



# Catharanthus Roseus Treatment Of Anti - Cancer

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## Abstract

The traditional Indian medical system known as Ayurveda emphasises the therapeutic properties of plants. One herb that Ayurveda recognises highly is *Catharanthus roseus*. Its antitumor, anti-diabetic, antimicrobial, antioxidant, and antimutagenic properties are well recognised. This evergreen shrub originally came from the islands off the coast of Madagascar. The leaves are placed in opposite pairs, and the flowers' colour can range from pink to purple. It yields about 130 alkaloids, primarily vinblastine, reserpine, vincristine, raubasine, and ajmalicine. Hodgkin's disease, breast cancer, skin cancer, and lymphoblastic leukaemia are among the cancers that can be treated with vincristine and vinblastine. Since it is an endangered species, methods like as micropropagation must be used to preserve it. Due of its strong therapeutic value, it must be

**Keywords:** Anti-Cancer ,*Catharanthus Roseus* ,Alkaloid , Vincristine, Vinblastine, Ethanolic Extract , Medicinal Plant

## Introduction

Traditional medicine has always made use of medicinal herbs. Information on ethnobotanical properties of medicinal plants and how indigenous societies use them is helpful for drug discovery, biodiversity preservation, community health care, and the preservation of traditional traditions. Vinblastine and vincristine, two terpene indole alkaloids that are used to treat cancer, are synthesised by the dicotyledonous angiosperm *Catharanthus roseus* L. (G.) Don, a significant medicinal plant in the Apocynaceae family [1]. In 1910, Peckolt reported that an infusion of the leaves was used in Brazil to treat chronic wounds, prevent bleeding and scurvy, and as a mouthwash for toothaches. Related species have been employed in Europe to privately stop the flow of milk. Within the hypoglycemic substance. In a more recent study, Chopra et al. found that the whole alkaloids have a notable and long-lasting hypotensive effect in addition to a modest antibacterial activity. While the plant's hypoglycemic and antibacterial properties have not been verified, ajmalicine, one of the alkaloids isolated from it, has been shown to have a brief diuretic effect on arterial blood pressure. The name "Periwinkle," or *Catharanthus roseus* (Family Apocynaceae), is derived from the Greek word meaning "pure flower." It is also referred to as "Nayantara" or "Sadabahar." According to , *roseus* signifies red, rose, or rosy. [2]

## Scientific classification <sup>[3]</sup>:

**Botanical Name(s)** : *Vinca Rosea* (*Catharanthus Roseus*)

**Family Name** : Apocynaceae

**Kingdom** : Plantae

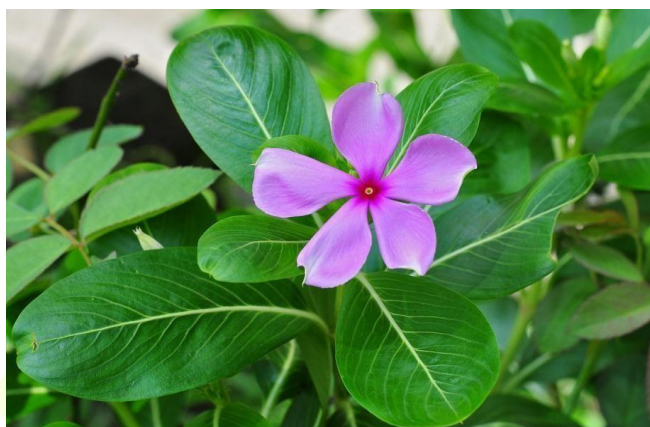
**Division** : Magnoliophyta (Flowering Plants)

**Class** : Magnoliopsida (Dicotyledons)

**Order** : Gentianales

**Family** : Apocynaceae

**Genus** : *Catharanthus* **Species** : *C. Roseus*

**Vernacular Names:****English** : Cayenne Jasmine, Old Maid, Periwinkle**Hindi** : Sada Bahar, Sadabahar**Kannada** : Batla Hoo, Bili Kaasi Kanigalu, Ganeshana Hoo, Kempu Kaasi Kanigalu **Malayalam** : Banappuvu, Nityakalyani, Savanari, Usamalari**Marathi** : Sadaphool, Sadaphul, Sadaphuli**Sanskrit** : Nityakalyani, Rasna, Sadampuspa, Sadapushpi**Tamil** : Cutkattu Malli, Cutukattu Malli, Cutukattuppu**Telugu** : Billaganneru**Gujarati** : Barmasi**Bengali** : Noyontara**Fig 1: Catharanthus roseus****Morphology**

