

## PHYTOCHEMICAL ANALYSIS OF *LEONOTIS NEPETIFOLIA* (L.) R. BR., A WILD MEDICINAL PLANT OF LAMIACEAE

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### ABSTRACT

*Leonotis nepetifolia* (L.) R. Br., is one of the wild members of family Lamiaceae. The plant is known for its anti-cold, anti-cough, anti-inflammatory and anti-diarrheal properties since ages and being used by local tribal communities as ethnomedicine. The present study is an attempt to investigate the preliminary phytochemical composition of this plant. The result reveals the presence of bioactive constituents comprising alkaloids, flavonoids, phenolics, tannins, glycosides, steroids and saponins in different solvents. The presence of these phytochemicals can be correlated with the medicinal potential of this plant.

**Key Words:** *Leonotis nepetifolia*, phytochemical composition, ethnomedicine.

### INTRODUCTION

*Leonotis nepetifolia* (L.) R. Br., is a wild herbaceous plant belonging to mint family (Family-Lamiaceae). It generally grows in patches along roadside or barren unused agriculture waste land during rainy season. The mature plant attains the height up to 2 meter. The orange yellow coronated verticillaster inflorescence and distinct plant odor are amongst the unique characters of this plant.

The plant is being used by the local peoples and tribal of Maharashtra as ethno medicine on various ailments. The infusion of leaves is traditionally being used to cure the stomach pain of the children and also to cure cough and cold by tribals of Melghat (MS) India. This plant is also being used for its anti-inflammatory, anti-diarrheal properties by various communities in Indian subcontinent and also across the world. The present study was designed to evaluate the fundamental phytochemical constituents of this wild medicinal plant.

### MATERIAL AND METHODS

The plant material was collected from agriculture waste-land of Dr. PDKV agriculture campus, Akola. Plant was identified taxonomically by local taxonomist and with the help of flora of Marathwada (Naik, 1986). The voucher specimen of plant is deposited in the herbarium of Department of Botany Shivaji College, Akola.

**Extraction:** The leaves of the plants were washed thoroughly and dried in shade. The shade dried

leaves are then powdered and the powder is used for further phytochemical analysis. The powder was then subjected to soxhlet extraction with different solvents (petroleum ether, benzene, acetone, chloroform, methanol and water) according to their increasing polarity. Each time before extracting with the new solvent, the powder material was dried in air oven below 50°C. The final extract of each solvent was used to analyze for the presence of different phytochemical constituents (Harborne, 1973). The methods employed for the quantification of various phytochemicals are described below-

**Alkaloid:** 5g of the sample was taken in 250 ml of 20% acetic acid in ethanol and kept for 4hrs. This was filtered and extract was concentrated using the water bath until the volume reduce to one fourth of the original volume. Then concentrated NH<sub>4</sub>OH was added drop wise to the extract until the precipitation was complete. The whole solution was allowed to settle and the precipitation was collected by filtration and weighed (Harborne, 1973; Obadoni and Ochuko, 2001).

**Tannin:** 500mg of the sample was weight into 100ml plastic bottle, 50ml of distilled water was added and shaken for 1h in a mechanical shaker. This was filtered into a 50ml volumetric flask and made up to the mark. Then 5ml of the filtrate was pipette out into a tube and mixed with 3ml of 0.1M FeCl<sub>3</sub> in 0.1N HCl and 0.008 M potassium ferrocyanide.

The absorbance was measured with spectrophotometer at 120nm wavelength, within 10mins. A blank sample without plant extract was prepared and absorbance was recorded at the same wavelength. A standard was prepared using tannic acid to get 100 ppm and measured the absorbance (Van-Burden and Robinson, 1981).

**Phenols:** The fat free sample was boiled with 50ml of ether for 15mins. 5ml of extract was pipette into a 50ml of flask, and then 10ml of distilled water was added. 2ml of ammonium hydroxide solution and 5 ml of concentrate amyl alcohol were also added. The sample was made up to the mark and left to react for 30 min. The absorbance of solution was recorded using spectrophotometer at 505nm (Harborne, 1973; Obadoni and Ochuko, 2001).

**Flavonoid:** 10 g of plant sample was extracted repeatedly with 100ml of 80% aqueous methanol at room temperature. The whole solution was filtered through whatman filter paper no.42 (125mm). The filter was later transfer to a crucible and evaporated to dryness over a water bath and weighted (Boham and Kocipai, 1994).

#### RESULTS AND DISCUSSION

The extraction of the leaf powder was done in five different solvents viz., petroleum ether, chloroform, acetone, methanol and water. The color of petroleum ether extract was light green, chloroform extract was creamy, acetone extract was yellowish green, methanolic extract was light green while water extract was yellowish creamy (table-1).

**Tabel-1: Successive solvent extraction of shade dried leaves of *L. nepetifolia***

Solvent system	Color of extract
Petroleum ether	Light green
Chloroform	Creamy
Acetone	Yellowish green
Methanol	Light green
Aqueous	Yellowish-creamy

**Table- 2: Qualitative chemical examination of various extracts**

Phytochemicals	PE	Ch	Ac	Me	W
Alkaloids	-	+	-	-	+
Phenolics	-	+	-	+	+
Glycosides	-	+	-	+	-
Flavonoids	-	+	-	+	+
Tannins	+	-	-	-	-
Steroids	+	-	+	-	-
Saponins	+	-	-	-	+

PE= Petroleum ether, Ch= Chloroform, Ac= Acetone, Me= Methanol, W= Water

**Table 3: Quantification of major phytochemicals from leaves of *L. nepetifolia***

Phytochemicals	Quantity (mg/100g dry wt)
Alkaloid	1.40 ± 0.12
Flavonoids	1.47± 0.11
Phenols	1.20± 0.21
Tannin	0.11±0.81

The results are average of triplicate estimation ± standard error.

The preliminary phytochemical analysis showed presence of alkaloid, phenolic, flavonoids, tannins, steroids, glycosides and saponins. However, all these chemicals were not extractable in one solvent. Alkaloids, phenolic, flavonoids and glycosides were present in chloroform extract; tannins, steroids and saponins were found in petroleum ether extract; phenols, flavonoids and glycosides were present in methanolic extract; alkaloids, phenolic, flavonoids and saponins were found in aqueous extract while acetone extract showed presence of only steroids (table-2). The quantitative analysis indicates that the plant possesses significant level of alkaloids, phenolic, flavonoids and tannins (table-3).

The availability of specific phytochemicals in plant gives it specific medicinal properties. Therefore, presence of above phytochemicals in *L. nepatifolia* can be correlated with its medicinal potential. Similar reports on phytochemical composition of various medicinal plants were made earlier by many workers (Chopra *et al.*, 1956; Del-Rio *et al.*, 1997; Obadoni and Ochuko, 2001; Okwu, 2001, 2004 and Koche *et al.*, 2010). However, it is very essential to isolate the bioactive fractions from these major groups so that it can be used further in designing specific drugs.

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