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THERAPEUTIC POTENTIAL OF LEUCAS CEPHALOTES (ROTH) SPRENG: AN ETHNOMEDICINAL REVIEW

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ABSTRACT

Various tribal communities are reported to reside in Terai region of Uttar Pradesh and Uttarakhand. Tharu tribal community is one of the oldest ethnic community residing in the area. They are equipped with the knowledge of medicinal use of a large number of plant drugs growing in their vicinity in Local Health Traditions and make use of such plants for the conservation and restoration of health of the community. This tribal community is also residing in the Khatima Sub-division of district Udham Singh Nagar of Uttarakhand. An Ethno-medicinal Study was planned and executed to document utilization pattern of medicinal plants and comparative analysis of information with known therapeutic uses described in classical texts of *Ayurveda* and modern pharmacological potential of the plants published in various studies in scientific Journals. *Leucas cephalotes* is one such plant reported to be utilized in local health traditions by tharu tribe in the study area. Present paper is an effort to bring forward the ethno- medicinal wisdom of tribal community in the perspectives of *Ayurveda* and modern scientific studies.

KEYWORDS: *Ayurveda*, Ethno-medicine, Tharu Tribe, *Leucas cephalotes.*

INTRODUCTION

Leucas cephalotes (Roth) Spreng., popularly known as *Dronapushpi* in *Ayurveda* is one of

the medicinal plant which has been unaffected from climatic changes since the period of *Samhita* texts i.e. almost 5000 years. It is a reputed drug in *Ayurveda* being utilized in the preparation of a large number of classical therapeutic formulations. It has been classified in *shak varga* in *Brihattrayi*, the great trio including *Charaka Samhita*, *Sushruta Samhita* and *Ashtanga Hridaya*. In *Ayurveda* it has been reported to be used for the treatment of Jaundice, Anasarca, Bronchial Asthama, Cough and other diseases originating due to vitiation of *Kapha* and *Vata*. The drug has also been reported to be used in the management of various diseases in ethno- medicinal practices among various ethnic groups across India. Tharu tribe and other inhabitants of Khatima sub-division of district Udham Singh Nagar of Uttarakhand use the plant for the treatment of fever and malaria. They also use it for the suppression of fertility. A large number of pharmacological studies have been carried out for the evaluation of pharmacological properties of the drug by modern scholars. Present paper is an effort towards a comprehensive review of the plant drug.

METHODOLOGY

Field survey method

An ethno-medicinal survey of Khatima Sub-division of District Udham Singh Nagar has been under taken. Systematic and frequent field visits and surveys were carried out to study area at regular intervals for collection of data regarding the use of herbal drugs in local health traditions with identification of traditional healers. The traditional healers, elderly men and women were interviewed with the use of a questionnaire as a tool. They were asked to accompany to the forests for in-situ identification of medicinal plants. Information about plants like local names, habitat, mode of administration, route of administration, ethno-medicinal uses in human being and animals were recorded, specimens of the plants were collected and preserved for herbarium preparation. In order to rule out dubious outcomes, the plant specimens of plant species were collected in flowering and fruiting stage. Specimens of plants were collected, numbered, documented, and preserved. Plant Herbarium was prepared following usual methods of herbarium preparation.[1] Collected plant specimens were preliminarily identified with the help of Supervisor, Co-supervisor and regional floras. Plant specimens collected during field visit were pressed between bloating papers using wooden press to protect them from getting deteriorated. Specimens were brought to the PG Department of Dravyaguna, Lalit Hari State Ayurveda College Pilibhit. Bloating paper of the preserved specimens were frequently changed to avoid any microbial growth on the specimen. Dried specimen were preserved using mercuric chloride solution prepared in

absolute alcohol. Preserved specimens were mounted on standard size herbarium sheet. Confirmatory Identification of Plants was done by taxonomist and herbarium sheets were deposited to P.G. Department of Dravyaguna, L.H. State Ayurveda College, Pilibhit.

