

PHARMACOGNOSY OF *NEPETA CATARIA*

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ABSTRACT: *Nepeta cataria* Linn (Family Labiatae), commonly known as catnip, is a herbaceous plant and is a native of southeast Europe, Orient, Southwest Asia and Western temperate Himalayas. Leaves and flowering tops, which contain tannin and volatile oil are aromatic, carminative, tonic, diaphoretic, refrigerant, emmenagogue, antiseptic, stimulant and useful in infantile colic and hysteria. Leaves are deltoid-oval with double layers of palisade, petiole about as long as blade, arc shaped in t.s., having vascular bundle flanked by 2 smaller bundles in two projection; stem hollow in the middle; leaves, petioles and stems contain glandular and uniseriate, multicellular non glandular hairs; TLC of alcoholic extract in Benzene: Chloroform (1:1) shows 8 spots and UV absorbance shows strong peak at 212 nm; extractive values and ash values were also determined.

INTRODUCTION

Nepeta cataria Linn. (Family Labiatae) commonly known as catnip or catmint in English, is a native of south east Europe, Orient, Southwest Asia western temperate Himalayas (from Dalhousi to Kashmmir up to an altitude of 1500 m: W.I., 1966).

It contains volatile oil and tannin, Volatile oil was obtained by steam distillation of the herb and maximum yield was obtained from partially dried plant material. Principal contents of "American Nepeta Oil" are Nepetalactone (C₁₅H₂₂O b.p. 67 – 70°C) nepetallic acid (C₁₅H₁₈O₂ m.p. 74-75°C), nepatalic anhydride (C₁₅H₂₀O₂ m.p. 139 – 140°C) B-carryphyllene, two unidentified substances and probably an ether and an ester are also present (Chopra et. al, 1956; W.I., 1966)

Therapeutically leaves (dried) and flowering tops are aromatic, carminative, tonic,

diaphoretic, refrigerant, emmenagogue, soporific, antiseptic and stimulant; leaves are some times chewed to relieve tooth ache (Chopra et. al, 1956; W.I., 1966). In homoeopathic system of medicine it is useful to break up a cold, in fantile colic and hysteria (Boericke, 1927). Scented leaves and flowering tops are used for flavouring purpose, specially for sauces, cooked foods and in medicine (W.I. 1966).

Pharmacognostic evaluation of this plant is not in record which is the present object of study.

MATERIAL AND METHODS

Seeds collected from France and America were germinated artificially and grown in our experimental Herb Garden. Plant materials were also collected from Dalhousi of H.P. and Kashmir (India). Conventional

method of hand-section cutting was taken up for anatomical studies; chemical analysis were done following Johansen (1940), Youngken (1951), Cormwell (1956), Trease and Evans (1972) and for determining physical characters IP (1970) was followed. Leaves and flowering tops were extracted with ethanol at room temperature in soxhlet apparatus for 24 hours. TLC of extract of leaves and flowering tops was carried out on silicagel 'G' coated plates using Benzene : Chloroform (1:1) as solvent system and plates were developed by exposing them to iodine vapour : UV absorption spectroscopy was carried out on Beckman M26 instrument.

OBSERVATIONS

I. MACROSCOPIC STUDIES

Leaf : (Fig.1) about 8 cm long, narrowly to broadly deltoid, ovate or generally corate, coarsely crenate-dentate, truncate or subcordate at base, softly tomentose and pale green in colour; petiole as long as the blade.

Flowering top : (Fig.2) flowers in continuous or interrupted clusters, rather loosely many flowered cyme. Flowers (Fig.3) small, inconspicuous, white dotted with purple or nearly almost white. Calyx: sepals 5, tubular, hairy, about 7mm long during anthesis and the lobes being about half as long as the tubes; corolla: petals typical bilabiate, white dotted with purple, 10,12 mm long; androecium: stamens 4, of them 2 long and 2 short, ascending under the upper lip or exserted: gynoecium: styli lobes subulate. Nutlets broadly oblong, smooth, brownish-black. The plant flowers from July to November. Odour strong aromatic and disagreeable, suggestive of a mixture of mint and pennyroyal; taste warm bitterish and camphoraceous.

