



## PRELIMINARY PHYTOCHEMICAL INVESTIGATION INCLUDING HPTLC PROFILE ON AERIAL PARTS OF *VERNONIA CINEREA* (L)

Sangeetha.T.<sup>1\*</sup>, Venkatarathinakumar.T.<sup>1</sup>, Sankari. G.<sup>2</sup>

<sup>1</sup>Madurai Medical College, Madurai - 625020, (TN), India.

<sup>2</sup>Adiparasakthi College of pharmacy, Melmaruvathur-19 (TN), India.

\*Corresponding author's E-mail: [sangee\\_pharm@yahoo.co.in](mailto:sangee_pharm@yahoo.co.in)

Accepted on: 25-08-2011; Finalized on: 20-11-2011.

### ABSTRACT

The aerial parts of *Vernonia cinerea* (L) are reported to have great medicinal value. Phytochemical screening including qualitative chemical examinations and quantitative analysis was carried out using HPTLC technique for Pet.ether extract, Chloroform extract and ethanolic extract of *Vernonia cinerea*. Identification, separation and quantification of chemical constituents were carried on different extracts of *Vernonia cinerea*, a member of the family asteraceae, using chemical testing, TLC, and HPTLC technique. The phytochemical screening reveals the presence of sterols, terpenes, carbohydrates, mucilage and flavonoids. These findings are useful in establishing a relation between chemical composition of aerial parts of *Vernonia cinerea* with the previously reported activities of this plant and also may assign a new potential role of *Vernonia cinerea* extracts in human health care.

**Keywords:** *Vernonia cinerea*, Phytochemical, Soxhlet extraction, Phytoconstituents.

### INTRODUCTION

*Vernonia cinerea* (Asteraceae) is a herb, rather weak plant, very variable in habit and foliage, annual or somewhat perennial, found in the tropics almost all over the world<sup>1-6</sup>. It has many therapeutic uses in different traditional medicine of the world. Different parts of the plants are of different therapeutic values<sup>7</sup> to mention a few it could be used as antimalarial, astringent, anthelmintic, anti-diarrhoeal and anti-viral activity. It is commonly known as sahdevi or little iron wood<sup>1,8</sup>. Stems are glabrous, cylindrical, hairy, slightly branched and the leaves are simple, alternate, stipulate and the margin are crenate-serrate. It bears fruits which is clothed with appressed white hairs, flowers are bisexual in small heads with divericate terminal corymbs<sup>9-11</sup>. Root Decoction is used in the treatment of diabetes mellitus<sup>12</sup>. Stem is used in the treatment of human breast cancer<sup>13</sup>.

### MATERIALS AND METHODS

The aerial parts of *Vernonia cinerea* for the present investigation were collected in and around Madurai. The solvents used for extraction, testing, chromatography were all of LR grade and were used after distillation. Distilled under normal atmospheric pressures was employed for extraction of plant material and for phytochemical screening. Removal of solvents, wherever required was carried out by distillation or vacuum desiccators. The solutions and reagents were prepared using distilled water. The Thin layer chromatography (TLC) was performed on glass plate coated with silica gel 'G' preactivated at 110°C for 30 min. Compounds were detected under UV light at 254nm.

In the extraction methodology the aerial parts were dried and powdered. 500gms of the drug was extracted with petroleum ether, chloroform, ethyl acetate, Benzene, ethanol and water in a soxlet extraction apparatus. The extraction was continued till a few drops of the last portion of the percolate did not leave any residue on drying. It took about 22 hrs for complete exhaustion. The extract was green in colour with semisolid consistency.

Testing of the extracts for alkaloids, carbohydrates, glycosides, sterols, proteins, flavonoids, saponins and tannins was carried out and the following results were obtained. The results of the foregoing experiment are summarized in Table 1. The TLC profile was developed for three extracts namely ethanolic, Chloroform and petroleum extracts of aerial parts of *Vernonia cinerea*. and Quantification of the extract was carried out using HPTLC technique. The colour of the spots and Rf value of the spots were Tabulated in Table 3. The TLC pattern of the following extracts is given in Fig. 1-3.

