

Spectrochemical Analysis Of Leaf Ethanol Extract Of Catharathus Roseus

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Abstract

Catharathus Roseus Is An Important Medicinal Plant Of The Apocynaceae Family Which Contains More Than 70 Different Type Of Alkaloids And Chemotherapeutic Agents That Are Effective In Treating Various Type Of Cancers. 100g Of Each Plant Part Were Extracted Using Different Organic And Aqueous Solvents, Which Have Varying Polarity (Petroleum Ether, Etoac, Etoh, H2O). Each 250ml Of The Solvent Were Used, With The Help Of Soxhlet Apparatus The Extract Was Prepared And Stored In Clean Beakers. Soaking Materials With 90% Ethanol And Leaving The Mixture Overnight Has Been Used To Extract And Filter The Compound From The Mixture Of Compounds Collected From Column Tube. For The Identification Of Indole Alkaloids Of Vindoline And Fatty Components, The Signals Of Catharanthus Roseus Leaf In Spectra Analysis Of Ethanol Extract Find Out The Compound Of Vindoline.

Key Words: C.Roseus, A Niger, Vindoline

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I. Introduction

Plants mainly used for variety of disease related to cancer treatment. Plants produce several secondary metabolites including alkaloids, flavonoids, saponins, steroids, cyanogenic glycosides and terpenoids to protect themselves from the attack of naturally occurring pathogen, insects' pests and environmental stresses. Catharanthus roseus (L.) which is an important medicinal plant of the family Apocynaceae is used to treat many of the fatal diseases. C. roseus also possess good antioxidant potential. There are about two common cultivars of C. roseus which is named on the basis of their flower color that is the pink flowered 'Rosea' and the white flowered 'Alba'. The two classes of active compounds in Vinca are alkaloids and tannins. The major alkaloid is Vindoline and its closely related semi-synthetic derivative widely used as a medicinal agent, has vasodilating, blood thinning, hypoglycemic and memory-enhancing actions. The extracts of Vinca have demonstrated significant anticancer activity against numerous cell types. The dried or wet leaves of plants are applied as a paste on wounds in some rural communities. The recent public perception against the vector control chemicals has using synthetic shifted the research effort towards the development of environmentally sound and agents. In that biodegradable way, plant extracts including essential oils have attracted much attention to control the transmitted diseases.

II. REVIEW OF LITERATURE

Freshly prepared leaf extracts were subjected to standard phytochemical analyses using standard procedure in order to find out the presence of various phytoconstituents such as alkaloids, terpenoids, flavonoids, tannins, steroids, anthroquinones, saponins, resins glycosides and phenols¹. Plants of C. roseus contain about 130 indole alkaloids of which 25 are dimeric in nature Some major chemical constituents are vinblastine, vindoline, catharanthine, ajmalicine and serpentine. The species is also rich in bisindole alkaloids (about 40 compounds), most of them containing a vindoline or catharanthine moiety².

III. MATERIALS AND METHOD

Plant Collection:

Catharanthus roseus was identified and mature plants were collected in the garden of Arulmigu Palaniyandavar College of Arts and Culture, Palani in the month of March. The plants were washed thoroughly with tap water to avoid dust. Then the plants were shade dried to avoid the loss of bio-active compounds. After complete drying, each part of the plant were subjected to mechanical grinding and collected in a air tight container.

Extract Preparation:

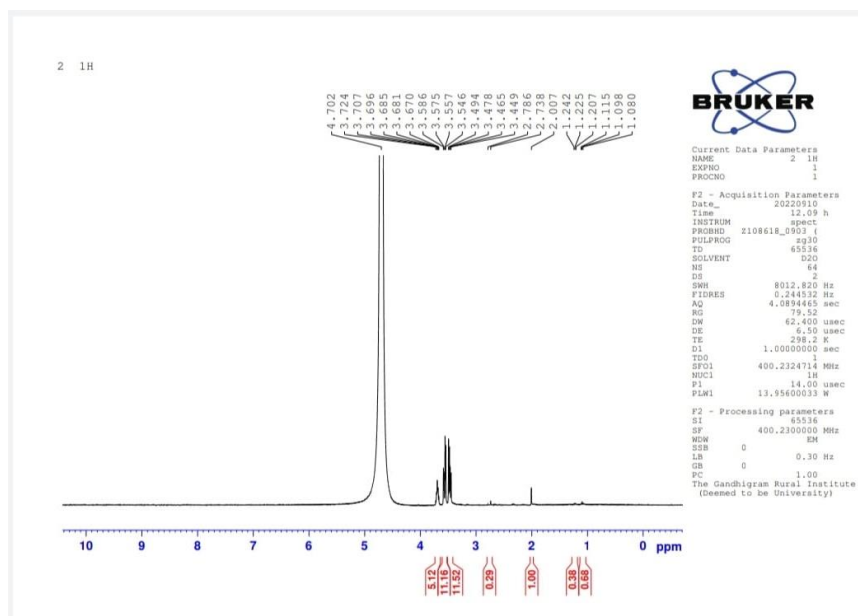
100g of each plant part were extracted using different organic and aqueous solvents which have varying polarity (Petroleum ether, EtOAc, EtOH, H₂O). Each 250ml of the solvent were used, with the help of soxhlet apparatus the extract was prepared and stored in clean beakers. Extracted the materials with 90% ethanol and leaving the mixture overnight. The extract was filter and the compound was isolated from the mixture of compounds collected by using column tube.