II. MICROSCOPIC STUDIES

Leaf: dorsiventral; transaction shows (Fig.4) single layer of epidermis present on both upper and lower surfaces leaf (Fig.5) bearing glandular and non-glandular trichomes and caryophyllaceous stomata (Fig.6), stomata less frequent on upper surface. Non glandular trichomes are 3 – 4 cells long and uniseriate. Glandular trichomes (Fig.6) are of 2 types : (a) small having unicellular head and unicellular stalk and (b) 4-celled head and unicellular stalk. Mesophyll is differentiated into 2-layered palisade and 4-6 layered spongy parenchyma. Midrib much pronounced towards lower surface, 2 layers of collenchyma present below both upper and lower epidermis in midrib region; vascular bundle in conjoint, collateral and arc shaped.

Petiole (Fig.7) : transaction shows single layered epidermis with trichomes as in lamina; 2-3 layers of collenchyma present below epidermis; cortex parenchymatous; a comparatively large conjoint, collateral vascular bundle is present in the centre and flanked by two smaller bundles in the two projecting arm-like structures.

Stem (Fig.8) : in transaction rectangular in shape with projecting corners; epidermis single layered with glandular and non-glandular trichomes as in lamina; ridges contain 6-8 layers of collenchyma; cortex parenchymatous; pericycle is represented by patches of sclerenchyma; xylem present in a continuous ring but narrowed at the furrows; phloem present beneath pericyclic patches; pith parenchymatous and having a central is hollow.

III. CHEMICAL ANALYSIS

- a. A preliminary chemical analysis reveals: presence of volatile oil, tannin, sterol and sugar; absence of oxalate, alkaloid, glycoside, anthraquinone and saponin.
- b. Thin layer chromatographic study of alcoholic extract was carried out using Benzene: chloroform(1:1) and spots were developed by exposing the plate in iodine vapour revealed presence of 8 spots (Rf values are 0.045,0.090,0.136,0.22,0.38,0.55,0.70,0.90)
- c. Alcoholic extract scanned for UV absorbance gave one strong peak at 212 nm

IV. PHYSICAL CHARACTERS

- a. Extractive values:
Alcohol soluble extractive=13.9%

Water (Ph 7) soluble
extractive=23.8%

- b. pH of alcohol extract =5.4
- c. Ash values:

Total ash values of powdered drug = 12.40%

Water Soluble ash = 2.70%

Acid insoluble ash = 1.23%

DISCUSSION

In India about 30 species of *Nepeta* are available, of them about 4 are very common in their native regions of India. (Kirtikar and Basu, 1935; Chopra et.al., 1956; W.I. 1966). They are *N.ciliaris* Benth., *N.elliptica* Royle ex. Benth., *N. ruderalis* Buch Ham (= *N. hindostana* (Roth.) Haines, *N.glomerulosa* Boiss (= *N. juncea* Benth). With these species. *N. cataria* is compared and it can be distinguished by the features presented in Table-1.

Table 1: Comparative characteristics of five common species of *Nepeta* found in India.

Characters	<i>N. cataria</i>	<i>N. elliptia</i>	<i>N. ciliaris</i>	<i>N. hindostana</i>	<i>N. glomerulosa</i>
Leaf:					
Petiole	Petiole about as long as the blade	Subsessile	Petioled	Petioled	Lower ones shortly petioled, rest sessile
Shape	Deltoid, ovate or generally cordate	Elliptic-oblong or oblong-cordate	Ovate-cordate	Broadly ovate or orbicular-cordate	Ovate
Tip	Acute	Rounded or Acute	Obtuse	Obtuse	Acute
Margin	Coarsely Crenate Dentate	Crenate	Crenate	Crenate	Crenate
Plant :	Densely Downy	Densely Hairy	Softly Tomentose	Softly Pubescent	Appressedly White-wooly

Explanation of Figures

Fig . 1 : Line drawing of Leaf showing different parts of it.

Fig. 2 &3 : Line drawing of Flowering top and a single flower

Fig.4 : Transection of leaf

Fig.5 : Surface view of epidermis showing glandular and non-glandular trichomes and Stomata

Fig. 6 a&b : Non glandular and glandular trichomes

Fig.7 : Transection of petiole

Fig.8 : Transection of stem.

