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PHARMACOGNOSTIC STUDIES OF *VERNONIA CINEREA* (L.) LEAVES - AN ANTISMOKING PLANT

Mangesh Dagawal* and D. Tarekar

Department of Botany, Smt. Radhabai Sarda College of Arts, Commerce and Science Anjangaon Surji Dist. Amravati (M.S.)

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***Corresponding Author**
Mangesh Dagawal
Department of Botany, Smt. Radhabai Sarda College of Arts, Commerce and Science Anjangaon Surji Dist. Amravati (M.S.)

ABSTRACT

Vernonia cinerea (L.) (Asteraceae) is annual herb commonly called as sahadevi. It is one of the ten herbs that constitute the group of a reputed ayurvedic medicine "Daspuspa". It is used as folk medicine by the people of Nepal and is also used in smoking cessation, cough fever, urinary calculi. *Vernonia cinerea* is extensively used in indigenous medicines as stomachic and for cold, asthma and bronchitis. Anatomically leaf is characterized by anemocytic stomata, simple as well as irregular T-shaped glandular trichomes. Present investigation showed the presence of alkaloids, Phenolics, flavononol, flavones, flavonone and polyoses in leaf. Leaves were extracted with Petroleum ether, chloroform, Acetone, Methanol and distilled water. TLC fingerprinting of all extracts was done for drug characterization. Fluorescence analysis of powder was done and shows distinct colour variation.

KEYWORDS: *Vernonia cinerea* (L.), Pharmacognosy, Phytochemistry, TLC fingerprinting.

INTRODUCTION

Vernonia cinerea (L.) (Asteraceae) is annual herb commonly called as sahadevi. It is one of the ten herbs that constitute the group of a reputed ayurvedic medicine "Daspuspa". It is used as folk medicine by the people of Nepal.[1] The *Vernonia cinerea* is used in smoking cessation, cough, fever, malaria, urinary calculi, arthritis[2] and leprosy.[3] The *Vernonia cinerea* possess antimicrobial[4], antioxidant[5], antihelmentic[6] , anti inflammatory, analgesic, antipyretic[7], antiflautulent, antispasmodic[8] and antdiuretic properties.[9] Due to traditional use of the *Vernonia cinerea* for the several diseases in the present investigation these plant parts selected for pharmacognostic study.

MATERIAL AND METHOD

Plants were collected from area around the Anjangaon Surji region Dist. Amravati; for identification standard floras were referred.[10,11,12] For anatomical studies hand sections of fresh material were taken and photography was done to illustrate micromorphology of leaf. Anatomy of plant part used i.e. leaf was studied. Mature leaves were shade dried, powered and stored at 4 ^{0}C in zip lock bag for further studies. Material was screened for presence of bioactive molecules following standard methods.[13,14] Leaves were extracted with five different solvent viz Petroleum ether, acetone,methanol, ethanol and distilled water. TLC fingerprinting of all extracts was done for drug characterization. Fluoroscence analysis of leaf poweder was also done as per method described by Chase and Pratt, 1949.[15]

RESULTS AND DISCUSSION

The biological and therapeutical applications of the plants of Asteraceae is the result of systematically conducted chemical and pharmacological research rather than simply of tradition**.** Cytotoxic sesquiterpene lactones of certain species may act as pointers for development of cancer drugs.[16]

Table No.1 Phytochemical Profile

Sr. No.	Test	Response	Intensity	Inference
1	Iridoids	Dark green	--	Absent
2	Alkaloids a) Mayer's Reagent b) Wagner's Reagent	 Yellow Brown	 -- ++	 Absent Presnt
3	Anthraquinones a) Test a b) Test b c) Test c	 Greenish Light Yellow Brown	 -- -- --	 Absent Absent Absent
4	Cardenolides a) Cardiac glycosides b) 2-deoxy sugar	 Light Green Brown	 -- --	 Absent Absent
5	Flavonoids a) Shinoda test b) Flavononol test c) Flavanol test d) Flavone, Flavonol, Flavanone test e) Rao & sheshandri test	Crimson Yellowish Yellowish Orange Light Yellow	-- ++ --- +++ --	Absent Present Absent Present Absent
6	Simple Phenolics Test a) with $Fecl_3$ Test b) with addition of NaOH Test c) Addition of excess $Fecl_3$	 Green Reddish Yellow	 ++ ++ ++	 Hydroquinone/n-naphthonol/catechol B-diketones or B-ketonic ester Hydroquinone