IV. RESULT AND DISCUSSION

S.No	Spectrum	Peaks	Compound
1	Ultra Violet (wave number cm ⁻¹).	i) 200 nm to 380 nm	Poly-unsaturated and aromatic (C=O, H-CH=O)
		ii) 400 nm	Yellow to green apparence
		iii) 700 nm	Blue-Green (N=O)
2	Infra Red (wave length cm ⁻¹)	i) 3403.74 cm ⁻¹	O-H Stretch (alcohols, phenols)
		ii) 2920.66 cm ⁻¹	C-H Stretch (alkanes)
		iii) 1687.41 cm ⁻¹	C=O Stretch (carbonyls)
		iv) 1380.78 cm ⁻¹	O-H Stretch (Phenol)
3	¹ H NMR (Wave number TMS)	i) 2.007 to 2.786	Carbonyl (alpha hydrogen)
		ii) 3.449 to 3.9 and 3.3 to 4.0	Ether (R-CH ₂ -OR) Alcohol (R-CH ₂ -OH)

NMR Measurements

NMR Spectra were recorded on a Bruker AV-400 NMR and DMX 600 spectrometer operating at a proton NMR frequency of 400.2300000 MHz and 600.13 MHz respectively. For each sample, 128 scans were recorder with the following parameters: The spectra were referenced to residual solvent signal of D₂O for EtOH extract and TSP at 0.00 ppm for water extract.



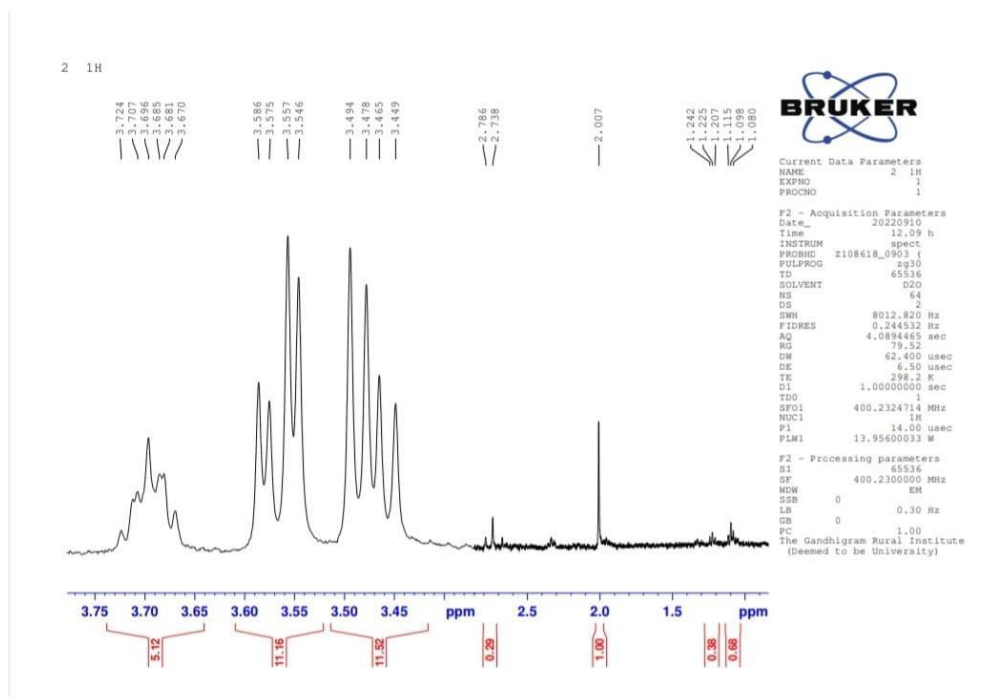


Figure: 1, olefinic signals of fatty components or terpenoids; 2, OCH₃ of C-11 of vindoline; 3, OCH₃ of C-22 vindoline.