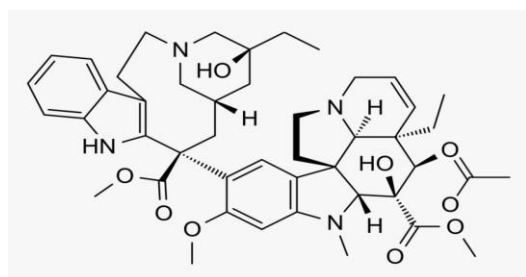
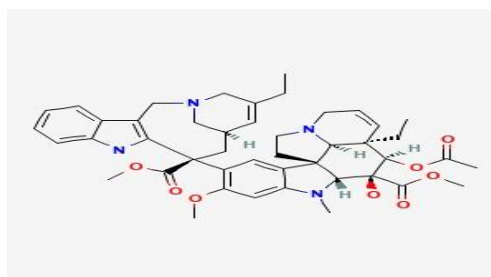
The evergreen subherb or herbaceous plant *Catharanthus roseus* can reach a height of one metre. The leaves are grouped in opposite pairs and are oval to oblong, 2.5–9.0 cm long and 1-3.5 cm broad. They are glossy, green, hairless, and have a light midrib and a short, 1-1.8 cm long petiole. The blooms have a rich red centre and range in colour from white to dark pink. They have a 2.5–3 cm length basal tube and a 2–5 cm diameter corolla with five lobes that resemble petals. The fruit consists of two follicles that are roughly 2-4 cm long and 3 mm wide.

**Geographical Distribution**

Originally from Madagascar, an island in the Indian Ocean, comes *Catharanthus roseus*. It is an endangered plant in the wild, and habitat damage from slash and burn agriculture is the main reason for its decline. Despite this, it is now widely found in many tropical and subtropical locations across the world, including the Southern United States.

**Potentially Active Chemical Constituents**

Researchers looking into its medicinal qualities found that it included a class of alkaloids that, despite being incredibly toxic, may be useful in the treatment of cancer. In order to carry out essential biological processes and protect themselves from attacks by herbivorous mammals, fungi, and insects, plants can synthesise a vast array of chemical compounds. Alkaloids, flavonoids, carbohydrates, and saponins are all present in *C. roseus*. The *Catharanthus roseus* plant's primary potentially active chemical components are called alkaloids. The plant contains more than 400 alkaloids, which are utilised as insecticides, agrochemicals, flavourings, fragrances, and components in cuisine. While the roots and base stem include alkaloids such as ajmalicine, vinceine, vineamine, raubasin, reserpine, and catharanthine, the aerial sections are mostly home to alkaloids such as actineo plastidemic, vinblastine, vincristine, vindesine, and vindeline tabersonine. The flower of *C. roseus* contains the anthocyanin pigment known as rosedin [4].

**Fig:1 Vinblastine****Fig:2 Vindesine**

## Pharmacological Activities **Anti-cancer activity**

The stem and leaves of *Catharanthus roseus* are the source of the anticancer alkaloids vinblastine and vincristine. Certain human tumours can be inhibited in their growth by these alkaloids. Vinblastine is advised for chorio carcinoma and Hodgkins disease, and it is utilised in experimental settings to treat neoplasmas. Another alkaloids called vincristine is used to treat childhood leukaemia. In vitro tests revealed that varying percentages of *Catharanthus*'s methanolic crude extracts exhibited strong anticancer activity against a variety of cell types; however, the greatest activity was observed against tumour forms that were resistant to multiple drugs. Vinblastine is marketed as Vincristine, oncovin, or as Velban [5, 6].

## **Anti-diabetic activity**

Similar to the usual medication, the ethanolic extracts of *C. roseus*'s leaves and flower demonstrated a dosedependent reduction in blood sugar. Blood sugar reduction is similar to that of the common medication glibenclamide. The result of increased hepatic glucose utilisation is the appearance of the hypoglycemic effect. In comparison to the dichloromethane and methanol extracts, which reduced the blood glucose level to 49–58%, the aqueous extract was observed to lower the blood glucose of diabetic rats by roughly 20%. Due to the liver's increased utilisation of glucose, the hypoglycemic effect has developed.

A medication made from the plant and marketed under the brand name Vinculin is intended to cure diabetes.

Pharmacological research has been done on the hypoglycemic effects of alkaloids extracted from *C. roseus* [7-9].

## **Anti-microbial activity**

The antibacterial properties of crude extracts derived from various plant sections were evaluated. The effectiveness of the leaf extract was noticeably higher. *Pseudomonas aeruginosa* NCIM2036, *Salmonella typhimurium* NCIM2501, and *Staphylococcus aureus* NCIM5021 were among the microorganisms used to test the plant's leaf extract's anti-bacterial activity. The results showed that the extracts could be used as a prophylactic agent in the treatment of many diseases [10].