7	Leucoanthocyanin Test a Test b	 Green Dark Green	 -- --	 Absent Absent
8	Steroids	Light Brown	--	Absent
9	Tannin Test a Test b	 Light Green Dark Green	 -- --	 Absent Absent
10	Saponins	No Froth	--	Absent
11	Juglone	Light Yellow	--	Absent
12	Emodins	Light Green	--	Absent
13	Polyoses	Red	++	Present
14	Polyuronoides	Brown	--	Absent
15	Anthracene glycosides	Green	--	Absent

TLC fingerprinting of extracts in mobile phase- Chloroform: Benzene (4 :1)

Table- 2

Name of extract	Developers	Number of spot	Rf value	Colour
Petroleum ether	H_2SO_4	02	0.30	Brown
			0.69	Blue
	Iodine	05	0.125	Yellow
			0.25	Brown
			0.375	Yellow
			0.558	Yellow
			0.95	Green
Methanol	H_2SO_4	03	0.3	Green
			0.37	Brown
			0.58	Light Brown
	Iodine	03	0.227	Light Green
			0.454	Light Yellow
			0.54	Light Brown
Ethanol	H_2SO_4	03	0.867	Green
			0.50	Brown
			0.38	Green
	Iodine	02	0.34	Light Green
			0.53	Light Green
Acetone	H_2SO_4	02	0.42	Brown
			0.81	Yellow
	Iodine	02	0.27	Green
			0.90	Yellow
Water	H_2SO_4	Nil	-	-
	Iodine	Nil	-	-

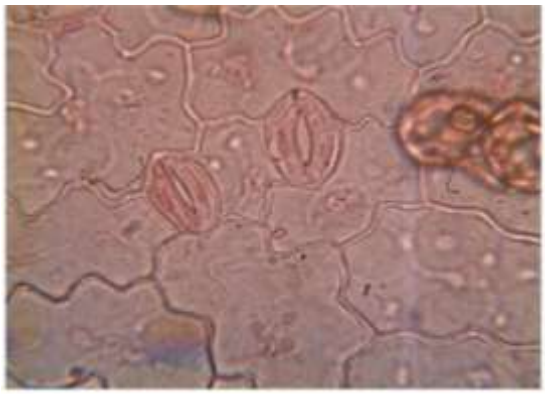
Beheviour of Leaf Powder with different Chemical Reagent

Table No. 3

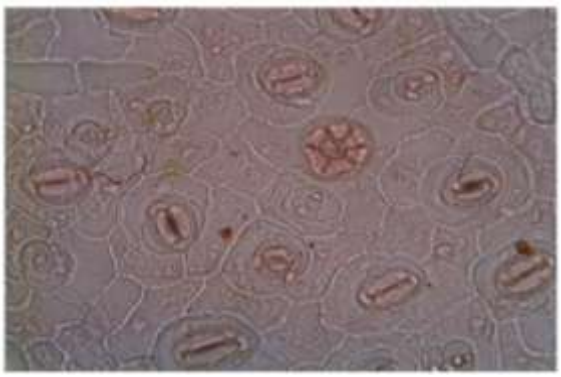
Sr. No.	Treatment	Observation (Colour)
1	Powder+Acetic acid	Green
2	Powder+conc. H_2SO_4	Blakish Brown

3	Powder+ conc. HNO_3	Brown
4	Powder+ $FeCl_3$	Light Brown
5	Powder+ Aq.NaOH	Yellowish Green
6	Powder+ conc.HCl	Dark Green

