

Research Paper

ISSN: 2321-1520

## **Identification of Bioactive Compound by Analytical Technique from *catharanthusroseusandjusticiaadhatoda.***

**Ami Patel, Mittal Patel and ChetanaRoat\***

Department of Microbiology and Biotechnology, University School of Science,  
Gujarat University, Ahmedabad, Gujarat.

\*Corresponding Author

### **Abstract**

Herbal medicine has been reckoned as the potential panacea for various lethal human disease including cancer and diabetics. The Periwinkle and Vasaka are an alkaloid yielding medicinal plant belonging to family Apocynaceae and Acanthaceae respectively. The plant part possesses pharmacological activities like anti-cancerous and anti-asthmatic properties. In Thin Layer Chromatography for solvents used are Ammonium hydroxides: water: acetone (3:7:90). Toluene: methanol: dioxane: ammonia (2:2:5:1). The Retardation factor (Rf) for vincristine and vinblastine are 0.95 and 0.85 respectively. Vasicine has Retardation factor (Rf) 0.54. The analytical technique revealed that the alkaloid vincristine, vinblastine and vasicine content of *in-vivo* leaf extract of *Catharanthusroseus and Justiciaadhatoda* give Rf values which is similar to standard Rf value.

Keywords: Periwinkle and Vasaka; Retardation factor; Vincristine; Vinblastine; Vasicine.

Abbreviation: TLC -Thin Layer Chromatography.

### **Introduction**

Medicinal plants have a long history of usage in traditional medicine. Ethno- botanical information on traditional plants and their usage by indigenous cultures is useful in the conservation of traditional cultures, biodiversity, community health care and drug development. *Catharanthus roseus* is an evergreen sub-herb plant growing to 1m tall plant. The leaves are oval to oblong 2.5 to 9.5 cm long and 1-3.5 cm broad glossy green hair less with a pale midrib and a short petiole of 1-1.8 cm long arranged in opposite pairs (Gajalakshmi and Rajeshwari 2013). *Justiciaadhatoda* medicinal plant found in India and utilized in rural areas for several ailments. It is an evergreen shrub having 1-2.5 m height with opposite ascending branch. The leaves are 8 to 10 cm long, contain several alkaloids (Srivastav and Nivasakar 2006). *C. roseus* in the wild, it is found to be an endangered plant and the main cause of their decline is the habitat destruction by the slash and burn agriculture. However it is widely cultivated and naturalized in the sub-tropical and tropical areas of the world.

It is found to be an evergreen shrub or the herbaceous plant that grows to about 1 meter tall with white to dark pink flowers. *J.adhatoda* grows on the plains of India and in the lower Himalayas, up to a range of 1000 m above mean sea level. This plant is also cultivated in other tropical areas. It has white flowers and lance shaped leaves. The plant lives for multiple seasons and retains its leaves throughout the year. *C.roseus* has various pharmacological properties such as antioxidant, anti-diabetic, anti-cancer activity etc. The ethanolic extract of the leaves and flowers of *C.roseus* showed a dose dependent lowering of blood sugar compared to standard drug Glibenclamide. Vinculin is used for the treatment of diabetes. Vinblastine is used for the treatment of Neoplasm, recommended for Hodgkin's diseases and Choriocarcinoma. *J.adhatoda* has anti-asthmatic, anti-ulcer and abortifacient activity etc. Vasicine has significant uterotonic activity influenced by the presence or absence of certain estrogens.

### **Materials and Method**

#### **Periwinkle and Vasaka Plant:**

Periwinkle plants (*Catharanthus roseus*) were collected from Godhra, Panchmahals Gujarat and Vasaka plants were collected from Pantaloon Mall, Law Garden, Navarangpura Ahmedabad.

#### **Reagents:**

Organic solvents like ammonium hydroxide, acetone, toluene, methanol, dioxane, ammonia.

#### **Preparation of Periwinkle leaves and Vasaka leaves Powder:**

Fresh leaves were removed from the plant then washed in clean water and spread on filter paper or tray. Leaves were washed at  $\pm 30^{\circ}\text{C}$  temperature. The dried material is then blended to form a fine powder and then filled in an air tight bottle.

