pradesh, Delhi, Gujarat, Haryana, Tamil Nadu, Punjab, Rajasthan, Orissa, Bihar, Maharashtra, West Bengal, and Uttar Pradesh. As per the ancient Indian Ayurvedic medicine system "dashmool" is incredibly strong ten distinct roots combined contain root of *Clerodendrum phlomidis* (Arni). It increases physical vitality and sustains good health. Numerous studies have documented the Clerodendrum biological activities *Clerodendrum Phlomidis*. Numerous studies have been discovered to report its operations on diabetes, inflammation, neurological disorders, digestive issues, rheumatism, asthma, urinary issues, etc. According to reports, aqueous extracts were effective as an antiplasmodial, antidiarrheal, and analgesic mild tranquilizers, hypoglycemic, anti-nematicidal, antifungal, asthmatic, and anti-arthritic The pulp that is produced by crushing the when swelling occurs, leaves are applied externally. The plant's leaves are used to treat rheumatism as well as antimicrobial properties. The leaf extracts are useful for reducing inflammation, weakness, gastric issues, and arthritis. Additionally, it is stated to possess antidiabetic, diuretic, antimicrobial, antidiarrheal, and antioxidant hepatoprotective and antiasthmatic properties. The plant exhibits a variety of activities in veterinary [(2)].

Discussion Systematic Exploration of Various Pharmacological Effects alongside their Formulation [3]

Taste - sweet,pungent,astringent,bitter
Potency -hot
Effect on dosha-Calms Kapha and Vata Doshas
Quality -dry,light

DESCRIPTION [5]

Description of *Clerodendrum pholmidis* from a botanical perspective important charactristics are revealed by the anatomy *of clerodendrum phlomdis* in all of its parts.

Root- The root exhibits an exfoliating cork made up of 10 to 15 layers of thin-walled, tangentially elongated cells. Some round to oval parenchymatous cells within the secondary cortex contain rhomboidal crystals of calcium oxalate. The isodiametric, thin-walled parenchyma that constitutes the secondary phloem has distinct phloem rays formed by radially elongated cells. Alongside this, the secondary xylem is broad and possesses lignified elements and vessels that may be found singly or in clusters, along with xylem parenchyma containing simple pits and numerous starch grains that vary in diameter from 6 to 17 micrometers.

A Leaf- The leaves measure 3.8-6.3 cm by 3.2-3.8 cm, are ovate or nearly rhomboidal with obtuse or acute tips, and have coarsely crenate-dentate or somewhat entire margins that are wavy. They are smooth on the upper side and slightly hairy on the underside, with a base that is truncate or somewhat heart-shaped; the petioles range from 6 to 20 mm in length.

Flower- The flower comprises small, dichotomous axillary cymes that create a rounded terminal panicle surrounding the fragrant, moderately sized flower. The bracts are acute and can be either lanceolate or obovate. The calyx is over 1

cm long, segmented into ovate, acutely acuminate, veined segments halfway down. The corolla, with a tube length of 2 to 2.5 cm, is either pink or white, glabrous on the inside and slightly pubescent on the outside. The lobes exceed 5 mm in length and are nearly

Stem- The cylindrical, straight, unbranched stem is 9 cm long and 2.5 cm is diameter. Its uneven surface is dotted with ridges that are auxillary elongated and irregularly connected.

Distribution- A common shrub found in low hills, tropical desert, and arid plains is *clerodendrum phlomidis.* They can be found in Pakistan (Sindh ,Baluchistan ,and Northwest provinces),Shri lanka, Myanmar,and the drier regions 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).

DISCUSSION SYSTEMATIC EXPLORATION OF VARIOUS PHARMACOLOGICAL EFFECTS ALONGSIDE DIFFERENT PART OF *CLERODENDRUM PHLOMIDIS* [4].

Table 1:*-Therapeutic uses of different part of clerodendrum phlomidis*[6]

Root	In Sotha (inflammation, swelling), Pandu (jaundice), Arsa (haemorrhoids, piles), Vibandha (constipation), Agnimandya (dyspepsia, slow digestion), Adhmana (body swelling), Gulma (chronic splenic enlargement or any glandular enlargement in the abdomen), Mutrakrcchra (painful urine discharge, a class of urinary affections), and Mutraghata (urinary disease). In rheumatism, inflammatory diseases, neurological disorders, and debility, it is used as a bitter tonic, antidote, analgesic, and anti-asthmatic.
Root bark	used to treat nervous disorders, oedema, anemia, colds, coughs, and asthma
Root decoction	Used to treat gonorrhea as a demulcent, astringent, and aromatica
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
Leaf	Used to treat diabetes in southern India, particularly among the Nilgiri tribes; used to treat fever from sunstroke and malaria; ground leaves are used to treat eye complaints, lung diseases, rheumatism, asthma, and inflammatory diseases; and used locally to treat guinea worms.
Leaf and leaf juice	In South India, half an ounce or twice a day is used as a bitter tonic, alternative remedy, and prescription for neglected syphilis
Leaf decoction	It reduces inflammation and works well for bronchitis, headaches, weakness, sleepiness, and digestive issues.
Aerial parts	To lessen joint pain or stiffness, the tribal people known as "Sahariya" apply the paste to their bodies for approximately a month
Leaf juice	Used to treat mental tension in Tamil Nadu

