

Pharmacognostical evaluation of leaves of *Vernonia cinerea* Less

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ABSTRACT

Vernonia cinerea Less. of family Asteraceae is of medicinal value. In the present study pharmacognostical investigations such as morphology, physico-chemical parameters, powder characters, reaction of powder with chemical reagents and quantitative microscopy are carried out on the leaves of *Vernonia cinerea* Less. The Preliminary phytochemical screening revealed the presence of Flavonoids, Glycosides, Tannins, and Carbohydrates. The finding may provide useful information with regard to its identification and standardization in future.¹

Key words: *Vernonia cinerea* Less., Asteraceae, Pharmacognostic, Phytochemical, Leaf constants.

INTRODUCTION

Vernonia Cinerea L. (Astraceae) is an erect annual herb, known as Sahadevi in Sanskrit, Purple Fleabane in English, Garita kammi in Telugu. It also exhibits a wide range of pharmacological effects, including antibacterial (U.K.Mazumdar *et al.*, 2003), analgesic, antipyretic, anti-inflammatory (E.O.Iwalewa *et al.*, 2003), fungistatic effects (G .N. Krishna kumari *et al.*, 2003), hypoglycaemic and anti-diabetic activity (G.Y.Sy. *et al.*, 2005). It possesses anticancerous activities and is good for cancerous malformations.

In spite of the numerous medicinal uses attributed to this plant, there is no pharmacognostical report on the leaf constants and other physicochemical standards required for the quality control of the crude drug. Hence the present investigation includes morphological evaluation, determination of physico-chemical constants and preliminary phytochemical screening of different extracts of *Vernonia cinerea* Less.

MATERIAL AND METHODS

The whole plant *Vernonia cinerea* was collected from an agricultural land near Chillargi, Bidar, Karnataka, India, in the month of December. The plant authenticated by Prof. Sajansetty, HOD of Botany, B.V.B. College Bidar, India. The fresh plant was used for the study of macroscopic characters and leaf constants, where as dried leaf powder material was used for the determination of ash values, extractive values and phytochemical constituents.

RESULTS AND DISCUSSION

Macroscopical characters (Fig 1)

The plant is branched herb, erect or decumbent growing up to 12-75cm high, with a cylindrical, glabrous, slightly branched stem of 10-17cm long, 1-8mm thick. The leaves are simple, alternate, lanceolate, 2.5-5cm long and 1.8-3.6 cm broad. The flowers are pinkish violet, in small heads,

Table 1. Quantitative Microscopy of *V. cinerea* leaf

S. No.	Leaf Constants	Values
1	Stomatal Index	25.18
2	Pallisade ratio	7.83
3	Vein-islet Number	7.00
4	Vein termination Number	13.00

acuminate, awned, silky on the back. Fruits are oblong achenes slightly narrowed at the base, clothed with appressed white hairs.

Powder analysis (Fig 2)

Numerous anomocytic or ranunculaceous stomata meaning there by that the cells surrounding the stomatal pores are irregularly arranged and cannot be differentiated from other epidermal cells.

Table 2: Behavior of *V. cinerea* powder with chemical reagents

S.No	Reagents	Colour/ Precipitate	Constituents
01	Powder+ Picric acid	No precipitation	Alkaloid absent
02	Powder+ Conc H ₂ SO ₄	No Change	Steroids/triterpenoids absent
03	Powder+ Aqes FeCl ₃	Light green	Tannins present
04	Powder + Iodine sol	No colour change	Starch absent
05	Powder + aqes NaOH	Yellow	Flavonoids present
06	Powder + Mg-Hcl	Magneta	Flavonoids present
07	Powder + Aq KoH	No Change	Anthraquinone glycosides absent
08	Powder + Dil NH ₃	No Change	Anthraquinone glycosides absent
09	Powder + Picric acid	No colour change	Cardiac glycoside absent
10	Powder + Conc HNO ₃	No yello Ppt	Protein absent
11	Powder + lead acetate	White ppt	Tannins present
12	Powder + lieberman burchard test	Redish green	Steroids/ triterpenoidPresent
13	Powder + mayers reagent	No precipitation	Alkaloids absent

Table 3: Loss on Drying and ash Value of *V. cinerea*

S. No	Parameters	Value(% w/w)
1	Loss on drying	5.55
2	Total ash	11.66
3	Acid insoluble ash	2.50
4	Water soluble ash	5.16

Vessels showing reticulate thickening.
 Fibres are thick walled, aseptate with pointed ends.
 Glandular and non-glandular type of trichomes present. Non-glandular are the multicellular types, some cell segments occasionally shriveled and T-shaped trichomes with 2-6 celled stalk.
 Epidermal cells polygonal to slightly irregular in shape in surface view, showing anomocytic stomata.

Table 4: Extractive Value of *V. cinerea*

S. No	Solvents	Value (% w/w)
1	Pet ether	3.28
2	Chloroform	6.98
3	Alcohol	10.93
4	Aqueous	11.41

Quantitative microscopy (Fig 3)

The vital quantitative microscopic leaf constants like vein-islet number, vein termination number, palisade ratio and stomatal index were carried out according to the standard method (Wallis, 1985) and the results are shown in Table 1.

Behavior of powder with chemical reagents

Behavior of leaf powder with different chemical reagents was studied to detect the presence of phyto-constituents with colour changes under day light by reported method (K. Mukhrjee, 2002) and the results are shown in Table 2.