Presentation of information collected during field visits

Structured interviews were conducted using a series of predetermined semi-structured and close ended questionnaire. Information collected from different Traditional Healers was documented and analyzed to ensure the proper presentation without repetition. The recorded plant species have been tabulated in present study and arranged in the following manner -

- Local name, Hindi name, Sanskrit name/Ayurveda name, Botanical name and their family
- Distribution
- Habit
- Medicinal and dietary uses.
- Ethno-veterinary uses
- Parts used.
- Therapeutic and dietary preparations.
- Pharmaco-therapeutic properties and indication of plant drugs as per *Ayurveda*.
- Modern therapeutic indication (if available).

Comparative analysis

Comparative analysis with known medicinal uses described in classical texts of *Ayurveda* and modern pharmacological properties published in various journals and periodicals has been undertaken.

RESULTS

Botanical name[2] **-** *Leucas cephalotes* (Roth) Spreng Syn. *Phlomis cephalotes* Roth.

Family – Lamiaceae

Vernacular names[2]

Local Name / Hindi – *Guma*

Bengali – *Hulkusha, Ghal ghase*

English – *Thumbe*

Kannad – *Thumbe gida, Tumbe*

Malayalam – *Thumba, Tumpa*

Marathi – *Tamba*

Oriya – *Bhutamari*

Punjabi – *Chatra*

Tamil - *Thumbai*

Telugu – *Tammachettu, Tummi*

Sanskrit/ Ayurveda – *Dronapushpi*

Morphology[3] **–** Erect pubescent annual herbs. Stems and branches angular, clothed with spreading hairs. Leaves ovate or lanceolate or elliptic, 5-8 X 1.5 cm, crenate-serrate. Flowers white, in dense, globose, terminal whorls. Bracts many, foliar. Nutlets smooth, brown. Flowers and fruits-September to March.

Distribution[3]**:** Found as common weed in cultivated fields and wastelands throughout the major part of India, ascending up to 1800 m altitude in the Himalayas.

Medicinal uses

Medicinal uses reported by tharu tribe in study area

1. Decoction/Juice of whole plant is used in the treatment of fever, Malaria.
2. Decoction/Juice of whole plant used as anti-fertility.

Ethno-Veterinary Uses

Decoction/Juice/Paste of whole plant used in the treatment of pyrexia in domestic animals.

Pharmacotherapeutic Properties and Indications of the plant drug as per *ayurveda*[4]

Kutumbaka has been identified with *Dronapuspi* which is supposed to be *Leucas* species called *Guma*. It has been classified in *Shak Varga* (CS.Su.27.98, SS.Su.46.274, AH.Su.6.93). *Madhur-Lavan-Katu Rasa, Gurü-Rükşa Guna, Madhur Vipāka, Uşna Virya, Malbhedaka, Vätpittakäraka.* Indicated in *Kamala, Sopha, Tamakśwāsa, Kāsa* (K.Ni, BP.Ni.); *Katu Rasa, Usna, Ruchikaraka, Kaphavata Sämaka* indicated in *Agnimandya* (R.Ni.); *Katu Rasa, Guru Ruksa, Tiksna Guna, Usna Virya* and *Kaṭu Vipāka*. It is one of the best drugs for pacification of *Kapha* and *Vata*.

Classical uses[5]

1. **Jaundice** - Juice of *Dronapuspi* used in Jaundice (VM.9.12, also RM.3.17).
2. **Malarial fever** - Juice of *Dronapuspi* is efficacious in malarial fever (SG.2.1.10).
3. **Eye diseases –** Juice of *Dronapushpi* pounded with rice-water destroys the disorders of

Patala in eyes (G.N.3.3.378).

Part used – Whole Plant, Leaves.

Doses: Juice 5 to 10 ml.