IR Measurements:

IR spectra were recorded on datas in wavelength of 4000cm⁻¹ to 399.193cm⁻¹. Comparison of these spectra with those of several other *Vinca rosea* alkaloids, notably *catharanthine* and *vindoline*, clearly indicated a close interrelationship between these compounds.

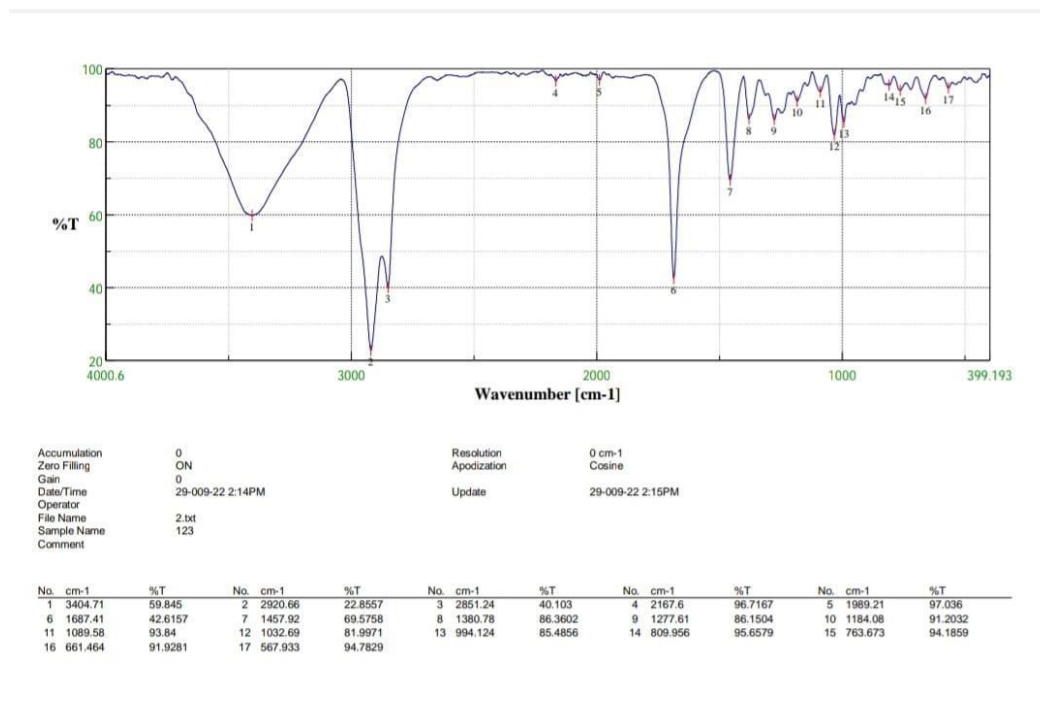


Figure: 1, Methoxy group (H₃Co), 2.Acetoxy group components (-OCOCH₃), 3. Aromatic compound C-H, 4. double bond stretching in secondary amine.

UV Measurements:

UV-Visible spectrometer were recorded in wave number(CM-1). (UV-visspectrophotometer, model UV-1800).UV-visible spectra was analysis of data taken as Wave number of (700CM-1 and 400CM-1)