### RESULTS AND DISCUSSION

Preliminary phytochemical testing which is carried using chemicals for the identification of various phytoconstituents suggest the presence of flavonoids, sterols, terpenoids, carbohydrates and saponins in different extracts of aerial parts of *Vernonia cinerea*. TLC profile of ethanolic extract is developed using Hexane : Ethylacetate solvent system in the ratio of (7: 3), chloroform extract is developed using Ethylacetate : Benzene solvent system in the ratio of (4 : 6), and extract is developed using Ethylacetate : Benzene solvent system in the ratio of (2 : 8) at different concentration under UV 254nm and UV



366nm (Table-2). After derivatization with VSR and 5 mins heating and 10 mins heating also shows the presence of salient spots for three extracts. The HPTLC chromatogram (Fig-4-6) developed and showed the

presence of peaks with maximum area under the curve indicating the possible quantity of phytoconstituents in different extracts of aerial parts of *Vernonia cinerea*.

**Table 1:** Chemical investigation for various extracts of *vernonia cinerea*

Chemical test	Ethanollic extract	Aqueous extract	Chloroform extract	Benzene extract	Pet.ether extract	Ethyl acetate extract
<b>Sterols</b>						
a) salkowski test	+	-	+	+	+	+
b) Libermann burchard's test	+	-	+	+	+	+
<b>Terpenoids</b>	+	-	+	+	+	+
<b>Carbohydrates</b>						
a) Molisch's test	+	+	-	-	-	-
b) Felhing's test	+	+	-	-	-	-
<b>Flavonoids</b>						
a) Shinoda test	+	+	-	-	-	-
b) Alkali test	+	+	-	-	-	-
c) Acid test	+	+	-	-	-	-
<b>Proteins</b>						
a) Million's test	-	-	-	-	-	-
b) Biuret test	-	-	-	-	-	-
<b>Alkaloids</b>						
a) Mayer's test	-	-	-	-	-	-
b) Hager's test	-	-	-	-	-	-
c) Wagner's test	-	-	-	-	-	-
d) Murexide test	-	-	-	-	-	-
e) Dragendroff's test	-	-	-	-	-	-
<b>Glycosides</b>						
a) Anthraquinone glycosides	-	-	-	-	-	-
b) Cardiac glycosides	-	-	-	-	-	-
c) Cyanogenetic glycosides	-	-	-	-	-	-
<b>Saponins</b>	+	+	-	-	-	-
<b>Tannins</b>	+	+	-	-	-	-
<b>Volatile oil</b>	-	-	-	-	-	-
<b>Mucilage</b>	+	+	-	-	-	-

+ve indicates positive response; -ve indicates positive response

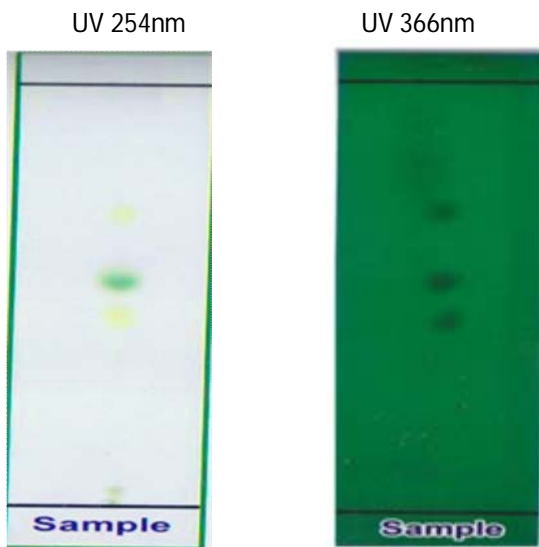
**Table 2:** TLC studies on various extracts of *vernonia cinerea*

Extracts	Stationary phase	Mobile phase	Detecting agent
Pet.ether extract	Aluminium sheet precoated with silica gel merk 60F <sup>254</sup>	Ethylacetate : Benzene 2 : 8	UV 254 nm
Chloroform extract	Aluminium sheet precoated with silica gel merk 60F <sup>254</sup>	Ethylacetate : Benzene 4 : 6	UV 254 nm
Ethanollic extract	Aluminium sheet precoated with silica gel merk 60F <sup>254</sup>	Hexane : Ethylacetate 7 : 3	UV 254 nm

