



Phytochemical & GC-MS Analysis of Aromatic Plant *Leonotis nepitifolia*

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ABSTRACT

This study indicates that *Leonotis nepitifolia* have good medicinal as well as cosmetics value. The current piece of work is a focus on micro level study and is purely based on contents in leaf of *Leonotis nepitifolia* in Nagpur region. Basically aromatic plants of family Lamiaceae that is *Leonotis nepitifolia* have aromatic smell and its aroma which is a characteristic features of family Lamiaceae. Many aromatic plants are species of the Lauraceae, Umbelliferae, Myrtaceae, and Labiatae families. Aromatic plants are a special kind of plants used for their aroma and flavour. Many of them are also used for medicinal purposes. Aromatic plants are from a numerically large group of economically important plants. Aromatic compounds are present in plants i.e. in the root, wood, bark, foliage, flower, fruit, and seed etc. Many of them are also used for medicinal purposes. Aromatic plants are from a numerically large group of economically important plants. Qualitative phytochemical GC-MS screening of leaf was done using different solvents which showed the presence of various vital secondary metabolites & constitute. The chemical Composition of *Leonotis nepitifolia* are Hematoporphyrin, Cyclodecasiloxane, Decanic acid, 2-(5-(5-[Cyano-(9,9-dimethyl)-1,4-dixa-7-aza-spiro[4,4]non-7-en-8-y)methylene]-3-3-dimethylprrolidin-2-ylid

Key words: *Leonotis nepetaefolia*, Phytochemical, GC-MS studies, Aromatic Plant.

INTRODUCTION

Leonotis nepitifolia (L) is a wild plant of family Lamiaceae. Commonly known as “Deepmal” (Lions tail), the plant is known for its anti-cold, anti-cough, anti-inflammatory properties and is widely used by local tribes as Ethnomedicine. Our knowledge of the intimate relationship between early man and plants has come to us mainly through traditions. This relationship has come to the core of the interdisciplinary science ‘Ethnobotany’, which attracted much attention not only due to its great academic importance, but also due to many economic applications. In recent years, much attention has been devoted to natural antioxidant and their association with health benefits (Arnous A *et al* 2001). It was reported that the Consumption of antioxidant constituents have protection against oxidative damage induced by degenerative and pathological processes including ageing and cancer. (Tadhani MB *et al*, 2007) The harmful effects resulted by disequilibrium in antioxidant-prooxidant balance can be largely prevented by the intake of antioxidant substances (Rattanachitthawat S *et al*, 2010). Antioxidant compounds present in food, play an important role as a health protecting factor. Scientific evidence suggests that antioxidants reduce the risk for chronic

diseases including cancer and heart disease (Scartezzini P. et al, 2000) Oxidation processes are intrinsic in energy management of all living organisms and are therefore kept under strict control by several cellular mechanisms (Harini R. et al 2012). Antioxidant properties in several plant species have been studied for the development of natural antioxidant formulations in the areas of food, medicine and cosmetics. (Miliauskas G. et al, 2004) Health promoting effects of antioxidants present in plants have been well documented. Antioxidants work in the way, that they donate an electron to a molecule which is been compromised by oxidation, bringing it back into a state of proper function. (Zulkhairi AH. et al 2010) The present study has therefore been designed to determine the antioxidant and anticancer activities of *Leonotis nepetifolia* and to profile the active compounds present in the leaf extract. *L. nepetifolia*, also known as Lion's Ear, is a species of plant in the *Leonotis* genus and the Lamiaceae (mint) family. *L. nepetifolia* is known in Trinidad as Shandilay and the leaves are brewed as a tea for fever, coughs, womb prolapse and malaria.



