

Histological and Phytochemical studies on aromatic plant, *Anisomeles indica*(L.) of family Lamiaceae (M.S.) India

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ABSTRACT

Anisomeles indica plant was collected from Dr. Panjabrao Deshmukh Krushi Vidyapeeth Agriculture Farm, Nagpur district (Maharashtra state). This plant belongs to family -Lamiaceae and is commonly known as "Gopoli" which is an evergreen aromatic, perennial, erect herb and measuring about 1.5cm in height. The stem is quadrangular, the leaves are covered by hairs and inflorescence is of verticillasters type. In the present study anatomical characters and phytochemical analysis of the leaves are reported. Anatomical characters reveal the study of leaf anatomy. Phytochemical analysis confirmed the presence of alkaloids, tannin, glycosides, carotenoids and saponin in leaves. Alkaloids showed high scores while tannins showed moderate scores but saponins indicated low scores. Aromatic oil is found in 6% in 3gm of dry weight of powder of leaves of *Anisomeles indica*. The present investigations concluded that the leaves of *Anisomeles indica* contains alkaloids>tannins> saponins >Glycosides>Carotenoids>Polyuronoids in this order, and contains double percent amount of aromatic oil. These chemicals are widely used in Ayurvedic traditional medicinal system.

KEYWORDS

Anisomeles indica,
Lamiaceae,
leaves,
Phytochemical,
anatomical,
analysis.

INTRODUCTION

The plant is being used by the local peoples and tribal of Maharashtra as ethno medicine on various ailments. It is fever associated with cold. Aromatics plants and species have great importance for food, cosmetics and pharmaceutical industries (Bhattachrjee and Jain, 2001). Plant has an almost limitless ability to synthesize aromatic substances, most of which are synthesized aromatic substances, most of which are phenols or their oxygen-substituted derivatives (Geissman, 1963). The final extract of each solvent was use to analyze for the presence of different phytochemical constituents (Harborne, 1973). Lamiaceae family species are important for its medicinal properties among plants. Chemical constituents of plants can be classified in different ways (kurin and Sankar,2007) and hence phytochemistry would refer to the study of chemicals derived from plants. Naturally growing Lamiaceae members have been used as tea, spice and for various medicinal purposes. Also used to treat fever, cough, headaches, wound healing heart diseases and stomach-aches. (Nurdan and Aysel, 2007). In the present study, we have concentrated on the anatomical features of the leaves and preliminary, screening and qualitative separation of secondary metabolites from leaves of plant, *Anisomeles indica*.

MATERIALS AND METHODS

The anatomical study of the species Double Staining Method was used (Farnsworth, 1966). Preliminary phytochemical screening of plant and oil percentage in leaves of from family Lamiaceae was carried out. (Thimmaiah, 1999).

Phytochemical Test: preliminary phytochemical screening of plants for detection of various plants constituent. Plant cells are highly sophisticated chemical factories, where large varieties of chemical compounds are synthesized through definite pathways. Separation of active substance from crude drug is called as extraction and it involved the use of different solvents. The choice of plant material for extraction depends on its nature and the compounds required being isolated. The dry powder of the plant material is commonly used for extraction. The expanding knowledge of the phytochemical screening has revolted that existence of close relationship between chemical constituent of plants and their taxonomical status. The alkaloids, tannins, glycosides, carotenoids, Polyuronoids and saponins are more important chemical constituents. The alkaloids are poisonous in nature but when used in small quantities exert useful physiological and hence they have secured significant place in medicines.

Phytochemical Analysis: Successive solvent extraction about 50 gm of the dry powder was successively extracted with the following solvents in a "Soxhlet Extractor". Petroleum Ether, Chloroform, Acetone, Ethyl Alcohol, Water. The liquid extract so obtained in each solvent was concentrated by distilling of the solvent and then evaporated to dryness in the water bath at 50°C. The solidified extract with each solvent was weighted and calculated the percentage in terms of dry weight of plant materials. Each time before extracting a residual part with the next solvent it was dried in even at 40°C to 50°C. Detection of alkaloids, Detection of tannins, Detection of glycosides, Detection of carotenoids, Detection of polyuronoids, Detection of saponins, Detection of oils percentage are carried out.

OBSERVATION AND RESULTS

Anisomeles indica (L.) O Ktze., Rev. Gen. PI 512, 1891. Mukherjee in Rec Bot. Surv. Ind. 14:152,1940. *Nepeta indica* L., Sp.PI.571,1753. *Anisomeles ovate* R.Br. in Ait. f.Hort. Kew. Ed.2.2:364,1811; F.B.I. 14:672, 1885 Mahabir

Distribution – Found throughout south India, in higher altitudes.