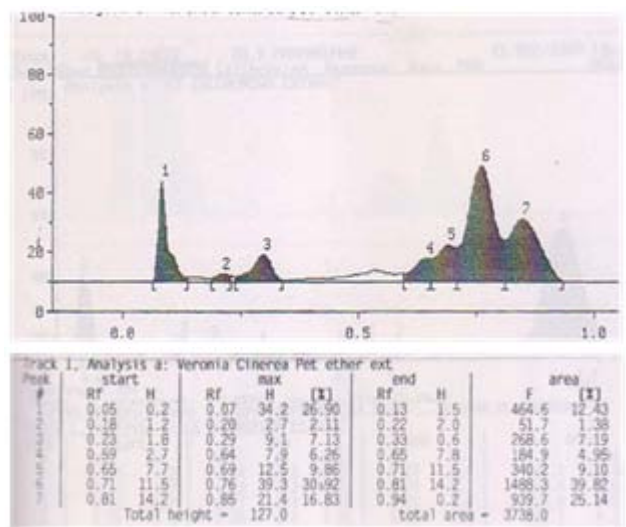
**Table 3:** The R<sub>f</sub> values of various extracts of various extracts of *Vernonia cinerea*

Samples	No of Spots	R <sub>f</sub> Values	Colour Development
Pet.ether extract	1	0.46	Orange
	2	0.53	Greenish yellow
	3	0.68	Orange
Chloroform extract	1	0.17	Orange
	2	0.76	Greenish orange
Ethanollic extract	1	0.49	Orange
	2	0.61	Greenish orange

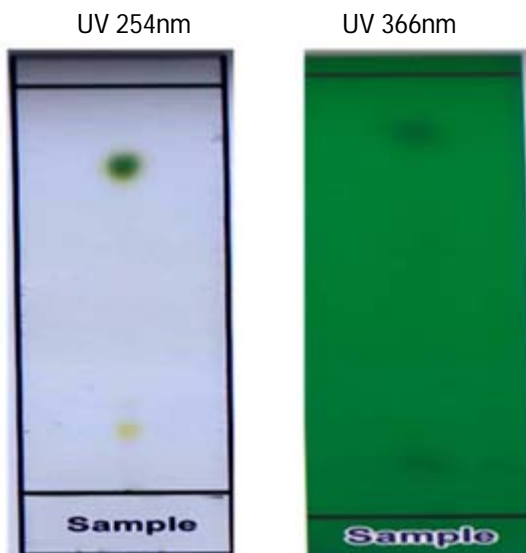




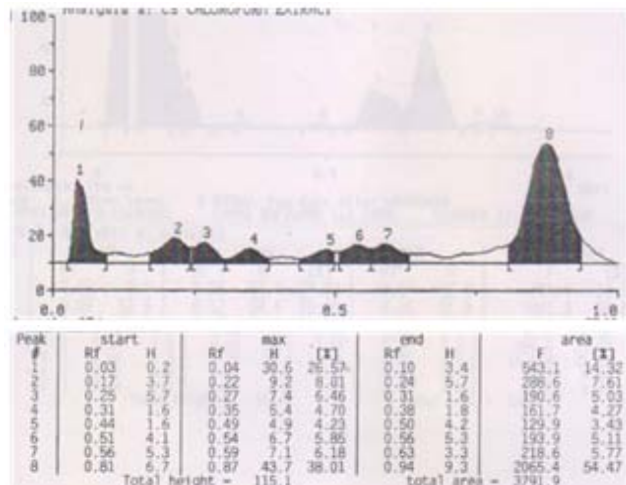
**Figure 1:** TLC for Petroleum ether extract on aerial parts of *Vernonia cinerea*



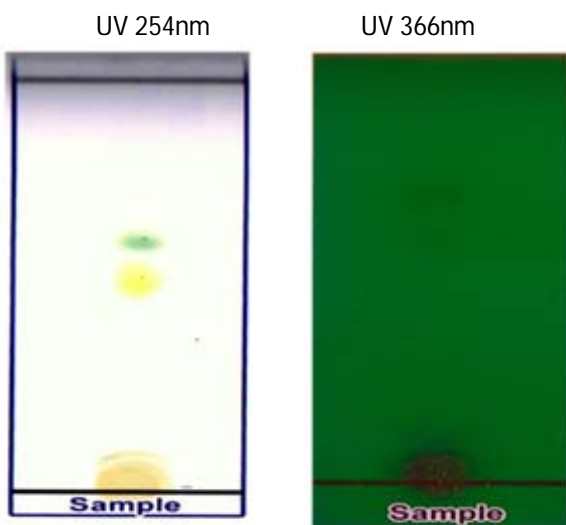
**Figure 4:** HPTLC profile of Petroleum ether extract on aerial parts of *Vernonia cinerea*