PHARMACEUTICAL PROSPECTS (3)

Anti-oxidant Activity:- Three distinct in vitro techniques were used to assess the free radical scavenging activity of extracts from the roots of Clerodendrum phlomidis. These were produced by sequential extraction using different polarities of solvents (Petroleum ether, chloroform, ethyl acetate, and ethanol): Superoxide anion radical scavenging, DPPH radical scavenging, and total antioxidant capacity. Compared to the other three extracts, the ethanolic extract exhibited the best free radical scavenging efficacy. Scavenging activity (IC50 = 60 µg/ml) outperformed that of regular quercetin (IC50 = 130 µg/ml).

Anti-Inflammatory Properties:- Aerial part - In the carragenin-induced paw edema model, the aerial part of Clerodendrum phlomidis was administered at doses of 200 and 400 mg/kg, resulting in a notable reduction of paw edema by 34.02 % and 26.80% respectively, 4 hours after administration. Research shows that a chloroform extract of Clerodendrum phlomidis demonstrates a notable anti - anti-inflammatory effect in albino rats. Outcomes from two doses are similarly aligned with the standard medication (phenylbutazone).

Root Bark- The aqueous extract of the root from Clerodendrum phlomidis was assessed for its anti-inflammatory properties. A model of acute inflammation, such as carrageenan-induced rat paw edema and acetic acid-induced peritonitis in mice and in the context of chronic inflammation, was evaluated using a cotton pellet granuloma model in rats. The action of clerodendrum phlomidis was in comparison to aspirin and dashmolarishta (a complex herbal formulation that includes clerodendrum phlomidis, which acted positive control. Clerodendrum phlomidis, at a dosage of 21.6 ml/kg, demonstrated a substantial anti-inflammatory effect.

Analgesic effect:- Intraperitoneal administration of methanolic and ethyl acetate extract from the aerial part of *clerodendrum phlomidis* in the hot plate test (200mg/kg) and the acetic acid induced abdominal constriction test (200mg/kg) demonstrated significant results. Pain relieving effect, *clerodendrum phlomidis* showed a notable concentration of sterols, saponin glycosides, and flavonoids. The flavonoids are recognized for their anti-inflammatory properties by blocking the cyclooxygenase involved in production of inflammatory prostaglandings.

Antimicrobial effect: -

Root-

Ethanol extract at 106.66µg/ml demonstrated a notable effect against Escherichia coli, which was noted as the most susceptible (15.33 mm). Chloroform extract exhibited significant antimicrobial effects against Staphylococcus aureus, demonstrating a zone of suppression of 14.67mm. Among the separate compounds, Ethyl-2-hydroxy-4-methyl benzoate exhibits favorable antimicrobial effectiveness compared to 3,6,7-trihydroxy-2-(3-methoxyphenyl)-4H-chromen-4-one and Phenyl acetic acid, towards Staphylococcus pyogenes and Candida albicans, displaying a zone of inhibition measuring 9mm each at a concentration of 60µg/ml.

Stem and leaves -

Extracts of methanol and acetone from combined stems and leaves were tested against five Gram-positive bacteria and seven Gram-negative bacteria, and three species of fungi using an agar diffusion technique, respectively. The acetone extract was not active, whereas the methanolic extract demonstrated inhibitory effects against Citrobacter freundii and

Staphylococcus epidermidis. Ethyl acetate and hexane extractions from leaves and stems at a concentration of 1 mg/ml were tested against human pathogens and plant pathogens through the poison plate technique, respectively. The leaf extract (especially the hexane extract) proved to be more effective than the stem extract against both pathogens.

Aerial section:-
The plant's aerial sections were extracted sequentially with petroleum ether, chloroform, ethyl acetate, and methanol, a solvent based on their ascending polarity. Desiccated Extracts were evaluated for anthelmintic properties using Pheretima posthuma as a species of earthworm for comparison paralysis duration and mortality duration with the standard medication albendazole.

Anti-arthritic effect: -
The oral administration of ethanolic extract from Clerodendrum phlomidis exhibits an anti-arthritic effect on Freund's adjuvant-induced arthritis has been researched in Wistar albino rats.

Anti-Asthmatic Properties: -
Ethanol extract from the leaves of Clerodendrum phlomidis showed a notable percentage reduction in contraction at 100mg/ml in the isolated guinea pig ileum setup, histamine histamine-triggered bronchoconstriction in guinea pigs. It markedly extended the latent phase of seizures after exposure to histamine aerosol at the dosage of 400mg/kg (oral administration), exhibiting a peak protection of 59.04% at the 4th hour when compared to Chlorpheniramine. Maleate (Standard) 1mg/kg, (by mouth). This provided the highest protection of 65.04% at the fourth hour.