Uses in folk medicine (Ethno-medicinal uses)

Plant used in liver troubles,[6] bronchial asthma,[7,8] bronchitis,[9] malaria,[10,11] as stimulant, diaphoretic and insecticide,[12,13,14] in skin diseases,[15,16,17] as anthelmintic,[18,19] in constipation, diarrhoea, eye complaints, headache, menorrhagia, migraine, piles, swellings and toothache,[20] for snake bite,[21,22] scabies,[23] rheumatism,[24] as diuretic,[25] as antimicrobial, anti-inflammatory,[26] in polio,[27] as blood purifier.[28]

Phytochemistry

The protein content of seeds was reported as 21.3 per cent and the amino acid composition was analysed as (g/100 g protein): aspartic acid 11.2; threonine 5.0; serine 6.5; glutamic acid 16.4; proline 4.6; glycine 8.4; alanine 6.8; cysteine 0.3; valine 5.5; methionine 0.4; isoleucine 4.3; leucine 6.3; tyrosine 1.1; phenylalanine 2.8; histidine 2.2; lysine 3.0 and arginine 6.5.[19] The petroleum ether extract of the seed oil yielded octadeca-5,6-dienoic (laballeuic) acid.[30] Preliminary phytochemical screening of whole plant, flowers and leaves revealed presence of steroids, flavonoids, saponin glycosides, phenols, terpenoids, carbohydrates, glycosides, proteins, fats, phenolics, resins, alkaloids and tannins.[31,32]

Antioxidant - The methanolic extract of whole plant was screened for in-vitro antioxidant activity using DPPH method. The extract scavenged the DPPH radicals in a dose-dependent manner. The antioxidant activity of the extract was low as compared to ascorbic acid.[32] Among the four extracts of leaves viz. hexane, petroleum ether, aqueous and methanol when tested for antioxidant activity using DPPH radical scavenging method, the methanol and aqueous extract showed maximum activity with IC values of 47.15 µg/ml and 39.20 µg/ml, respectively.[33]

Administration of ethanol extract of leaves at the doses of 150, 300 and 450 mg/kg to diabetic (IDDM and NIDDM) rats decreased plasma glucose and improved lipid profile and antioxidant status of both types of diabetic rats. The extract improved hepatic glycogen content and hexo- kinase activity, decreased glucose-6-phosphatase activity, blood urea, creatinine content and also lipid peroxidation in diabetic rats. Out of these three doses, 450 mg/kg was found to be more potent which was comparable to glibenclamide and

metformin.[34]

Antifertility - The chloroform and alcohol extract of flowers at doses of 200 and 400 mg/kg in rats showed significant anti-implantation activity. The extracts further showed more significant increase in uterine weight in immature ovariectomised rats.[35]

Hepatoprotective - The pretreatment with ethylacetate extract of the whole plant at a dose of 30 mg/100 g p.o. did not protect the liver from carbon tetrachloride induced hepatotoxicity in mice and rats.[36] The methanolic extract of the whole plant at doses of 100 and 200 mg/kg po. produced significant hepatoprotective activity in CCl_4 induced hepatotoxicity in rats as evidenced by reduction in serum levels of SGOT, SGPT, ALP, total bilirubin and total cholesterol in treated groups as compared to control. The acute toxicity of extract showed no sign of toxicity upto a dose of 2000 mg/kg.[37]

The hydroalcoholic (1:1) extract of plant (583 mg/kg orally) caused significant lowering of serum markers of liver function to near normal in CCL_4 - induced hepatotoxicity in rats. It also reversed the liver tissue damage and prophylactic effect was more marked than curative effect.[38]

Analgesic - The methanolic extract of the whole plant (200 and 400 mg / kg po.) exhibited analgesic activity in mice. The higher dose was comparable to standard pentazocine.[32]

Antiinflammatory - The methanolic extract of the whole plant (200 and 400 mg/kg p.o.) in rats showed anti-inflammatory response in the acute test.[32]

Antimalarial activity - The chloroform extract of plant showed good anti-plasmodial activity against Plasmodium falciparum while methanol and aqueous extracts were found inactive.[39]

