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Review on Leonotis nepetifolia Linn

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ABSTRACT

The plant of *Leonotis nepetifolia* Linn in India, belongs to family *Lamiaceae. Leonotis nepetifolia* is commonly called 'kilp dagga' or 'lion ear', 'shandilay' and 'bradi-bita'. It is native to tropical Africa and southern India. It grows to a height of 3 metres and striking lipped flowers that are most commonly orange but can vary to red, white, and purple. It has drooping dark green, very soft serrated leaves that can grow up to 10 centimetres wide. The plant stems emanates from a thick wood base. Sunbirds and ants are attracted to the flowers. It has been found growing on road sides, rubbish heaps or waste land. The cultivation of medicinal plants is the key to meet the raw material needs of the industry based on the medicinal plant products. Phytochemical investigation shows the presence of alkaloids, protein & amino acids, flavonoids, terpenoids, phenolics, glycosides, carbohydrate, saponins, steroids, tannins and fixed oil. Gas Chromatography – Mass Spectoscopy analysis of showed several active components. A review lowed formed on various parts of this plant are anti-inflammatory activity, anti-bacterial, anti-diarrheal, Healing, antiviral, antifungal, anti-giardial, analgesic, anti-diabetic, anti-thelmintic, antioxidant, antimicrobial and cytotoxic activity.

KEYWORDS: Lamiaceae, Leonotisnepetifolia, Lion's ear, Ranabheri.

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INTRODUCTION

Herbal medicine (also Herbalism) is the study of the botany and use of medicinal plants. Plants have been the basis for medical treatments through much of human history, and such traditional medicine is still widely practiced today. The scope of herbal medicine is sometimes extended to include fungal and bee products, as well as minerals, shells and certain animal parts. Herbal medicine is also called phytomedicine or phytotherapy. Para herbalism is the pseudoscientific use of extracts of plant or animal origin as supposed medicines or health-promoting agents.[18]

Medicinal plants are the nature's gift to human beings to help them pursue a disease-free healthy life. The world's cultures have an extensive knowledge of herbal medicine. Plants are a valuable source of a wide range of secondary metabolites, which are used as pharmaceuticals, agrochemicals, flavours, fragrances, colours, bio pesticides and food additives.[18]

The genus *Leonotis* has 12 species widely distributed in pan tropics and is represented by one species, *Leonotis nepetifolia* in India. It belongs to family *Lamiaceae. Leonotis nepetifolia* is important medicinal plant of repute in Indian traditional systems of medicine such as Ayurveda, Unani and Siddha. Medicinal uses of the plant are reported in Madagascar, Brazil, Canada, Kenya and many African Countries to treat diseases, rheumatism, dysmenorrhoea, bronchial asthma, fever and diarrhoea[9,3].

PLANT DESCRIPTION

Leonotis nepetifolia Linn plant belong to genus *Leonotis*and family *Lamiaceae*. Commonly it's know "Lion ear" and hindis "Baraguma". It is a medium sized deciduous plant and very vigorous in growth. *Leonotis nepetifolia* is otherwise called as 'Ranabheri' in tamil. It is one of the most traditional system of medicine in Ayurvedic and Siddha.[9,3]

Botanical name **:***Leonotis nepetifolia*Linn.

Family **:**Lamiaceae

Kingdom **:**Plantae

Order **:**Lamiales

Subfamily **:**Lamioidae

Genus **:**Leonotis

Species **:***Leonotisnepetifolia*

Domain :Eukaryota

Phylum :Spermatophyta

Subphylum :Angiospermae

Class :Dicotyledonae

Common name :Annual lion's ear, lion's ear, flor de mundo and chrishmas candlestick

Synonyms :*L.globosus*Moench, *L.nepetifolius*Mill and*Phlomisnepetifolia*Linn.

Fig. 1: Whole plant of LeonotisnepetifoliaLinn.

VERNACULAR NAMES

Tamil: Ranabheri.

Sanskrit: Granthi andGranthika.

Kannada: Deepashoole.

Telugu: BaeriandBeri.

Gujarati: Lalguma andMahadrona.

English: Bald bush and Bald head.

Hindi: Baraguma and Hejurchel.

MEDICINAL USES[3]

1. *Leonotis* may be involved in the anti-nociceptive, anti-inflammatory and anti-diabetic effect of the plant's extract.
2. Which has been used to treat bronchial asthma, diarrhoea, fever, influenza, malaria and analgesic.
3. This herb in control of painful, arthritic, and other inflammatory conditions.
4. It is used to type2 diabetes mellitus.

5. It is also anti-asthmatic and has anti-diarrhea properties.
6. They are used for heart conditions associated with anxiety and tension.

