



LEUCAS CEPHALOTES (ROTH) SPRENG: REVIEW AT A GLANCE

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ABSTRACT

Leucas cephalotes is an annual herb growing widely in India. It is used as anti-filarial, anti-inflammatory, antioxidant, hepato-protective, antimicrobial & anti-diabetic. The *Leucas cephalotes* (Roth) Spreng whole herb contains new Labdane, Nor Labdane & Abietone-type, Diterpenes named Leucasdins A (1), B (2), C (3), five sterols and eight flavones. The review summaries phytochemical and pharmacological investigations carried out on this plant.

Keywords: *Leucas cephalotes*, Lamiaceae, Diterpenes, Sterols, Flavones etc.

INTRODUCTION

Leucas Cephalotes (Roth) Spreng. syn. *Phlomis cephalotes* belong to family Labiatae or Lamiaceae, commonly known as Spiderwort and Dronapushpi (in Sanskrit). It mainly found in North India as rainy season weed. It used as traditional medicine in Gujarat where it known as 'Kubo or Kubi'. According to Ayurveda it has considered to be stimulant, diaphoretic, insecticidal and emmenagogue action. It is used in psoriasis, scabies, chronic skin eruptions as a blood purifier and eye diseases. It is used as homeopathic drug in the diagnosis of chronic malaria and asthma disease in many parts of India mainly in North India [13-14]. Dronapushpi was evaluated for *in vitro* anti-filarial activity, anti-diabetic activity and hepatoprotective activity [16]. In plant the lauric acid, tridecanoic acid, adipic acid and glutaric acid has been reported. The other constituents are triterpenes, oleanolic acid, sterols and flavones. In the seed oil of Dronapushpi 28% Labellenic acid (Octadeca-5, 6-dienoic acid) has been reported. β -sitosterol has been also isolated from the plant. The volatile compounds of inflorescence and seeds were shown caryophyllene oxide 26.56%, delta-fenchene 12.02%, α -cardinal 2.13%, 1-hepten-3-ol 6.53%, methanol 6.30%, deca hydro naphthalene

5.15% and trans-caryophyllene 4.05% [17-19]. The genus *Leucas* comprises of about 103 Asiatic and African species. The some *Leucas* species are *Leucas aspera* (Wild) Spreng, *L. biflora* (Vahl), *L. linifolia* spreng, *L. lanata* Benth, *L. diffusa* Benth, *L. inflata* Benth, *L. indica* (L.) R.Br, *L. zeylanica* (L.) etc. *L. indica* (L.) R.Br. is mainly found in the Asian countries. Here, a description of phytochemical and pharmacological investigations of *Leucas cephalotes*.

Scientific classification

Domain: - Eukaryota
 Kingdom: - Plantae
 Subkingdom: - Viridiaeplantae
 Phylum: - Tracheophyta
 Subphylum: - Euphyllophytina
 Infraphyllum: - Radiatopes
 Class: - Magnoliopsida
 Subclass: - Lamiidae
 Superorder: - Lamianae
 Order: - Lamiales
 Family: - Lamiaceae
 Genus: - *Phlomis*/ *Leucas*
 Specific epithet: - *Cephalotes*

PROPERTIES AND ACTIONS ^[1]

Rasa : Madhura, Lavana, Katu
Guna : Guru, Ruksha, Tikshna
Virya : Ushna
Vipaka : Madhura
Karma : Kaphahara, Pittakara, Vatakara, Bhedani, Rucya

Important Formulations: Sudarshan churna, Gorochandi vati pleehari vatika, Balarogantaka-rasa, Vishmajvaradi-kshar^[2].

Ayurvedic Therapeutic Uses: Vishamajwara, Kamal, Netrarogani.