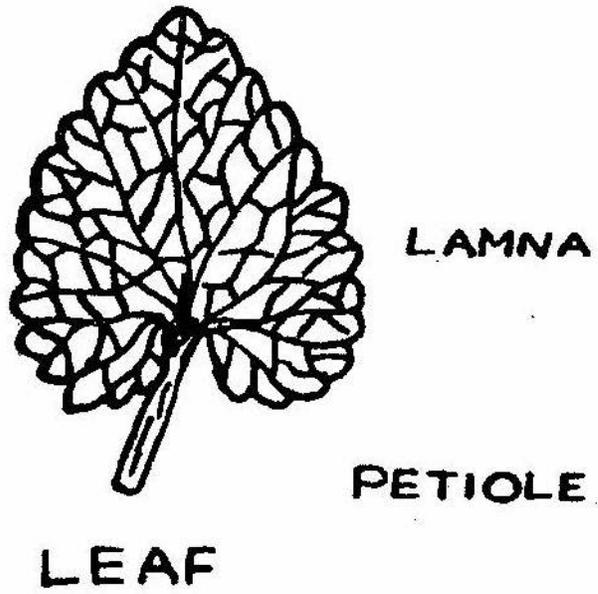


FIG 1



FIG. 2



FLOWER

FIG 3

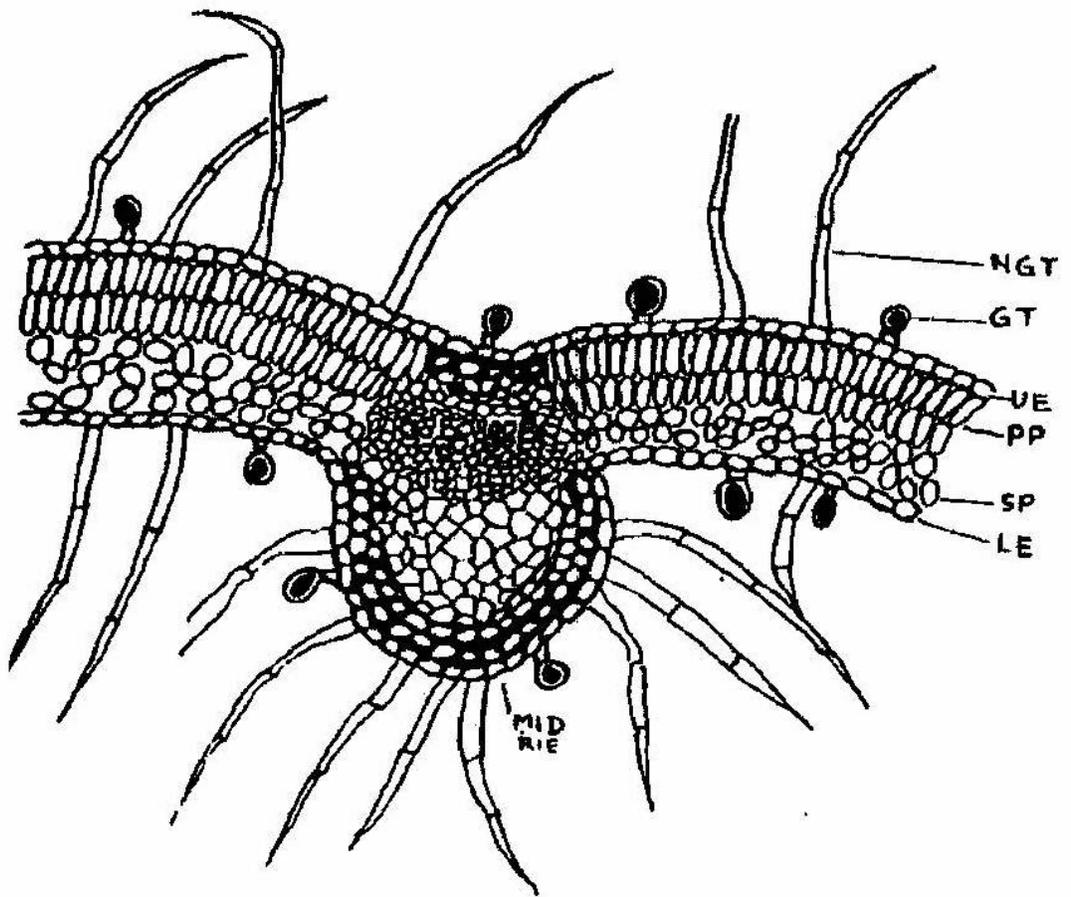


FIG. 4

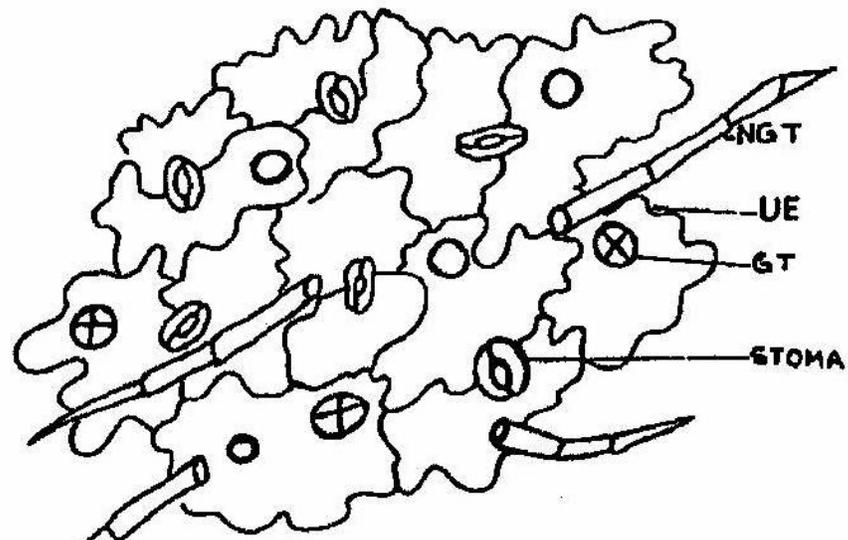


FIG. 5

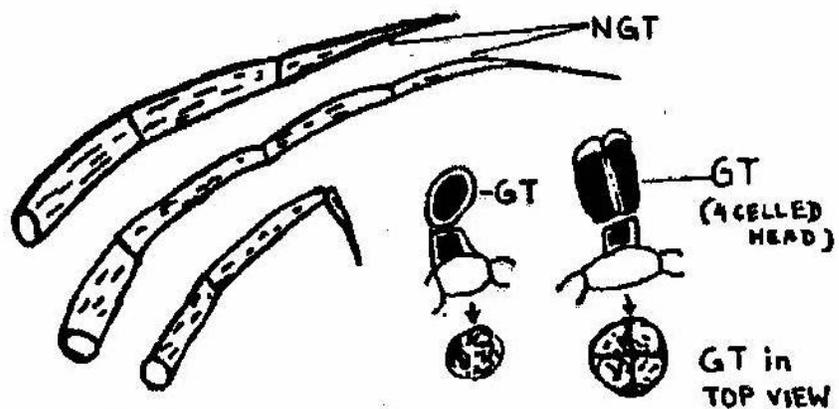


FIG. 6