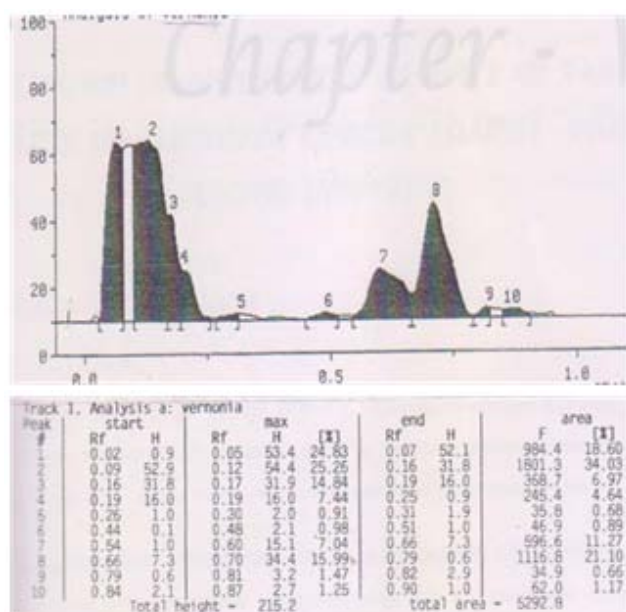
**Figure 2:** TLC for Chloroform extract on aerial parts of *Vernonia cinerea*



**Figure 5:** HPTLC profile of Chloroform extract on aerial parts of *Vernonia cinerea*



**Figure 3:** TLC for Ethanolic extract on aerial parts of *Vernonia cinerea*



**Figure 6:** HPTLC profile of Ethanolic extract on aerial parts of *Vernonia cinerea*

**CONCLUSION**

In conclusion it may be stated that the approach given for standardization of any new herbal or medicinal plant includes chemical evaluation and comparison should be developed systematically for completion of database of newer plants. This shall help to obtain monographs of the future medicinally active plant. For developing analytical method pure active chemical constituent should be isolated in further study and identification on basis of reference standard shall be made. This also helps in setting in-house standards of the medicinal plants used extensively by herbal manufacturers.

**REFERENCES**

1. Wealth of India, CSIR, Vol-IV, 1956, 448-449
2. Online-Indian-Herb-Exporters.com
3. Nadkarni K., The Indian Materia Medica, Vol.II, 1270
4. Vaidyaratnam P.S., Varier's., Indian medicinal plants- a compendium of 500 species, 5, 1996, kottakkal, 359.
5. Dastur J. F., Medicinal plants of india and Pakistan, 1<sup>st</sup> edition, Taraporevala sons and co, Bombay, 244-245.
6. Chopra R.N., Nayar S.L., Chopra I.C., Glossary of Indian medicinal plants, New Delhi, 1956, 254.
7. Journal of Molecular and cellular biochemistry, 281, 87-93.
8. Krithikar K.R., Basu B.D., Indian medicinal plants, Vol-II. PP.1322-1323.
9. The Ayurvedic pharmacopeia of India, 2001, Part-I, Vol-III, 1<sup>st</sup> edition, 169-1171.
10. Naryana Aiyer M.A., Kolammal M., Pharmacognosy of ayurvedic drugs, 9, 10-12.
11. Online-entry of Vernonia cinerea(L) less. – Useful plants of west tropical Africa.
12. Mishra A.S., Observation on the efficacy of vernonia cinerea less, root in the therapy of Diabetes mellitus, Journal of crude research, 123(4), 1984, pp- 1012-1028.
13. Yao-haur kuo, Yu-Jenkuo, Ang-Suyu, Ming-Derwu. Two novel sesquiterpene lactone, cytotoxic vernolide-A and B from vernonia cinerea, Chemical and pharmaceutical bulletin. 51, 2003, No.4, 425.

\*\*\*\*\*