#### **Preparation of Extract:**

For vincristine and vinblastine extraction 5g of dried powder of *C.roseus* were soaked in 50ml methanol in 250ml Erlenmeyer flask for overnight at 30-300 rpm having  $\pm 30^{\circ}\text{C}$  temperature.

For vasicine extraction 1g of dried powder of *J.adhatoda* were soaked in 12.5ml chloroform in 250ml Erlenmeyer flask for 10 hours then filtered with Whatman filter paper no.1. It was then evaporated to dryness at  $\pm 30^{\circ}\text{C}$ , so that the bioactive compound would not degrade. The residue was dissolved in 1ml ethanol.

The above extracts were analyzed by TLC method.

#### **Thin Layer Chromatography (TLC):**

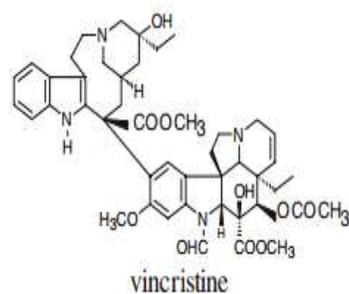
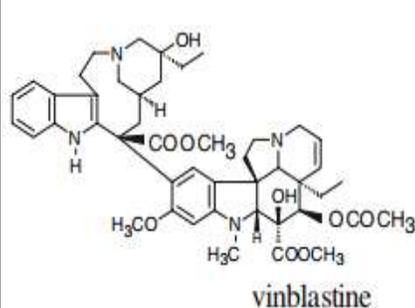
TLC was performed on pre-coated silica gel (5cm $\times$ 10cm) plate of uniform thickness (0.2mm). Spots of both the samples were added as a spot using capillary tubes on the one end of TLC plate at above 1cm. For vincristine and vinblastine solvent system in chamber was saturated with mobile phase ammonium hydroxide: water: acetone (3:7:90). For vasicine solvent system in chamber was saturated with mobile phase toluene:methanol:dioxane:ammonia (2:2:5:1). The mobile phase was then allowed to run up to a distance of 8cm from the base. The sheet was then removed and allowed to dry. Then the results were recorded.

## Results

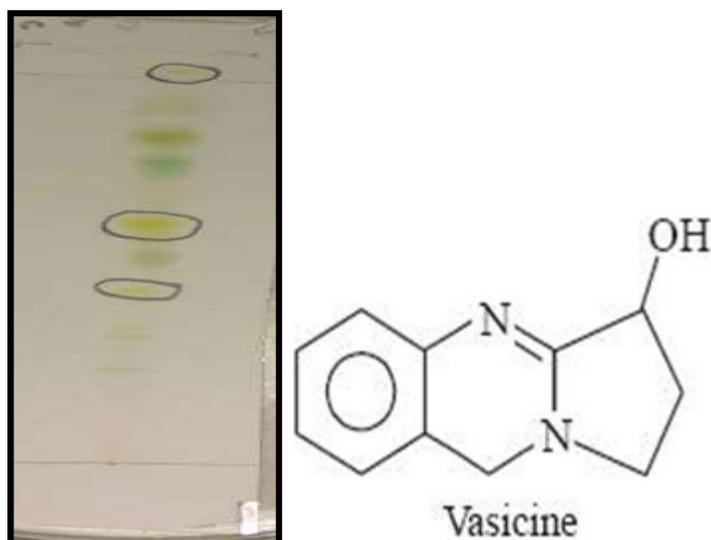
**Table 1:** Characteristics of Vincristine, Vinblastine and Vasicine of Periwinkle and Vasaka leaf extracts respectively on Thin Layer Chromatography.