A) Petiole



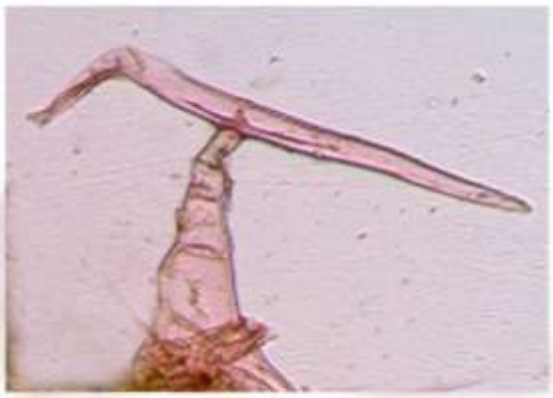
B) Upper epidermis



C) Lower epidermis

D) Midrib

E) Multicellular trichomes



F) Regular T shaped trichomes

PLATE-1

Vernonia cinerea(L.)

A)Twig

B) Capitulum

Macromorphology

Annual herbs, Erect,20-80 cm tall; Stem branch, cylindrical, hairy. Leaf simple, alternate, short petiolate, ovate or lanceolate hairy on both sides, leaves 0.8-3X0.3-2cm, acute ,serrate, reticulate venation. Head purple, 0.6-0.9 cm across, in paniculate cymes. Flower, homogamous, actinomorphic pappus bristles in two series, the outerones shorter than innerone. Petals gamopetalous valvate aestivation, violet colour. Stamens 5, syngenesious, epipetalous, anther dithecous. Gynoecium bicarpellary, syncarpus, ovary inferior, unilocular, basal placentation (Plate I –A and B).

Anatomy

Petiole -Epidermis uniseriate, elongated and arranged in more or less parallel row,covered with cuticle, trichomes present on epidermis, and followed by single layered collenchyma upper as well as lower side. Which is followed by ground tissue parenchymatous, enclosing intercellular spaces. Vasculature in the form of 3 separate stands. Vascular bundle canjoint, collateral (Fig.A). Lamina dorsiventral, amphistomatous**.** Epidermis single layered ,cutinized and cuticularized; stomata anomocytic. Mesophyll differentiated into palisade and spongy parenchyma ; Palisade single layered densely filled with chloroplast. Spongy parenchyma 2-3 layered; cells irregular, loosely placed and filled with chloroplast . Midrib epidermis single layered covered by cuticle, hypodermis collenchymatous and 1-2 layered below epidermis. Ground tissue parenchymatous; with small intercellular spaces. Vascular bundle conjoint, collateral (Fig.B,C & D).

Trichomes regular T-shaped as well as multicellular trichomes present (Fig.E & F). Regular T-shaped trichomes emergent hairs with long unicellular head attached centrically to uniseriate stalk, present on epidermis of petiole and lamina. Multicellular trichome are present on the epidermis of petiole.

Anatomically members of the asteraceae family show much constancy of characters. Simple as well as glandular trichomes are common in family. Glandular trichomes are sunken capitates hairs with short multicellular stalks , hair larger in *Vernonia amygdalina* than *vernonia cinerea*. Irregular T-shaped glandular trichomes, common in *Vernonia amygdalina*, absent in *Vernonia cinerea*. Uniseriate non glandular trichomes observed in *Vernonia cinerea.*[17]

Phytochemistry: In present investigation plant material was screened for 15 biomolecules of these six were found to be present in the material studied. (Table 1). Plant extracted in petroleum ether, chloroform, acetone, methanol, and water were subjected to TLC finger printing for characterization (Table 2). In present investigation the TLC fingerprinting showed that the petroleum ether extract for leaf shows maximum spot when iodine vapour developer used as compared to other extract. The fluorescence characteristics of powder when treated with various chemical reagent have been extensively studied in day light which sets a standard parameter for authentication the results are shown in table 3.

CONCLUSION

Vernonia cinerea contain some of the phytochemical compounds and are effective antimicrobials also *Vernonia cinerea* possesses potential to develop a bioinsecticide.

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