Antihepatotoxic effect:-
Antihepatotoxicity of the chloroform, petroleum ether, and methanol fractions of Anti-arthritic. The pulp that is produced by crushing the leaves when swelling occurs is applied externally. The plant's leaves are used to treat rheumatism as well as have antimicrobial properties. The leaf extracts are useful for reducing inflammation, weakness, gastric issues, and arthritis. Additionally, it is stated to possess antidiabetic, diuretic, antimicrobial, antidiarrheal, antioxidant, hepatoprotective and antiasthmatic properties.

Anti-obesity action:-
Alcoholic and methanolic extracts of *Clerodendrum* roots' ability to prevent obesity Phlomidis was tested against obesity brought on by a 13-week high-fat diet. One group of C57BL/6J female mice was fed a regular chow diet to assess the *Clerodendrum phlomidis's* impact on food consumption, body weight fluctuations, and digestive enzymes activity, thermogenesis, lipid metabolism, adiposity diameter, and fat pad histology. Compared to alcoholic extract, methanolic extract demonstrated a potent anti-obesity effect.

Antidiarrhoeial action:-
The methanolic extract at doses of 200, 400, 600, and 800 mg/kg was assessed for castor oil-induced effects diarrhea, gastrointestinal motility, and enteropooling induced by prostaglandin E2 in albino rats (Wistar strain, 180 to 200 g, any gender. The extract also notably suppressed prostaglandin E2-triggered enteropooling at nearly all the dosage levels.

Immunomodulatory effect:-
Oral ingestion of methanol extracts from *Clerodendrum phlomidis* administration of roots (300 mg/kg x 7 days) to mice before immunization with Sheep Red Blood Cells (SRBC) led to a notable rise in haemagglutinating antibody titre, plaque-forming cell assay, and delayed-type hypersensitivity to SRBC. *Clerodendrum phlomidis* demonstrated greater specific immune activity than *P. integrifolia*.

Clerodendrum. phlomidis *Premna Integrifolia* improved the nonspecific immune response in carbon clearance testing and demonstrated notable. immunoprophylactic impact, when evaluated on E. coli induced abdominal sepsis. In the current research, C. phlomidis exhibited a stronger reaction to particular immune responses than *Premna integrifolia*, both roots exhibited a nearly identical immune response.

Anti-Amnesic Effect:-

The aqueous extract of *Clerodendrum phlomidis*, at doses of 100 and 200 mg/kg, was given orally for 6 consecutive days both juvenile and older mice. Exteroceptive behavioral frameworks like the elevated plus maze and passive avoidance paradigms were used to assess short-term and long-term memory, respectively. Scopolamine [0.4 mg/kg, administered intra Peritoneal (i.p.) administration of diazepam (1 mg/kg, i.p.) was used to create amnesia in mice. To describe the process by the nootropic action of *Clerodendrum phlomidis* was assessed by measurement its impact on brain acetyl cholinesterase levels. Piracetam (200 mg/kg, i.p.) served as a reference nootropic compound. *Clerodendrum phlomidis* pretreatment (100 and 200 mg/kg, p.o.) For 6 consecutive days notably improved learning and memory in mice. It negated the memory loss caused by scopolamine, diazepam, and natural aging. It likewise lowered the levels of acetyl cholinesterase in the entire brain.

THERAPEUTIC USES OF AGNIMANTHA [6]

- Agnimantha aids in addressing the subsequent health issues.
- Disorders associated with Vata (conditions connected to the nervous and musculoskeletal systems)
- Inflammatory conditions
- Rheumatoid joint inflammation
- Low blood iron levels
- hemorrhoids
- Frequent cold
- Nerve pain
- Difficulty in bowel movements
- Decreased appetite
- Different types of fevers – scarlet fever (scarlatina), measles, smallpox, varioloid rashes, and Erysipelas
- Diabetes mellitus
- Abnormal lipid levels
- uricaria (Sugar in urine)
- Respiratory Problems and asthma
- Frequent cough

CONCLUSION

Clerodendrum phlomidis, an important medicinal plant from the Lamiaceae family, carries substantial ethnopharmacological significance in traditional medicinal practices like Ayurveda. Commonly referred to as Agnimantha, it constitutes a vital part of various Ayurvedic formulations, such as Dashmoola. The plant shows various pharmacological effects confirmed by both conventional use and contemporary scientific research. Different components of the plant—roots, leaves, and aerial parts—exhibit a wide range of therapeutic effects such as antioxidant, anti-inflammatory, analgesic, antimicrobial, anti-diabetic, anti-arthritic, anti-asthmatic, hepatoprotective, immunomodulatory, and anti-obesity properties.

Phytochemical studies indicate that *Clerodendrum phlomidis* includes various bioactive substances like flavonoids, sterols, glycosides, and diterpenoids, enhancing its extensive pharmacological capabilities. Its pharmacognostic traits and anatomical characteristics assist in accurate identification and distinction from related species such as *Premna serratifolia* and *Premna mollissima*.

In summary, *Clerodendrum phlomidis* serves as a significant medicinal resource with encouraging possibilities for drug

discovery and development. Ongoing scientific investigation, incorporating pharmacological validation and clinical studies, may improve its therapeutic uses and facilitate the incorporation of this traditional plant into contemporary pharmacotherapy.

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