FOLK MEDICINAL USES[3]

1. The fresh stem juice is an infusion drunk for 'blood impurity'. The infusions made from flowers and seeds, leaves or stems are widely used as tonics for tuberculosis, jaundice, muscular cramps, high blood pressure, diabetes, viral hepatitis, dysentery, and diarrhoea.
2. The leaf tea has a hypnotic effect, is diuretic and relieves headache.
3. The leaf and stem decoction or inhalations have been used internally for cough, common cold, bronchitis, wound healing and asthma.
4. Tea made from the whole plant is used for arthritis, piles, bladder and kidney disorder, obesity, cancer and rheumatism.
5. The leaves and stems decoction are applied topically as a treatment for eczema, skin infections and itchiness.
6. The leaves, roots and bark are widely used as an emetic for snakebites, bee and scorpion stings.

OTHER USES[3]

1. The seeds are rich in a fatty oil resembling olive oil

PHYSICOCHEMICAL INVESTIGATION

Physicochemical screening of *Leonotis nepetifolia* revealed that, it possess good physicochemical parameters such as total ash, acid insoluble ash, water soluble ash, loss on drying, swelling index and foaming index. The extractive values such as alcohol soluble extract, water soluble extract, pet ether, benzene, chloroform, ethyl acetate, methanol and aqueous extract are also determined.

Table 1: Physicochemical parameters of *Leonotisnepetifolia*[16]

S. No	Parameters	Observation of leaves	Observation of root
1.	Total ash	5.88 % w/w	4.083 % w/w
2.	Acid insoluble ash	1.003 % w/w	0.7067% w/w
3.	Water soluble ash	4.1 % w/w	3.15% w/w
4.	Foreign organic matter	0.88 % w/w	1.85% w/w
5.	Moisture content	7.8% w/w	5.1% w/w
6.	Foaming index	Less than 100	Less than 100

Table 2: Extractive values of*Leonotisnepetifolia*[6,16]

S. No	Parameters	Observation of leaves	Observation of root
1.	Alcohol soluble extractive	29.2 % w/w	21.83 % w/w
2.	Water soluble extractive	27.97 % w/w	28.39 % w/w
3.	Pet ether	4.48 % w/w	0.05 % w/w
4.	Benzene	4.17 % w/w	0.48 % w/w
5.	Chloroform	1.63 % w/w	2.43 % w/w
6.	Ethyl acetate	1.47 % w/w	0.16 % w/w
7.	Methanol	21.4 % w/w	22.53 % w/w
8.	Aqueous	15.04 % w/w	18.25 % w/w

PRELIMINARY PHYTOCHEMICAL INVESTIGATION

The petroleum ether, ethyl acetate, chloroform, methanol and aqueous extracts were subjected to preliminary phytochemical screening for detection of various plant constituents present. They are individually performed using different qualitative tests for alkaloids, carbohydrates, flavonoids, glycosides, protein & amino acids, saponins, fixed oils, terpenoids, phenolics, tannins and steroids.

Table 3: Phytochemical Investigation of leaves of *Leonotisnepetifolia*[2,6,12,16]

S. No	Type of Phyto Constituents	Petroleum ether extract	Ethyl acetate Extract	Chloroform extract	Methanol extract	Aqueous extract
1.	Alkaloids	-	-	+	+	-
2.	Carbohydrates	-	-	-	+	+
3.	Flavonoids	-	+	-	+	+
4.	Glycosides	-	-	+	+	+
5.	Protein & amino acids	-	-	-	-	+
6.	Saponins	-	-	-	-	+
7.	Fixed oil	+	-	-	-	-
8.	Terpenoids	+	-	+	-	-
9.	Phenolics	-	-	-	+	+
10.	Steroids	+	+	+	-	-
11.	Tannins	+	-	-	-	-

Table 4: Phytochemical Investigation of root of *Leonotisnepetifolia*[6,12,16]

S. No	Type of phyto Constituents	Petroleum ether extract	Ethyl acetate extract	Chloroform extract	Methanol extract	Aqueous extract
1.	Alkaloids	-	-	-	-	-
2.	Carbohydrates	-	+	-	+	+
3.	Flavonoids	-	+	-	+	+
4.	Glycosides	-	-	+	+	+
5.	Protein & amino acids	-	-	-	+	+
6.	Saponins	-	-	-	+	+
7.	Fixed oil	+	-	+	-	-
8.	Terpenoids	+	-	+	-	-
9.	Phenolics	-	+	-	+	+
10.	Steroids	+	+	+	-	-
11.	Tannins	-	+	-	+	+

PHARMACOLOGICAL ACTIVITY

Table: 5Ethnopharmacology of *Leonotis nepetifolia* Linn.