Vernacular names ^[3]

Sanskrit	Katumba
Assamese	Dronaphool
Bengali	Bholghasiya
English	Spider wort
Gujrati	Kubo
Hindi	Guma
Kannada	Tumbe
Malayalam	Tumba
Marathi	Tumba
Oriya	Gaisha
Punjabi	Gomobati, Gumma
Tamil	Tumbai
Telugu	Tummi

GEOGRAPHICAL DISTRIBUTION

It is commonly found throughout India, especially as a weed in cultivated lands, road sides and on waste lands at an altitude of 30-100 m high and ascending upto 1,800 metres in the Himalayas. It is also found in Java, Philippines, china, Malaysia and Mauritius. The Guma was commonly found in Himalaya's hilly regions of Nepal, India, Pakistan, Bhutan and Bangladesh. In East Asia it found at an elevation of 1,700 m in Afghanistan to Western China^[4].

MORPHOLOGICAL DESCRIPTION ^[5-6]

It is an erect, scabrous or pubescent, stout annual herb.

Leaves: Yellowish-green, 3-9cm long, 1-2.5cm wide, ovate or ovate-lanceolate, sub-acute, more or less pubescent, crenate, serrate, taste, pungent.

Roots: Cylindrical, zigzag, smooth, along with numerous wiry, fine rootlets size variable, fracture, fibrous and taste is characteristic.

Stem: Light greenish-yellow, surface rough, hairy, quadrangular with four prominent furrows, up to 4mm thick nodes and antinodes distinct, taste slightly bitter.

Inflorescence: Sessile, white, crowded in dense, globose about 2-3.5 cm across, surrounded by numerous foliaceous bracts, thin, lanceolate, acute, ciliate, 1.2-1.5 cm long and 0.3-0.35cm wide.

Fruits: Schizocarpic carcerule, nutlets 3mm smooth, brown.

Flowers: Sessile, floral leaves like the cauline, bracts imbracts, foliaceous, green, thin, membranous.

Seeds: 0.3 cm long and 0.1 cm wide, Oblong, trigonous, smooth, dark brown.

TRADITIONAL USES

Leaves: Leaves paste is used by the Kol tribals of Uttar Pradesh, India on old boils on head. In Rewa district, Madhya pardesh; tribals chewed or massaged the paste of leaves over gums and teeth to cure mouth ulcers and headache^[7]. It was observed that the decoction of leaves with equal amount of *Boerhavia diffusa* used by the tribal pakets of Northern Gujarat, India for the treatment of burning sensation and painful urination. It was reported that leaves paste are used for the treatment of stomachache, Diarrhoea, and for the abdominal colic in Almora district, Uttarakhand^[8]. The leaves are used in many parts of India to prepare a herbal tea, and as a potherbs in Bhaji, Chattisghar, India. Dry leaves are used for the treatment of bleeding and itching piles while smoked with tobacco in 1:3 ratio^[9-10]. The poultices of leaves are applied by the tribes on wounds and sore in Tarkeshwar Sacred Grove, Garhwal, Madhya Pradesh^[11]. Leaves are useful in Chronic rheumatism and its pastes used as traditional herbal medicine for the treatment of snake bite by the inhabitants in southern parts of Tamilnadu, India^[12].

Flowers: Flowers juices in a little honey are used in cold and cough^[13]. Flowers are used for stimulant, expectorant, diaphoretic, expectorant and emmenagogue^[14]. Decoction of flower and leaves with black pepper is given as expectorant and in anthelmintic. Flowers are efficacious against burns^[15]. It was found that paste of flowers and seeds are used by the tribals of Hazaribagh district, Bihar in mustard oil to cure pus formation in the ear. The flowers of *Leucas cephalotes* are used with little powder of Date Palm fruits in curing intestinal catarrh in children.