## **Anti-oxidant property**

The ethanolic extract of the roots of the two varieties of *C. roseus*, *rosea* (pink flower) and *alba* (white flower), was found to have anti-oxidant potential using various assay systems, including nitric oxide radical inhibition, uperoxide radical scavenging activity, DPPH radical scavenging activity, and hydroxyl radical scavenging activity. Although *C. roseus* was shown to have greater antioxidant activity than *C. alba*, the results of the assay demonstrated that the ethanolic extract of the roots of Periwinkle types had a sufficient scavenging action throughout in a concentration-dependent manner [11].

## **Anti-helminthic activity**

The chronic sickness caused by helminthes infections affects both humans and livestock. It was discovered that *Catharanthus roseus* was utilised as an anti-helminthic medication since the conventional era. Using Piperazine citrate as the standard reference and *Pheretima posthuma* as an experimental model, the anti-helminthic property of *C. roseus* has been assessed. Significant anti-helminthic action was discovered in the ethanolic extract at a dosage of 250 mg/ml [12].

## **Anti-ulcer property**

The plant's alkaloids, vincamine and vindoline, demonstrated antiulcer properties. Vincamine, an alkaloid found in plant leaves, has neuroprotective and cerebrovasodilatory properties. Rats with artificially induced stomach injury demonstrated the anti-ulcer action of plant leaves [13].

## **Hypotensive property**

The plant's extract from the leaves significantly altered the hypotensive. It has been reported that the leaves include 150 beneficial alkaloids in addition to other pharmacologically active substances. In experimental animals, the leaf extracts (hydroalcoholic or dichloromethane-methanol) have demonstrated significant hypotensive and antihyperglycemic effects [14].

## **Anti-diarrheal property**

The anti-diarrheal properties of plant ethanolic leaf extracts were evaluated in wistar rats in combination with castor oil, an experimental drug used to induce diarrhoea, before and after the extract was pretreated. The ethanolic extract of *C. roseus* demonstrated a dose-dependent reduction of castor oil-induced diarrhoea in its anti-diarrheal action [15].

## **Wound healing property**

In comparison to the controls, rats given 100 mg/kg/day of the ethanol extract from *Catharanthus roseus* showed a high rate of wound contraction, a much shorter epithelization period, a considerable rise in dry weight, and a significantly higher amount of hydroxyproline in the granulation tissue. The application of *C. roseus* in the treatment of wound healing is supported by wound contraction, elevated tensile strength, and elevated hydroxyproline content [16].

## **Hypolipidimic effect**

The study found that the leaf juice of *Catharanthus roseus* (Linn.) G. Donn. had a strong anti-atherosclerotic effect, as evidenced by a decrease in the serum levels of total cholesterol, triglycerides, LDL-c, VLDLc, and the histology of the aorta, liver, and kidney. may have been caused by the flavonoid and maybe vinpocetine-like compound's antioxidant effects found in *Catharanthus roseus* (Linn.) G. Donn's leaf juice [17].

### Memory enhancement activity

Numerous activities of vinpocetine have been identified, some of which may be advantageous in the case of Alzheimer's disease (AD). The sole research examining this medication in a specific group of AD patients revealed no advantages. There is currently insufficient evidence to justify the clinical use of vinpocetine, according to a metaanalysis of earlier research on the drug in populations with dementia that were not well defined. In clinical trials for dementia and stroke, vinpocetine has been well tolerated at doses up to 60 mg/d with no notable side effects [18].

### Conclusion

Medicinal plants were a powerful source of numerous innovative medicinal compounds with strong pharmacological effects on humans. Rather than employing chemical medications that cause side effects, research into traditional medicine may help find novel therapeutic formulations that are less expensive, more effective, and have less adverse effects. Even while many conventional medications were taken without a fundamental understanding of their mechanism, the application of modern technologies and instruments allowed for additional proof of their effects. With the necessary approval from the relevant organisations, the active ingredient that causes the pharmacological effect may be located quite quickly and also sold as a drug product. One of the 21000 significant medicinal plants is *Catharanthus roseus*. Numerous illnesses, including diabetes, oral sores, mouth ulcers, and leukaemia, can be cured with it. It yields over 130 alkaloids, including ajmalicine, vinceine, raubasin, and reserpine. Vinblastine and vincristine exhibit anti-leukemic action. This plant contains varying levels of alkaloids in different parts; the root bark yields the highest quantity, or almost 1.79%. Its antimicrobial activity against *Shigella*, *Pseudomonas*, *Bacillus megatarium*, and *Staphylococcus albusi* is supported by several investigations. Additionally documented are its anti-oxidant and antimutagenic properties. To further investigate its anti-tumor benefits, more research is required.

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