MATERIAL AND METHODS

Sample collection and preparation:

Fresh plant *L. nepetifolia* was collected from the fields located in Gorevada forest and PKV Forest in Nagpur region. The collected plant was taxonomically identified by Dr. A.U. Pachekhede, Ex Head and Professor in Botany, Shree Brijlal Biyani Science College, Amravati. After identification, the fresh leaves were spread thinly on paper-lined wooden trays and subjected to shade drying at ambient temperature to prevent the loss of volatile aroma compounds and also photooxidation for five days according to method reported by Killedar *et al.* Then they were ground into coarse powder and subjected to extraction. The method of using solvents such as chloroform, ethyl alcohol and acetone, were used for or the extraction and this work was processed at GC-MS study at IIT Pawai, Mumbai.

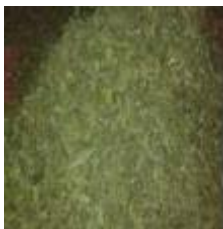


Figure 1: Fresh, dried and powder *Leonotis nepetifolia* Leaves.

RESULT AND DISCUSSION

Medicinal Importance of *Leonotis nepetifolia* (L)

Leonotis nepetifolia plant is very much useful in medicine. The uses of it were found in some literature reviews. Some uses found are as followed...

1. The whole plant ash of *L.nepetifolia* is used externally to treat paralysis.
2. The application of paste of inflorescence mixed with ground oil is used for wound healing.(Nithya V, Brindha P, Anand KV (.2011),
3. The paste of leaf is reported to be used in applying in Eczema, burning sensation of Scorpion sting.
4. The ash of the whole plant mixed with mustard oil is used as an external application, which relieves breast pain during post natal period and pain due to swelling anywhere in the body including joint pain. (Hemandri K A. (2011)
5. In India, the medicinal uses of the plant are reported for ring worm, scalds, skin affliction, and malaria.

The present investigation concluded that further advanced study must be done on these plants, so that it will help in preserving our traditional knowledge. The well thought-out arguments have been made many years ago to raise public awareness on destruction of flora and fauna. Important aspects to be covered are identification of medicinal plants, time and methods for collection/harvesting. The present GC-MS screenings are an essential tools for confirmation of the results and it may serve as pavements for the researcher to select a group of plants having similar chemical constituents and their detailed investigation regarding their chemistry and functions is required, so that they can be used in allopathic or in Ayurvedic medicine.

Thin layer chromatography Plate of *Leonotis nepetifolia*

The specific compound-band, which has anti oxidative properties; are shown in the R_f value of 0.44, which was chosen as effective compound for obtaining partially purified compounds. The purity of the compounds was checked by TLC, with 20% methanol in chloroform. (As shown in below Figure). Antioxidant activity was confirmed when the colour of band black color changed to red .

