



Phytochemical analysis of certain medicinal plants of the family Lamiaceae

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Abstract

Members of the Lamiaceae family include aromatic plants that are being used for various disorders in traditional medicine. Lamiaceae (*Ocimum sanctum*, *Leonotis nepetifolia* (L.), *Mentha arvensis* L.) to study secondary metabolites present in family leaves. The samples were extracted using solvents such as acetone, chloroform, ethanol, petroleum ether, and water. These mixtures were shaken at room temperature for 24 hours. After the incubation, the extracts were filtered, which was labeled as no. 1 was collected using filter paper and stored at 4°C. Initial phytochemical screening was performed by standard methods. Phytochemical screening revealed the presence of alkaloids, carbohydrates, flavonoids, phytosterols, proteins, steroids, terpenoids, phenol, saponins, quinones, coumarins, and glycosides. The results reveal the presence of bioactive components containing alkaloids, flavonoids, phenolics, tannins, glycosides, steroids, and saponins in various solvents. The medicinal potential of this plant can be correlated with the presence of these phytochemicals.

Keywords: Plant material, Acetone extract, methanol extract, water extract phytochemical

Introduction

Medicinal plants play a major role in meeting the medical and health needs of about 70% of the population in developed and developing countries, which serve as an important resource for the treatment of various pathologies and diseases (Ngari *et al.*, 2010) [1]. Globally, about 85% of traditional medicines used by various ethnic groups living in different localities for primary health services are derived from plants, especially in India; Medicinal plants are widely used by all sections of the population, with an estimated 7500 plant species used by many ethnic communities (Farnsworth, 1988) [2]. This plant is being used as ethno medicine on various diseases by the local people and tribals of Madhya Pradesh. The plant is also being used for its anti-inflammatory, anti-diarrheal properties in the Indian subcontinent and by various communities throughout the world. The present study was designed to evaluate the basic phytochemical components of this wild medicinal plant.

They are known for various biological activities such as antimicrobial, antifungal, antioxidant, etc. Important bioactive components in plants are usually secondary metabolites such as alkaloids, flavonoids, tannins, and other phenolic compounds (Edeoga *et al.*, 2005) [3]. Medicinal plants have powerful phytochemical components that are important sources of antibiotic compounds and are responsible for therapeutic properties (Jeeva *et al.*, 2011; Jeeva and Johnson, 2012; Florence *et al.*, 2012 and 2014; Jocelin *et al.*, 2012 & 2013; Sainakhedia and Ray, 2012; Sumati and Uthyakumari, 2014) [4-11]. Therefore, the aim of the present work is to evaluate the phytochemical composition, with 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. Medicinal use. *Ocimum sanctum*, *Leonotis nepetifolia*, *Mentha arvensis* L. in traditional medicine are used in Table 1.

Material and methods

The plant material was collected from certain places of Shahdol area.. The plants were identified and authenticated by a taxonomist.

Preparation of crude extracts

Fresh leaves were collected, washed with distilled water, dried to shade crisp (about 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 then sieved with fine muslin cloth and dried to dry and evaporated to form raw extracts 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 FeCl₃ 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

S.No.	Plant species	Common name in English	Traditional uses
1.	<i>Ocimum sanctum</i>	Basil	Cough cold, chronic fever, sore throat, bronchial asthma, malaria, bronchitis, skin diseases, arthritis, diarrhea, dysentery.
2.	<i>Leonotis nepetifolia</i>	Lion's ear	Bronchial asthma, diarrhoea, fever, influenza and malaria and is also an analgesic
3.	<i>Mentha arvensis</i>	Mint	Digestive Ailments Acne, Bronchitis, Burns, Colds, Liver Problems, Headaches, Toothache

Table 2: Phytochemical constitute of the leaf extract

S.No.	Phyto-constituents	<i>Ocimum sanctum</i>			<i>Leonotis nepetifolia</i>			<i>Mentha arvensis</i>		
		EE	ME	CE	EE	ME	CE	EE	ME	CE
1.	Flavonoids	+	+	+	-	+	+	+	+	+
2.	Tannin	-	-	+	-	-	-	+	+	+
3.	Steroids	+	+	+	+	-	-	+	+	+
4.	Terpenoids	+	+	+	-	+	+	+	+	-
5.	Saponins	+	+	-	-	-	+	+	-	+
6.	Glycosides	+	+	+	-	+	+	+	-	+
7.	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) ^[12]. 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.

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References

- Ngari EW, Chiuri LW, Kariuki ST, Hockett S. Ethnomedicine of Ogiek of River Njoro Watershed. *Ethnobotany Research and Applications*. 2010; 8:135-152.
- Farnsworth NR. Preliminary phytochemical screening and HPLC Analysis of Flavonoid from Methanolic Extract of Leaves of *Annona squamosa*. Screening plants for new National Academy Press, Washington, DC, 1988, 83-97.
- Edeoga HO, Okwu DE, Mbaebie BO. Phytochemical Constituents of some Nigerian Medicinal plants, *African journal of Biotechnology*. 2005; 4:685-688.
- Jeeva S, Johnson M, Aparna JS, Irudayaraj V. Preliminary phytochemical and antibacterial studies on flowers of selected medicinal plants. *International Journal of Medicinal and Aromatic Plants*.; 2011; 1(2107-114).
- Jeeva S, Johnson M. Antibacteriial and phytochemical studies on *Begonia flaccifera* Bedd. flower. *Asian Pacific Journal of Tropical Biomedicine*. 2012; 1(S1):S151-S154.
- Florence AR, Joselin J, Jeeva S. Intraspecific variation of bioactive principles in select members of the genus *Clerodendrum* L. *Journal of Chemical and Pharmaceutical Research*. 2012; 11:4908- 4914.
- Florence AR, Joselin J, Brintha TSS, Sukumaran S, Jeeva S. Preliminary phytochemical studies of select members of the family Annonaceae for bioactive constituents. *Bioscience discovery*. 2014; 5(1):85-96.
- Joselin J, Brintha TSS, Florence AR, Jeeva S. Screening of select ornamental flowers of the family

- Apocyanaceae for phytochemical constituents. Asian Pacific Journal of Tropical Disease. 2012; 2:1.
9. Joselin J, Brintha TSS, Florence AR, Jeeva S. Phytochemical evaluation of Bignonaceae flowers. Journal of Chemical and Pharmaceutical Research. 2013; 5(4):106-111.
 10. Sainkhediya J, Ray S. Preliminary study of flowering plant diversity of Nimar region. Bioscience Discovery. 2012; 3(1):70-72.
 11. Sumathi BM, Uthayakumari F. GC MS analysis of Leaves of *Jatropha maheswarii* Subram & Nayar. Science Research Reporter. 2014; 4(1):24-30.
 12. Mukeshwar, Pandey, Mousumi Debnath, *et al.* Phytomedicine: An ancient approach turning into future potential source of therapeutics, Journal of Pharmacognosy and phytotherapy. 2011; 3(1):113-117.