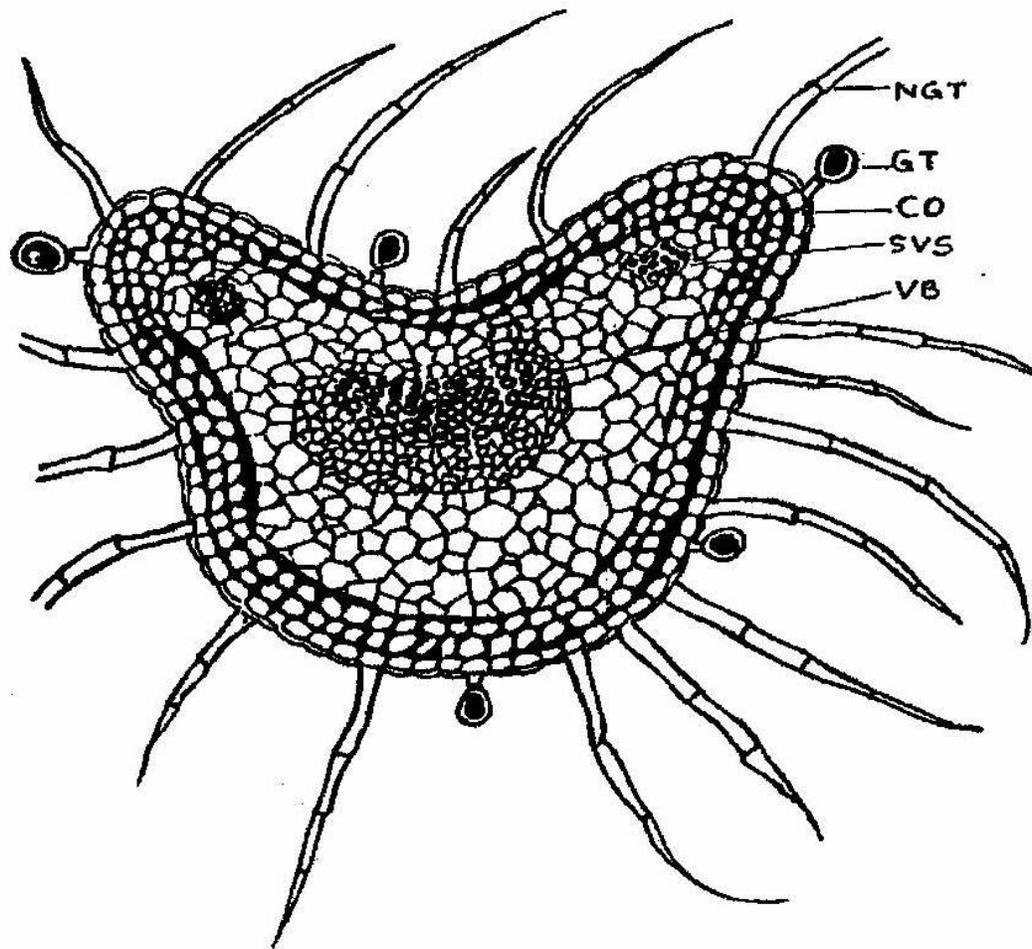


FIG. 7

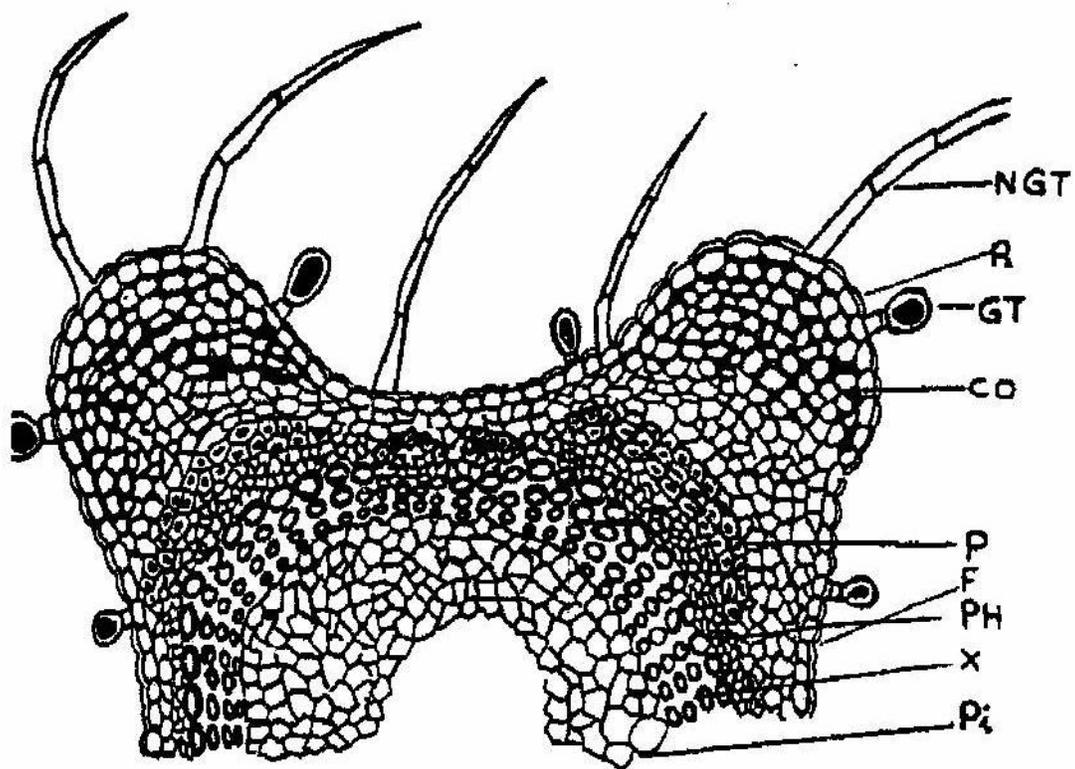


FIG. 8

Abbreviations used:

BS = Bundle Sheath ; C=Cortex; Co=Collenchyma; F=Furrow; GT=glandular trichome; LE=Lower epidermis; NGT=Non glandular trichome; P=Pericycle; PH= Pholem; Pi=Pith; PP=Palisade Parenchyma; R=Ridge; SP=Spongy Parenchyma; SVS=Small Vascular Supply; UE=Upper epidermis; VB=Vascular Bundle; X=Xylem.

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