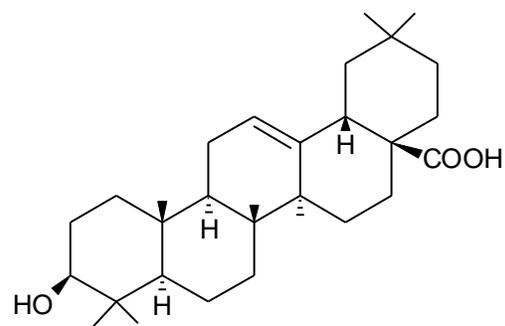
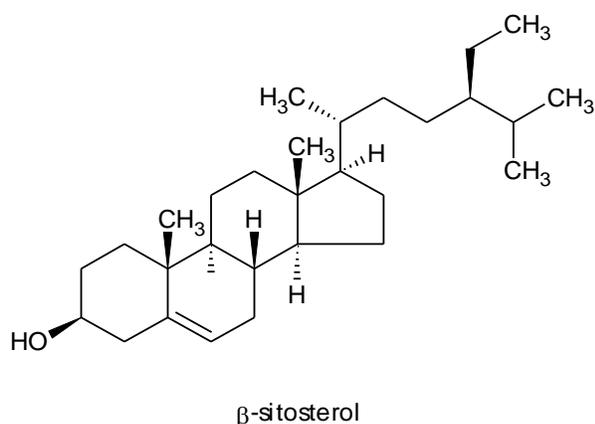
Other uses: The tribal's of the Buldhana district of Maharashtra used dried roots wrapped in a betel leaf to check fever and pneumonia. According to

Ayurveda, the different parts of plants have been used for various ailments. Roots pounded with black pepper are used by the tribals of Almor district in enlarged liver and its parts was used to treat asthma in Jaunpur district, Uttar Pradesh^[16]. The shrubs are useful to check inflammations and cure jaundice and stomach troubles. As per Ayurveda, the Dronapushpi is widely used as a homeopathic drug and used in the treatment of chronic malaria and asthma. The plant is useful in bronchitis, inflammation, asthma, dyspepsia, paralysis and leucoma.

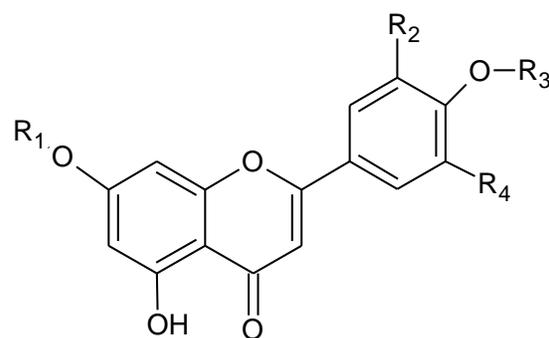
CHEMICAL CONSTITUENTS

Leucas cephalotes (Roth) Spreng whole herb contains new Labdane, norlabdane and abietane type Diterpenes named Leucasins A (1), B(2) and C(3), respectively and two protostane type triterpenes named Leucastrins A (4) and B (5) were isolated, together with a known triterpenes, oleanolic acid, five sterols 7-oxositosterols^[17-18], 7-oxostigmasterol^[18], 7 α -hydroxysitosterol^[19], 7 α -hydroxystigmasterol and stigmasterol^[20] and eight flavones 5-hydroxy-7,4-dimethoxyflavone^[21], pillion, gonzalitosin^[22], tricin^[23], cosmosin, apigenin 7-O-b-D-(6-O-p-coumaroyl) glucopyranoside^[24], anisofolin A and Luteolin 4-O-b-D-glucuronopyranoside^[25]. The structures of 1-5 were determined as (3S,6R-8R,9R,13S,16S)-9,13,15,16-bisepoxy-3,16-diacetoxy-6-formyloxylabdane, (3S,6R)-3-acetoxy-6-formyloxy-iso-ambreinolide, (4R,9S,12R,13R)-12,13-dihydroxyabiet-7-en-18-oic acid, (3S,17S,20S,24S)-3,20-dihydroxy-24-methylprotost-25-en and (3S,17S,20S,24S)-3,20,24-trihydroxyprotost-25-en respectively^[26]. The other constituents of herb present in seed oil are Laballic acid^[27] {octadeca-5,6-dienoic acid} lauric acid, Glutanic acid, Tridecanonic acid, Adipic acid^[28]. β -sitosterols and Stigmasterol is the major constituent found in plant.