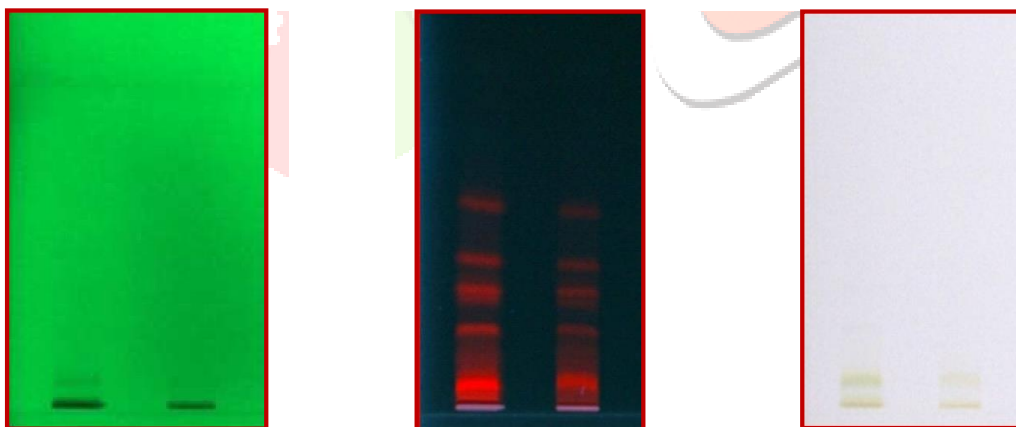


Fig- Thin layer chromatography Plate of *Leonotis nepetifolia*

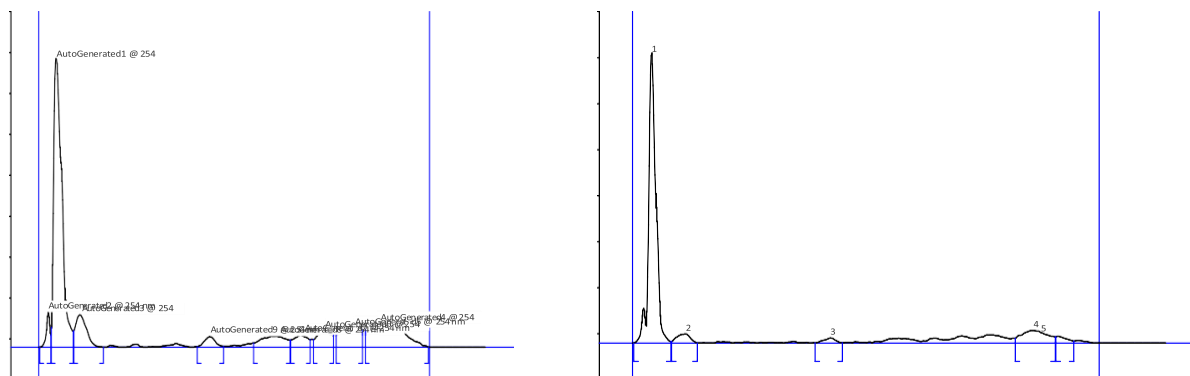


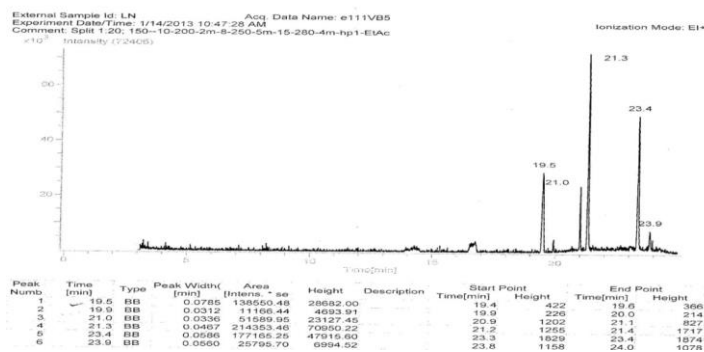
Fig.-Graphical View of TLC Plate

Gas Chromatograph with High Resolution Mass Spectrometers

The test plants extract were subjected to GC-MS analysis at a laboratory of (IIT Bombay's) Sophisticated Analytical Instrument Facility (formerly RSIC), Indian Institute of Technology Bombay Powai, Mumbai. 400 076, India.

Table No.1 : The chemical Composition of *Leonotis nepetifolia*

S. N.	R. T.	Name of compound	Molecular formula	Mol. Weight	Peak Area
1	19.5	Hematoporphyrin	C ₃₄ H ₃₈ N ₄ O ₆	566	138550
2	19.5	Cyclodecasiloxane	C ₂₀ H ₆₀ O ₁₀ Si ₁₀	740	138550
3	19.9	Decanic acid	C ₅₀ H ₈₂ O ₉	826	11166.44
4	19.9	2-(5-(5-[Cyano-(9,9-dimethyl-1,4-dixa-7-aza-spiro[4,4]non-7-en-8-y)methylene]-3-3-dimethylprrolidin02-ylide	C ₃₂ H ₄₂ N ₆ O ₂	870	11166.44