S. No	Plant part	Solvent used for extraction	Activity	Author name
1	Leaves	Ethanolic extract	Anti-bacterial, anti- diarrheal, healing and antiviral	Darley Maria Oliveira *et al.*, 2015
2	Leaves	n- Hexane and Methanolic extract	Antibacterial, antifungal and antiviral	UdayaPrakash*et al.*, 2013
3	Flower	Methanolic extract	Antifungal	Wagara IN *et al.*, 2015
4	Root	Methanolic extract	Anti-giardial	Ndukui James Gakunga *et al.*, 2013
5	Whole plant	Ethanolic extract	Analgesic and anti-diabetic	Neeraj Sethiya*et al.*, 2011
6	Whole plant	Ethanol and aqueous extract	Anti-thelmintic	Reshmi Pushpan*et al.*, 2017
7	Aerial part	Methanol and Acetone extract	Antibacterial and cytotoxic	Sarath Chandirian*et al.*, 2017
8	Leaves, flower and stem	Ethanolic extract	Antimicrobial and cytotoxic activity	Tiziana Fornari*et al.*, 2012
9	Leaves, flower and stem	n-Hexane, methylene dichloride and methanolic extract	Anti-inflammatory	Ana Paula de Oliveira *et al.*, 2015
10	No specified	Methanolic extract	Antioxidant	Usharani Veerabadran*et al.*, 2013

GAS CHROMATOGRAPHY - MASS SPECTROSCOPY ANALYSIS

GC-MS analysis of the fixed oils from the leaves of specimens of *L. nepetifolia*showed 16 bioactive compounds were identified such as Methyl linoleate (46.98%) was the majority compound. Among these, two pairs of isomers, propanoic acid 2-methyl-3-hydroxy-2,4,4-trimethylpentyl ester (31.97%) and propanoic acid 2-methyl-2,2-dimethyl-1-(2-hydroxy-1-methylethyl)-propyl ester (22.78%). This compound like methyl laurate (0.38%), methyl myristate (0.64%), phytol (0.49%), cycloartenol (1.93%), methyl palmitate(13.67%), β-amyrim (2.58%), y-undecanolide (1.32%), y-decanolide(7.67%), 9,12-octadecadienoic acid methyl ester(9.21%), 6-octadecynoic acidmethyl ester (6.49%),methyl stearate(2.79%), arachidic acid methyl ester(0.74%), docosanoicacifd methyl ester(0.45%), squqlene(0.62%), stigmasterol (1.62%), stigmast-5-en-3β-ol(1.11%), stigmast-7-en-3β-ol(0.95%), pentacosane(0.48%).[7]

GC–MS study was analysed essential oil from*Leonotis nepetifolia*oil was obtained in 0.004% w/w yield. A total of 36 compounds constituting 94.80% of the oil were identified. The oil was characterized by a high percentage of sesquiterpenes (75.32%). The major compounds were germacrene D (37.16%),germacrene–D-4-ol (6.02 %,) and *cis*-ocimene (4.79%).

RESULT AND DISCUSSION

The survey of literature revealed that the *Leonotis nepetifolia* having effective pharmacological activities such as anti-inflammatory activity, anti-bacterial, anti-diarrheal, healing, anti-viral, anti-fungal, anti-giardial, analgesic, anti-diabetic, anti-thelmintic, anti-oxidant, anti-microbial and cytotoxic activity. It having important medicinal phytochemical compounds such asalkaloids (leonuride), iridoid glycoside (leonurin and leonuridine), diterpenoides (leocardin), flavonoids (ratin, quercetin, hyperoside, apigenin), volatile oil, tannins, vitamin A. The results from this review are quite promising for the use of *Leonotis nepetifolia*as a multi-purpose medicinal agent, while *Leonotis nepetifolia* has been used successfully in Siddha medicine for centuries, more clinical trials should be conducted to support its therapeutic use. Moreover, the therapeutic potential of the plant should also be checked when used in combination with other herbal drugs.[1, 5, 8, 9, 13].

CONCLUSION

Ethno pharmacological activity and traditional uses of natural compounds, especially of plant origin received much attention in recent years as they are well tested for their efficacy and general

believed to be safe for human use. Traditionally, plants are used in the treatment of many infections and systemic disorders. More than hundreds of chemical compounds are derived from plants which have medicinal values due to their health-enhancing and therapeutic properties are referred as herbs. Through screening of literature available on *Leonotis nepetifolia* depicted the fact that it is a popular remedy among the various ethnic groups Siddha and Ayurvedic properties.

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