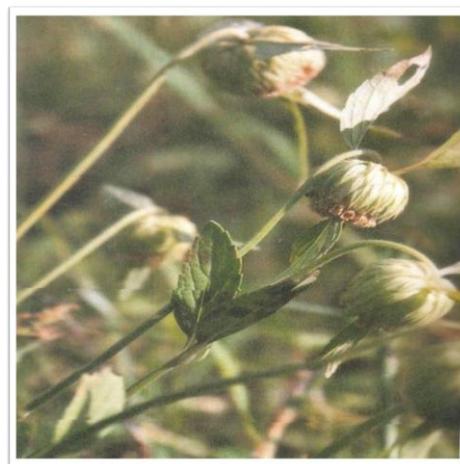
Major Chemical structures



oleanolic acid



Stigmasterol



Leucas cephalotes (Roth) Spreng herb

PHARMACOLOGICAL ACTIVITIES

Hepato-protective activity: Methanolic extract of whole plant was evaluated for hepato-protective activity against carbon tetrachloride induced hepatic damage in rats at a dose of 100 & 200mg/kg body

weight orally once daily for 24 hours. It was reported that marked reduction in lowering serum levels of Serum glutamic oxaloacetic transaminase, Serum glutamic pyruvic transaminase, alkaline phosphatase, total bilirubin, total cholesterol and significant increase in albumin level. The treatment with extract showed significant protective effect in treated groups when compared with control group^[29].

Anthelmintic activity: Pretreatment with alcoholic and aqueous leaves extract of *Leucas cephalotes* was investigated for anthelmintic activity against earthworms (*Pheretima posthuma*) and roundworms (*Ascaridia galli*) at 10-100mg/ml dose of plant extract. They concluded that plant extract exhibited significant anthelmintic activity at higher concentration of 100mg/kg^[30].

Antimicrobial activity: Toluene and methanolic extracts of the powdered plant material were evaluated for antimicrobial activity against bacterial strains (*Bacillus cereus*, *Shigella flexineri*) and fungal strains (*Candida albicans*). The methanolic extract showed wide range of better antimicrobial activity as compared with toluene extract at same doses (5mg/disc). *Leucas cephalotes* methanolic extract showed lesser zone of inhibition on all tested bacterial and fungal strains when compared to the standards^[31].

Antioxidant, analgesic and anti-inflammatory activity: The powdered plant of *Leucas cephalotes* were continuously extracted with methanol. The crude extracts of methanol were tested for their biological activity including antioxidant activity by scavenging effect on DPPH (Diphenyl picryl hydraryl) method. The crude extract of *Leucas cephalotes* showed the IC₅₀ value of 421.3µg/ml. The hot plate methods were employed to evaluate analgesic activity. *Leucas cephalotes* methanolic extract were administered to both young and aged mice at two consecutive doses (200 and 400mg/kg p.o.). It observed that 200mg/kg dose of plant extract show significant (p<0.05) analgesic effect and also

reported that methanolic extract at a dose of 400mg/kg exhibited highest analgesic effect as comparable to the standard pentazocine. In a study, methanolic extract of *L. cephalotes* was studied in wistar albino rats for anti-inflammatory activity at doses of 200 & 400mg/kg body weight p.o in a caarragenan induced oedema test. They reported a reduction in paw volume when compared to control group^[32].

Anti-filarial activity: *Leucas cephalotes* alcoholic extract of flower and stem demonstrated anti filarial activity against both the adult worms and the microfilarial of the *Setaria cervi*^[33].

Anti-diabetic activity: The ethanolic extract of leaves is reported to have antidiabetic, anti hyperlipidemic & antioxidant activity. The administration of ethanolic extract of *Leucas cephalotes* leaves possess anti hyperlipidemic effect in addition to antidiabetic activity at doses of 150, 300 & 450mg/kg body weight. Extract at the dose of 450mg/kg body weight was found to be more potent as comparable to glibenclamide and metformin as an antidiabetic. Dose dependent reduction in plasma glucose level & lipid profile in normal and alloxan, streptozotocin induced diabetic rats with ethanolic leaves extract. However they showed that *Leucas cephalotes* ethanolic extract show IDDM and NIDDM antidiabetic activity^[34].

Antibacterial activity: The organic leaf extract of *Leucas cephalotes* showed significant antibacterial activity against *Staphylococcus aureus*, *Escherichia coli*, *Pseudomonas aeruginosa*, *Proteus vulgaris* and *Klebsiella pneumonia*. *Leucas cephalotes* showed lesser zone of inhibition in all tested pathogenic bacteria when compared with other plant extracts^[35].

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