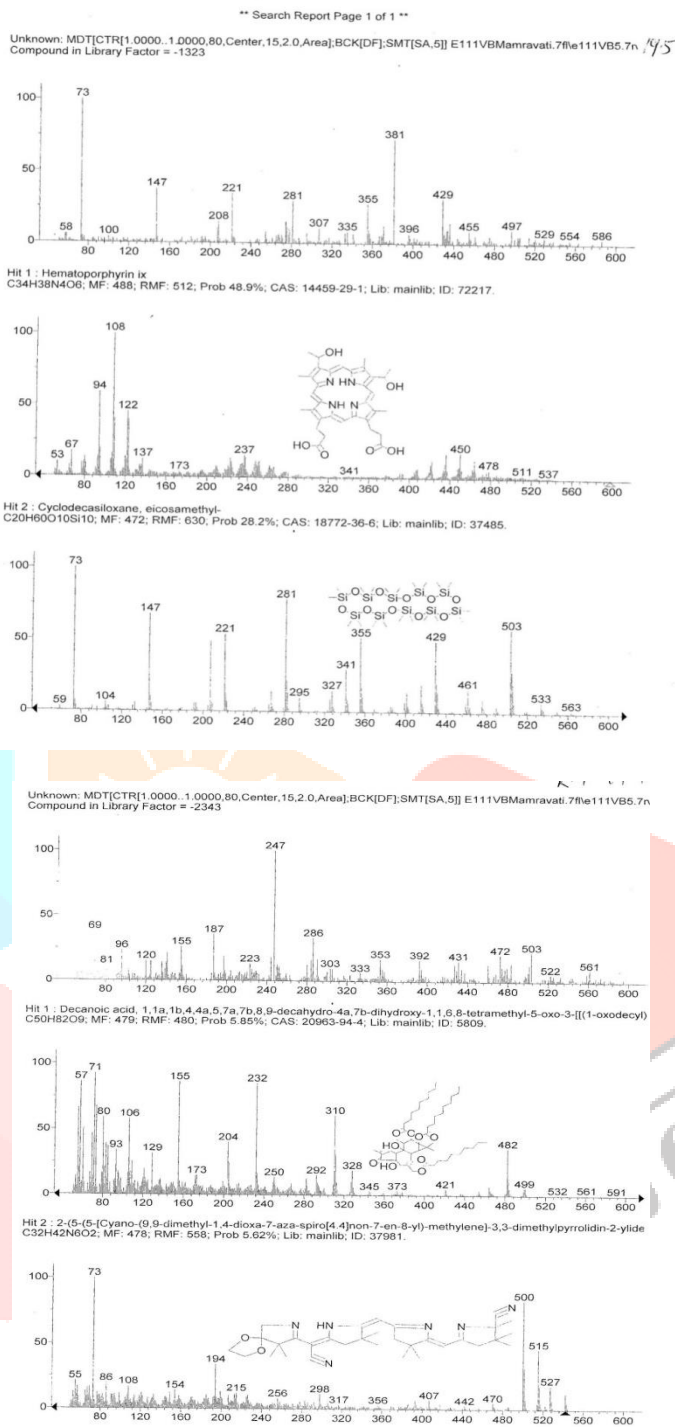


Fig- Graphical GC-MS Representation of *Leonotis nepitifolia*

CONCLUSION

From this study, we derived some conclusions such as the dried leaves of the plant of *L.nepitifolia* and its ethnomedicinal properties such as proximate (Moisture, Ash, crude protein, crude fat, crude fiber and carbohydrate), minerals such as (Ca, Na, K, Mg, Fe, Zn, Cu and Mn), phytochemicals (total phenolic, total flavonoid, and condensed tannin) contents, and the antioxidant capacity of dried leaves and its infusion were done scientifically and the results were compiled as shown under results and discussion parts. However, there is a need to carry out further composition profile of the dried leaves infusion using GS-MS, TLC to explore the potential chemicals present in the infusion.