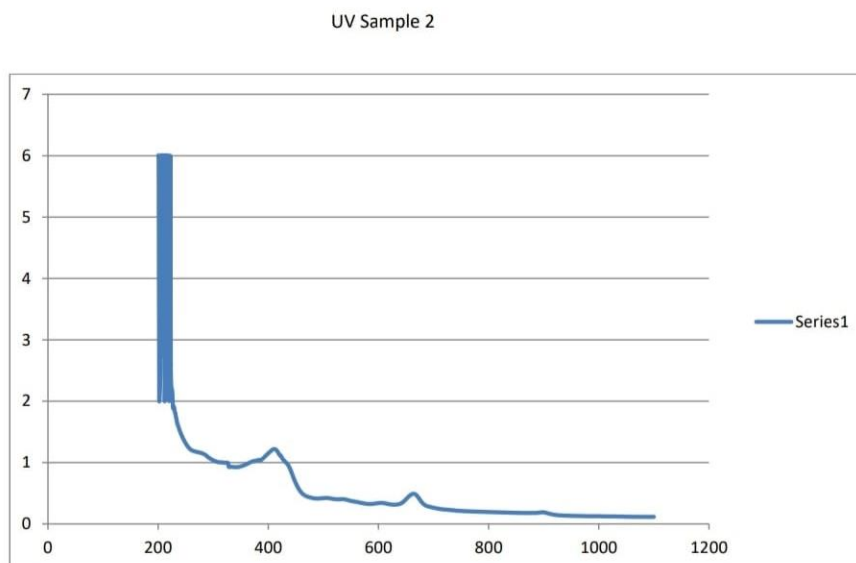
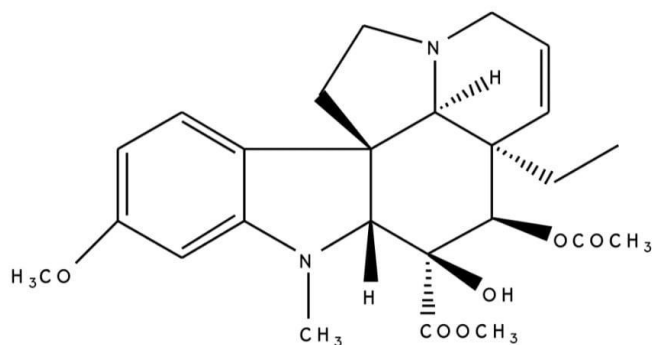


Figure:1, (200 cm⁻¹) poly unsaturated and aromatic (C=O, H-CH=O), 2. (400 cm⁻¹) violet visible light uv rays,700cm⁻¹ of colour of absorbing in blue and green (N=O, N-->N *).

STRUCTURE

For the identification of indole alkaloids of vindoline and fatty components, the signals of catharanthus roseus leaf in spectra analysis of ethanol extract find out the compound of vindoline.



Vindoline (C₂₅H₃₂N₂O₆)
R=COOCH₃, R=H, R₄=OCH₃, R=CH₂OH

Vindoline component and their medical uses

Alkaloids that are isolated from *C. roseus* are found to be hypotensive, sedative and possess tranquilising and anti cancerous properties. Traditionally, the plant has been used for relieving muscle pain, depression of the central nervous system and wasps stings. It is used in the cases of nose bleed, bleeding gums, mouth ulcers and sore throats. It has also been used internally for the treatment of the loss of memory, hypertension, cystitis, gastritis, enteritis, diarrhoea and the raised blood sugar levels.

It's application ranges widely from the prevention of cancer, cancer

treatment, anti-diabetic, stomachic etc. *Catharanthus roseus* was the highly exploited and studied medicinal plants as it was found to produce more than 100 mono terpenoid indole alkaloids (MIAs) that includes the two major commercially important cytotoxic dimeric alkaloids that are used in the cancer chemotherapy.

C. roseus was also found to be a good source of the non-enzymatic and enzymatic antioxidants. From the Traditional period itself, the plant has been used to cure diabetes and high blood pressure as it was believed to promote the insulin production or to increase the body's usage of the sugars from the food in case of diabetes.

C. roseus was found to possess a large number of chemicals in the alkaloid class. Alkaloids are the bitter-tasting plant compounds that contains mostly of nitrogen many of them was found to possess pain relieving or the anticancer properties. Especially two major alkaloids in *C. roseus* such as vinblastine and vincristine was developed into the prescriptions for the anticancer drugs. These injectable drugs and its derivatives such as vinflunine acts in several pathways and was found to interfere with the division of the cancer cells.

Catharanthus roseus L. is found to be an important source of the indole alkaloids that are present in all plant parts. The plant has been used for the treatment of diabetes, fever, malaria, throat infections, chest complaints, regulation of menstrual cycles and as a euphoriant. The physiologically important antineoplastic alkaloids such as vincristine and vinblastine are present in the leaves and the antihypertensive alkaloids are found in the roots such as various types of lymphoma and leukemia.

V. CONCLUSION

Aspergillus niger growth was mostly inhibited by the methanolic leaf extract which showed that ethanol extracted very potent active ingredients from *Catharanthus Roseus* Leaf. For identification of indole alkaloids, and steroids main alkaloid of vindoline components were investigated. Similar metabolomic patterns were observed by visual inspection of ¹H-NMR, and ultra violet then infrared spectras of the various *Catharanthus Roseus* Leaf infected by phytoplasmas and those of healthy Plants. The signals of Vindoline are well distinguishable in the Spectroscopy. The signals of alkaloids estimated by the spectras intensity was relatively compared to that of vindoline. Several methyl groups that might originate from steroids or triterpenoids showed high intensity in the range of Spectra. The present work is very much helpful in future studies.

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