Locality – Plant was collected from Dr. Panjabrao Deshmukh Krushi Vidyapeeth Agriculture Farm (Botanical Garden), Nagpur.

Family – Lamiaceae

Botanical name – *Anisomeles indica*,

Vernacular name – **Gopoli**,

Flowers & fruits – August – April



Fig. *Anisomeles indica*.

Anatomical character of leaf

The upper and lower epidermis comprises uniseriate, spherical to polygonal cells.

Both epidermises are covered with cuticle. Mesophyll is transverse by large number of veins and is represented by groups of few spiral vessels. Collenchymas located below both the epidermis. Vascular bundles are

surrounded by a parenchymatous bundle sheath. Palisade parenchyma is triseriate below upper epidermis. Xylem vessels are covered with xylem fibers.



Fig. T.S. Leaf of *Anisomeles indica*

Phytochemical analysis of Leaf

The important properties of medicinal plants are perhaps due to presence of various secondary metabolites such as alkaloids, tannin, carotenoids, glycosides, polyuronoids, saponins etc. The above results indicate that the leaves of plant investigated that it is rich in alkaloids. Anatomical study of leaf was carried out to observe the anatomical details as well as to points out site of chemical constituents. Leaves were dorsoventral, palisade to only upper sides spongy parenchyma well developed with prominent inclusion of chemical constituents.

Phytochemical analysis of this plant - high concentration observed in ethyl alcohol, moderate contraction in petroleum ether and low in water. Maxwell *et al.*, (1995) Singh and Sawhney (1988) and they have reported Alkaloids as important medicinal constituent in family Lamiaceae. In *Anisomeles indica* (L.) Poit, high concentration was observed in ethyl alcohol extract, moderate in ethyl alcohol, Acetone and Chloroform is found to negative for this test. Tannins are considered as food product is plant vegetable. Tannins like isoflavones were detected by Harborne, (1998) for member of Lamiaceae and saponin was reported in low concentration. The presence of these chemical constituents in the investigated plant accounts for their usefulness as medicinal plants. Alkaloids are known to play some metabolic role and control development in living system. They are used in medicine especially steroidal alkaloids.

In the present study also reported that alkaloids are the major constituent in the leaf of *Anisomeles indica* (L.) for member of Lamiaceae. In the leaves of *Anisomeles indica* (L.) Tannin is found at considerable level and thus supports Harbone's view. The presence of tannin in above plant may be the reasons why most of the animal does not graze this plant. The present investigations

concluded that the leaves of *Anisomeles indica* (L.) contains alkaloids> tannins> saponins >Glycosides> Carotenoids> Polyuronoids in this order, and contains double percent amount of aromatic oil. These chemicals

are widely used in Ayurvedic traditional medicinal system. The presence of tannin in above plant may be the reasons why most of the animal does not graze this plant.

Table 1: Qualitative chemical analysis of various extract obtained by solvent extraction of leaves of *Anisomeles indica*

Test	Petroleum ether extract	Chloroform extract	Acetone extract	Ethyl alcohol extract	water extract
Alkaloids	++	+++	++	+	-
Tannins	-	++	++	+	++
Saponin	+	-	+	+++	-
Glycosides	+	-	+++	-	-
Carotenoids	++	+	++	+	-
Polyuronoids	++	++	-	-	-

(Low +, Medium ++, High +++, absent -)

Table 2: Analysis of oil percentage in leaf

No. Plant	Plant Sample Name	Empty flask weight	Empty flask oil weight	Oil % of leaf
1	<i>Anisomeles indica</i>	138.680 gm	138.870 gm	6.33 %

CONCLUSION

The Histological and anatomical characters are necessary for identification of plants species. The variations found in the chemical constituents of the studied plants, viz. alkaloids, saponins, tannins, glycosides, carotenoids and polyuronoids are due to the changes in the solvents. These changes might be due to the soil composition and environmental factors. Their detailed investigation regarding their chemistry and functions is required, so that they can be used in allopathic or in Ayurvedic medicines. Therefore, this study concludes and recommends further advanced study of these plants, so that it will help in preserving our traditional knowledge. With further hope that, these observations may help in identification of proper plants and also hope that, the present phytochemical screening may serve as pavements for the researcher to select a group of plants having similar chemical constituents of particular class to isolate biologically active principles and future studies on family Lamiaceae.

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