Imbalance in pro-oxidant and antioxidant homoeostasis occasioned by excessive free radicals generation or insufficient antioxidants has been implicated in the development of several human disease conditions, such as atherosclerosis, hypertension, ischaemic diseases, Alzhemiers' disease, Parkinsonism and

cancer(Narendhira kannan RT *et al* 2010). Different extracts from traditional medicinal plants have been tested to identify the source for the therapeutic effects. As a result, some natural products have been approved as new antimicrobial drugs, but there is still an urgent need to identify novel substances, that are active towards pathogens with high resistance. (Qadrie LZ *et al*2009)

REFERENCES

1. Killedar SG, Pawar AV, Suresh Killedar C. (2017) Preparation of Herbal Tea from Mulberry Leaves. *J Med Plants.* ; 5: 325-328.
2. C.Kalu and. Anifowoshe E.I (2003) Ethnomedicinal uses of plants the Ekitis in Irepodun
3. Chandra Prakash Kala.(2005),Ethnomedicinal botany of the Apatani in the Eastern Himalayan region of India. *Journal of Ethnobiology and Ethnomedicine* p 11.
4. Hemandri K A. (2011), *Treatise on Tribal's Medicine* 1st ed Dr.Koppula Hemadri's House of Tribal Medicine. p- 20.
5. Nithya V, Brindha P, Anand KV (.2011), Wound healing activity of *Leonotis nepetaefolia* R.Br,in Wistar Albino rats. *Asian J Pharm Clin Res*;4(2): p 23-26
6. Shobhangini Nayak, Soumit K Behera & Malaya K Mishra. (2004), *Ethno-Journal of Traditional Knowledge* p72-79
7. S.K.Jain and Sumitha Srivastava,(2005),Traditional uses of some Indian Plants among islanders of the Indian Ocean *IJTK.P* 345-357.
8. Arnous A, Makris DP, Kefalas P. (2001)Effect of principal polyphenolic components in relation to antioxidant characteristics of aged red wines. *J Agri Food Chem.* ;49:5736–5742. [PubMed] [Google Scholar]
9. Tadhani MB, Patel VH, Subhash R. (2007) *In vitro* antioxidant activities of *Stevia rebaudiana* leaves and callus. *J Food Compos Anal.* ;20:323–329. [Google Scholar]
10. Rattanachitthawat S, Suwannalert P, Riengrojpitak S, Chaayasut C, Pantuwatana S. (2010) Phenolic content and antioxidant activities in red unpolished Thai rice prevents oxidative stress in rats. *J Med Plants Res.* ;4(9):796–801. [Google Scholar]
11. Scartezzini P, Speroni E. (2000) Review on some plants of Indian traditional medicine with antioxidant activity. *J Ethnopharmacol.* ; 71:23–43. [PubMed] [Google Scholar]
12. Harini R, Sindhu S, Gurumoorthi P, Sagadevan E, Arumugam P. (2012) Characterization of *in vitro* antioxidant potential of *Azadirachta indica* and *Abutilon indicum* by different assay methods. *J Pharm Res.*5:3227–3231. [Google Scholar]
13. Miliauskas G, Venskutonis PR, Van Beek TA. (2004) Screening of radical scavenging activity of some medicinal and aromatic plants. *Food Chem.*;85:231–237. [Google Scholar]
14. Zulkhairi AH, Khairunnuur SM, Hafipah NRM, Azrina A, Rasadah AM, Kamilah KAK, (2010) An aqueous extract of *Citrus mitis* possesses antioxidative properties and improves plasma lipid profiles in rat induced with high cholesterol diet. *J Med Plants Res.* ;4(1):49–57. [Google Scholar]

15. Narendhira kannan RT, Rajeswari K. (2010) *In vitro* antioxidant properties of three varieties of *Allium sativum* L. extracts. *E J Chem.*7:573–579. [Google Scholar]
16. Qadrie LZ, Jacob B, Anandan R, Raj Kapoor B, Ulla RM. (2009) Antibacterial activity of ethanolic extract of *Indoneesiell echioides* (L) Nees evaluated by the filter paper disc method. *Pak J Pharm Sci.*22:123–125. [PubMed] [Google Scholar]

