

# Phytochemical screening of selected medicinal plants of the family Lamiaceae

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## ABSTRACT

The members of Lamiaceae family include aromatic plants that are being used in traditional medicine for various disorders. To study the secondary metabolites present in the leaves of the family Lamiaceae (*Ocimum sanctum*, *Leonotis nepetifolia* (L.), *Mentha arvensis* L.). The samples were extracted using solvents like acetone, chloroform, ethanol, petroleum ether and water. These mixtures were shaken at room temperature for 24 h. After incubation, the extracts were filtered using Whatman No.1 filter paper, collected and stored at 4°C. Preliminary phytochemical screening was performed by standard methods. The phytochemical screening revealed the presence of alkaloids, carbohydrates, flavonoids, phytosterols, proteins, steroids, terpenoids, phenols, saponins, quinones, coumarins and glycosides. 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.

**Keywords:** Plant material, Acetone extract, methanol extract, water extract phytochemicals

## INTRODUCTION

Medicinal plants play a major role in meeting the medical and health needs of about 70% of populations in developed and developing countries, which serve as an important resource for the treatment of various maladies and illnesses (Ngari et al., 2010). Globally, about 85% of the traditional medicines used by different ethnic groups inhabiting various terrains for primary healthcare are derived from plants, especially in India; medicinal plants are widely used by all sections of the population with an estimated 7500 species of plants used by several ethnic communities (Farnsworth, 1988). The plant is being used by the local peoples and tribal of Maharashtra as ethno medicine on various ailments. 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.

They are known to have various biological activities such as antimicrobial, antifungal, antioxidant, etc. The important bioactive components in plants are usually the secondary metabolites such as alkaloids, flavonoids, tannins and other phenolic compounds (Edeoga et al., 2005). The Medicinal plants have potent phytochemical components which are important source of antibiotic compounds and are responsible for the therapeutic properties (Jeeva et al., 2011; Jeeva and Johnson, 2012; Florence et al., 2012 & 2014; Joselin et al., 2012 & 2013; Sainkhediya and Ray, 2012; Sumathi and Uthayakumari, 2014). Therefore, the present work aims at evaluating the phytochemical composition, by qualitative and quantitative methods, of methanol, ethanol and chloroform extracts of three other members of the Lamiaceae family, namely, *Ocimum sanctum*, *Leonotis nepetifolia*, *Mentha arvensis* L. are known to be of medicinal use. The use of *Ocimum sanctum*, *Leonotis nepetifolia*, *Mentha arvensis* L., \in traditional medicine is represented in table 1.

## MATERIALS AND METHODS

The plant material was collected from agriculture waste-land of Dr. PDKV agriculture campus, Akola. The plants were identified and authenticated by a taxonomist.

### Preparation of crude extracts

Fresh leaves were collected, washed with distilled water, shade dried till it is crisp (approximately 15 days) and cut into small pieces. These dried samples were powdered and stored at 4° C until further use. Crude extracts (10% w/v) were made using 3 solvents i.e., methanol, ethanol and chloroform. The extracts were filtered through fine muslin cloth and the clear filtrate was evaporated to dryness to form the crude extract and stored at 4° C for further use.

**Phytochemical Screening:** The chemical tests were carried out with the crude extracts of each plant i.e., methanol extract (ME), Ethanol extract EE and Chloroform extract CE.

**Tests for Tannins:** About 2 ml of the aqueous extract was stirred with 2 ml of distilled water and few drops of FeCl<sup>3</sup> Solution were added. Formation of green precipitate was indication of presence of tannins.

**Tests for Saponins:** 5 ml of aqueous extract was shaken vigorously with 5 ml of distilled water in a test tube and warmed. The formation of stable foam was taken as an indication of the presence of saponins.

**Test for phlobatannins:** About 2 ml of aqueous extract was added to 2 ml of 1% HCL and the mixture was boiled. Deposition of red precipitate was taken as an evidence for the presence of phlobatannins.

**Tests for Flavonoids:** To 1 ml of aqueous extract, 1 ml of 10% lead acetate solution was added. The formation of a yellow precipitate was taken as a positive test for flavonoids.

**Test for terpenoids:** 2ml of the organic extract was dissolved in 2 ml of chloroform and evaporated to dryness. 2 ml of concentrated sulphuric acid was then added and heated for about 2 min. Development of a greyish colour indicates the presence of terpenoids.

### Test for glycosides: Liebermann's test:

2ml of the organic extract was dissolved in 2 ml of chloroform and then 2 ml of acetic acid was added in it. The solution was cooled well in ice. Sulphuric acid was then added carefully, a colour change from violet to blue green indicates the presence of a steroidal nucleus (that is, a glycone portion of glycoside).

**Table 1: Medicinal uses of the plants in the study**

Plant species	Common name in English	Traditional uses
<i>Ocimum sanctum</i>	Basil	Cough cold, chronic fever, sore throat, bronchial asthma, malaria, bronchitis, skin diseases, arthritis, diarrhea, dysentery.
<i>Leonotis nepetifolia</i> (L.)	Lion's ear	Bronchial asthma, diarrhoea, fever, influenza and malaria and is also an analgesic
<i>Mentha arvensis</i> L	Mint	Digestive Ailments Acne, Bronchitis, Burns, Colds, Liver Problems, Headaches, Toothache

**Table 2: Phytochemical constitute of the leaf extract:**

Phyto-constituents	<i>Ocimum sanctum</i>			<i>Leonotis nepetifolia</i>			<i>Mentha arvensis L</i>		
	EE	ME	CE	EE	ME	CE	EE	ME	CE
Flavonoids	+	+	+	-	+	+	+	+	+
Tannin	-	-	+	-	-	-	+	+	+
Steroids	+	+	+	+	-	-	+	+	+
Terpenoids	+	+	+	-	+	+	+	+	-
Saponins	+	+	-	-	-	+	+	-	+
Glycosides	+	+	+	-	+	+	+	-	+
Phlobatannins	+	+	+	+	+	-	+	-	+

**EE:** Ethanol extract; **ME:** methanol extract; **CE:** Chloroform extract;  
 '+': presence of phytochemical; '-': absence of phytochemical

**Test for steroids:** 1. A red colour produced in the lower chloroform layer when 2 ml of organic extract was dissolved in 2 ml of chloroform and 2 ml concentrated sulphuric acid was added in it, indicates the presence of steroids. 2. Development of a greenish colour when 2 ml of the organic extract was dissolved in 2 ml of chloroform and treated with sulphuric and acetic acid indicates the presence of steroids.

## RESULTS AND DISCUSSION

Fresh plant leaves of were collected, the leaves were washed thoroughly with normal tap water followed by sterile distil water. Then leaves were dried under shaded condition at room temperature. Leaves were dried under shaded condition at room temperature. Leaves were crushed to powder using grinding machine. Powder was stored at 4°C in light air container bottle for further analysis. The results confirm the presence of constituents which are known to exhibit medicinal as well as physiological activities (Mukeshwar et al., 2011). The phytochemical characteristics of the leaf extract were investigated are summarized in table-2. The results obtained in this study thus suggest that the identified phytochemical compounds may be the bioactive constituents responsible for the efficacy of the leaves of the plants studied. The presence of some of these compounds has also been confirmed to have antimicrobial activity. Hence it could be inferred that the plant extracts could be a source for the industrial manufacture of drugs useful in the chemotherapy of some microbial infection.

**Conflicts of interest:** The authors stated that no conflicts of interest.

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