Antifilarial activity - The alcoholic extract caused inhibition of the spontaneous movements of whole worm and the nerve-muscle preparation of S. cervi in-vitro. However, the aqueous extract failed to modify the movement of the whole worm but it caused irreversible paralysis of nerve- muscle preparation characterized by decrease in rate, tone and amplitude of contractions. The duration of survival of microfilarae of S. cervi was also decreased.[40]

General pharmacology - The 50 per cent ethanol extract of the whole plant showed

spasmolytic effects on isolated guinea pig ileum. LD_{50} of the extract was found to be 750 mg/kg i.p. in mice.[41] In another study the alcoholic extract of the aerial parts was found to be inactive, when screened for diuretic, anti-inflammatory, hypoglycaemic, antipyretic and anticoagulant activities and effects on CVS, CNS and isolated tissues of experimental animals. LD_{50} of the extract was found to be 1000 mg/kg ip in rats.[42]

Antibacterial/ Antidiarrhoeal - The methanolic extract of whole plant was found to be active against Bacillus cereus and Shigella flexneri while toluene extract was inactive against the two organisms.[43] Various extracts of leaves viz., methanol, hexane, diethyl methane and ethyl acetate were tested for activity against Staphylococcus aureus, Escherichia coli, Pseudomonas aeruginosa, Proteus vulgaris and Klebsiella pneumoniae. The hexane and methanolic extracts showed significant activity against Staph. aureus, E. coli and Ps aeruginosa.[44]

Antifungal - The methanolic and toluene extracts of whole plant were found to be inactive against Candida albicans.[43] The vapours of the essential oil from leaves did not show any antifungal activity against Aspergillus flavus, A. fumigatus and A. nidulans.[45]

Antiprotozoal - The chloroform extract of plant exhibited activity against *Leishmania donovani.*[39]

Insecticidal - The petroleum ether extract of leaves, flowers, seeds and stem showed larvicidal activity against Culex quinquefasciatus, Anopheles stephensi and Aedes aegypti.[46]

DISCUSSION

Leucas cephalotes has been reported to be a trusted medicinal plant local health traditions prevailing in the study area. Tribal community uses decoction/juice of whole plant in the treatment of fever, malaria and for the suppression of fertility. It has also been reported to be used for the treatment of pyrexia in domestic animals. The plant has been reported to be used for the treatment of jaundice by Vrinda Madhav, the treatment of malarial fever in *Sharangdhar Samhita* and for the treatment of eye diseases in *Gad Nighrah*. The plant has been also classified in *Shak Varga* in *Brihattrayi*. It has been indicated in the treatment of constipation, generalized Anasarca, *Tamak Swasa*, *Kasa*, *Aruchi*, *Agnimandya* and in the disease derived by vitiation of *Kapha* and *Vata*. In modern pharmacological screening studies

plant has been found to be demonstrated Anti fertility, Hepato-protective and Anti malarial activity. This uses of the plant in local health traditions was the Tharu tribes stand validated on the basis of its pharmacological properties and indications describes in classical texts of *Ayurveda* as well as on the basis of modern pharmacological properties demonstrated in pharmacological screening studies.

CONCLUSION

From the study it may be concluded that therapeutic uses of medicinal plants by tribal communities residing in remote areas of the country are of potential importance. Observations of the utilization pattern reveals the either the tribal community borrowed the knowledge from the classical texts of *Ayurveda* or the tribal knowledge has been documented during ethno-medicinal survey studies. Validation of tribal claims in pharmacological screening studies provides scientific evidences to tribal claims.

Abbreviations used

CS.-Charak Samhita, SS.- Sushruta Samhita, AH.- Astang Hridaya, K.Ni.- Kaiyadev Nighantu, R.Ni.- Raj Nighantu, BP.Ni.- Bhavprakash nighantu, VM.- Vrinda Madhav, RM.- Rajamarttand, SG.- Sharangdhar Samhita, G.N.- Gad Nighrah, Su.– Sutra Sthan.

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