Sample	Rf values	Color
Standard Vincristine	0.85	Green
Periwinkle Leaf extract	0.82	Green
Standard Vinblastine	0.95	Yellow
Periwinkle Leaf extract	0.94	Yellow
Standard Vasicine	0.52	Orange
Vasaka Leaf Extract	0.54	Orange

Retardation Factor =  $\frac{\text{Distance travelled by the solute}}{\text{Distance travelled by the solvent}}$



**Figure: - 1** Spots of Vincristine and Vinblastine along with their structures.



**Figure: -2** Spot of Vasicine and its structure.

#### Discussion

*C.roseus* and *J.adhatoda* medicinal plants were taken; the alkaloids Vincristine, Vinblastine from *C.roseus* and Vasicine from *J.adhatoda* were detected by Thin Layer Chromatography using solvents as ammonium hydroxide, acetone and water for *C.roseus* and toluene, methanol, dioxane and ammonia for *J.adhatoda*. The R<sub>f</sub> value 0.84 and 0.94 for Vincristine and Vinblastine and 0.54 for Vasicine obtained was similar to the standard R<sub>f</sub> values of the alkaloids.

#### References

- Agharkar, Gazetteer of Bombay State Part I-Medicinal Plants. The Government Central Press, Bombay(1953).
- Amin AH, Mehta DR. A bronchodilator alkaloid from *Adhatodavasica* Nees. Nature (1959).
- Asma Nisar, Awang Soh Mamat, Mohd Irfan Hatim Mohamed Dzahir, Muhammad Syarhabil Ahmad. An updated review on *Catharanthus roseus*, phytochemical and pharmacological analysis (2016).
- Bhalla HL, Nimbkar AY. Preformulation studies III. Vasicinone, a bronchodilatory alkaloid from *Adhatodavasica* Nees (absorption, potency and toxicity studies). Drug Dev India Pharma (1982).
- Divya Paikara, Bhawana Pandey, Sheetal Singh. Pytochemical analysis and antimicrobial activity of *Catharanthus roseus*.
- Dorsch W, Wanger H, New antiasthmatic drug from traditional medicine. Int Arch Allergy Appl Immunol(1991).
- Gajalakshmi S, Vijyalakshmi S and Devi Rajeshwari V. Pharmacological activities of *Catharanthus roseus* a perspective review(2013).

Gaurau Kumar Sharma. General techniques in Plant Tissue Culture(2015).

Gupta M, Mazumdar UK, Kumar TS, Kumar RS, Iranian journal of pharmacology and therapeutics.

Joshi BS, Bai Y, Puar MS, 1H and 13 C NMR assignments for some pyroquinoxaline alkaloids of *Adhatodavasica*.

Kokate CK, Purohit AP, Gokhale SB, Pharmacognosy, 2<sup>nd</sup> edition, NiraliPrakashan, Pune.

Lahiri PK, Pradhan SN pharmacological investigation of vasicinol – An alkaloid from *Adhatodavasica* Nees. Indian Journal Experimental biology.

Lorena Almagro, Francisco Fernandez Perez and Maria Angeles Pedreno. Indole alkaloids from *Catharanthus roseus*. Bioproduction and their effect on human health.

Mayuri Thanwar, Dhananjay Dwivedi, Anil kumar G. study of methanolic extract of *Catharanthus roseus* journal of chemical and pharmaceutical research.

Meenakshi Koul, Neha. S. Lakra, Ramesh Chandra and Sheela Chandra. *Catharanthus roseus* and prospectus of its endophytes a new avenue for production of bioactive metabolites (2013).

Runa Rashmi and Trivedi M.P. Rapid in-vitro regeneration of an important medicinal and ornamental plant *Catharanthus roseus*.

S. Nathiya, N. Sahista, I. Jagapriya, B. Senthikumar, K. Devi. Estimation of bioactive compound of *Catharanthus roseus* leaf extract by phytochemical screening (2017).

Shrivastava N, Shrivastava A, Banerjee A, Nivsakar M, Anti-ulcer activity of *Adhatodavasica* Nees. J Herb Pharmacother (2006).

V. Maharajsri, D. Devamalar Characterization of antibacterial, anticancer properties and bioactive compounds of methanolic leaf extract of *Catharanthus roseus*.

Vander hejiden, R, Jacobs, DI, Snoeijer, W Hallarad, D and Verpoorte (2004). *C. roseus* pharmacognosy and biotechnology.

### **Acknowledement**

We are thankful to the Department of Microbiology and Biotechnology to provide all the requirements for our work.

□