Ash Values

Total ash, acid insoluble ash, water soluble ash and loss on drying values of the leaf powder were done as per the Indian Pharmacopoeia (2007) and results are tabulated in Table 3.



Fig. 1: Macroscopy of aerial parts of Vernonia cinerea Less

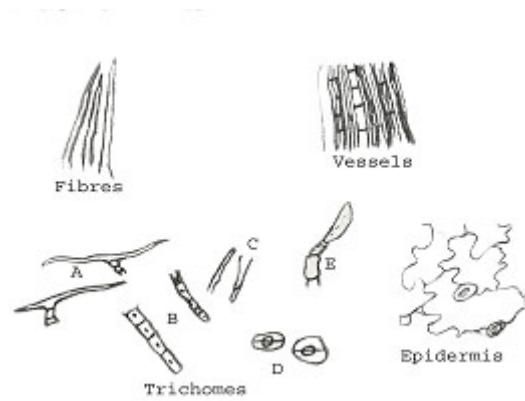
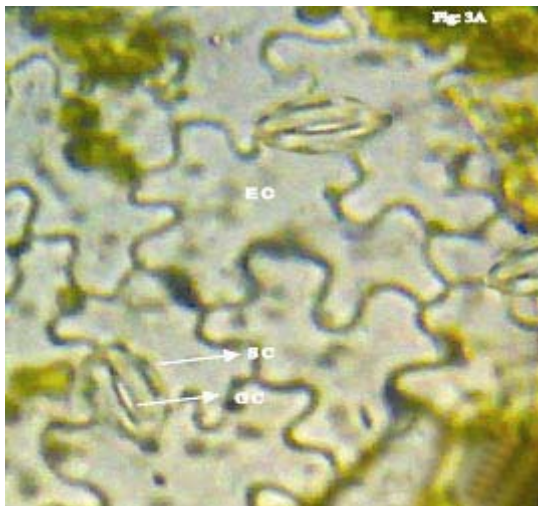
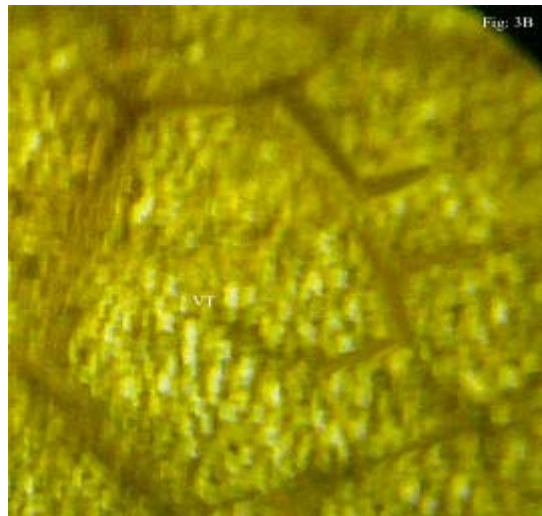


Fig. 2: Powder analysis of vernonia cinerea Less
A-T shaped, B- Capitate with multicellular stalk, C- Different unicellular types, D-Sessile glandular, E-Multicellular



EC: Epidermal Cell
SC: Subsidiary Cell
GC: Ground Cell

Fig. 3(a): A portion of leaf showing Stomata



VT: Vein termination
VI: Vein-islet

Fig. 3(b): A portion of leaf showing the Vein-islet and termination

Table 5: Colour, consistency and Percent Extractives of successive extracts of *V. cinerea*

S.No	Solvents	Colour/Consistency	Percentage Yield(% W/W)
1	Pet ether	Dark green/ sticky	2.94
2	Chloroform	Greenish black/ Sticky	1.41
3	Absolute alcohol	Dark green / Sticky	6.48
4	70% Ethanol	Dark green / Sticky	9.57

Table 6: Preliminary phytochemical screening of *V. cinerea*.

S. No.	Phytochemical Constituents	Petroleum Ether Extract	Chloroform Extract	Absolute Ethanol Extract	70% Ethanol Extract	Aqueous Extract
1	Alkoids	-	-	-	-	-
2	Carbohydrates	-	-	-	+	+
3	Glycosides	-	+	+	+	-
4	Steroids	+	-	-	-	-
5	Saponnins	-	-	-	-	-
6	Flavonoides	-	-	+	+	+
7	Tannins	-	-	-	+	-
8	Triterpenoids	-	-	-	-	-
9	Protein & Amino Acids	-	-	-	+	-
10	Fixed oil & Fats	-	-	-	-	-
11	Mucilage	-	-	-	-	-

Where: + = Present, - = Absent

Extractive values

Extracts were prepared with various solvents by reported methods (Indian Pharmacopoeia, 2007). Percentages of the extractives values were calculated with reference to air dried drug (Table 4). Colour, consistency and percentage of successive extracts (Khandelwal KR, 2008) are given in Table 5.

Preliminary Phyto-chemical screening

Freshly prepared organic extracts of the leaf were tested for presence of phyto-chemical constituents using reported methods (Kokate, 1986 and Harborne, 1998) and the results are given in Table 6.

CONCLUSION

The present study on pharmacognostical characters of *Vernonia cinerea* will be providing useful information in regard to its identity and help to differentiate from the closely related other species of *V. cinerea*. The presence of anomocytic stomata and T-shaped trichomes with 2-6 celled stalk are characteristic features of *V. cinerea*. The other parameters of quantitative microscopy may be useful for the future identification of the plant.

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