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## OVERVIEW OF VINCA (Catharanthus roseus)

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**Abstract:** Indian traditional system of medicine ayurveda which focuses on the medical potential of plants. Medical plants have so many uses. The four major vinca alkaloids used in various cancer chemotherapies are vinblastine, vincristine (or semisynthetic derivatives), vindesine, and vinorelbine from which two natural compounds, vinblastine and vincristine and two semi-synthetic derivatives, vindesine and vinorelbine. They are naturally extracted from the plant and have hypoglycemic and cytotoxic effects. They used to treat cancer, diabetes. Vincristine is a chemotherapeutic agent administered in combination with other drugs such as methotrexate for the treatment of malignancy (e.g., lymphoma and leukemia). Vinca alkaloids are having poisonous activities have physiological effects too that makes them useful as medicines.

### KEYWORDS:

Botanical classification, vernacular name, Apocynaceae, chemical constituent, vincristine, vinblastine, etc.

### INTRODUCTION-

Near about 350,000 species of plants are found on earth every plant have something medicinal value..

Vinca alkaloids were discovered in the 1950's by Robert Noble and Charles Beer of Canada. Vinca were one of the first plant alkaloids to be developed for use as anti-cancer agents in humans. The parts that grow above the ground and the root are used to make medicine. The plant has spread all over tropical and subtropical parts of India and grows wild all over the plains and lower foothills in Northern and Southern hills of India. The vinca alkaloids are a well known source of drugs derived from the Madagascar periwinkle (*Catharanthus roseus*) belongs to the family Apocynaceae. The genus *Catharanthus* consists of eight species. *C. roseus* is a diploid plant species. They have been used to treat diabetes, high blood pressure and have been used as disinfectants.

### BOTANICAL CLASSIFICATION

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

**Family Name:** Apocynaceae

**Kingdom:** Plantae

**Division:** Magnoliopsida (Flowering plants)

**Class:** Magnoliopsida (Dicotyledons)

**Order:** Gentianales

**family:** Apocynaceae

**Genus:** *Catharanthus*

**Species:** *C. roseus*

### VERNACULAR NAMES

**English:** Cayenne, jasmine, old maid

**Hindi:** Sada-bahar

**Malayalam:** Banappuva, Nityakalyani

**Marathi:** Sadaphool, Sadaphul

**Sanskrit:** Nityakalyani, Rasna,

**Tamil:** Cutkattu malli, Cutukattu malli

**Telugu:** Billaganneru

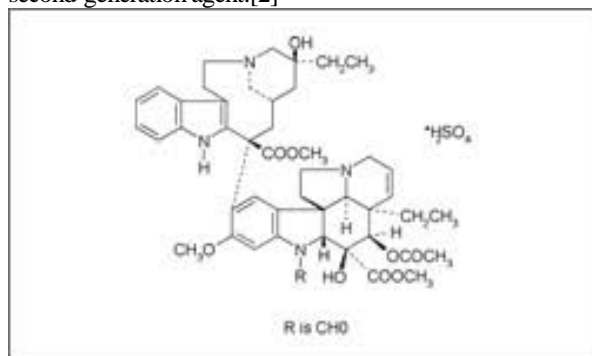
**Gujarati:** Barmasi

**Bengali:** Noyontara

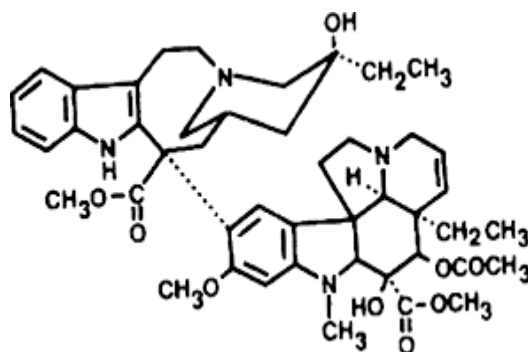
**MORPHOLOGICAL CHARACTERISTICS-****HABIT-** A Perennial herb.**STEM-** Erect, Cylindrical, Branched, Solid, Reddish Green, Glabrous.**ROOT** -Tap root, rarely branched.**LEAF** -cauline, simple, opposite, decussate, petiolate, extipulate, entire, mucronate apex, uncostate reticulate venation.**INFLORESCENCE-** cymose, flower arranged in axillary pairs.**FLOWER** -pedicellate, bractate, hermaphrodite, actinomorphic, complete, pink, hypogynous**CALYX [K]**- 5, polysepalous, glandular, green, inferior, quinquecuneate aestivate**COROLLA [C]**- 5, gamopetalous, corolla tube, throat of corolla tube hairy forming a corona, contorted aestivate**ANDROECIUM [A]**- 5, free, epipetalous, alternate to petals, almost sessile, anthers dorsifixed, yellowish.**GYNOECIUM [G]** -2 carpels, bicarpellary, syncarpous, carpel united above in the region of the style and stigma, ovaries free, nectar glands present, unilocular, marginal placentation [9]**CHEMICAL CONSTITUENTS-**

Plants are well known to secrete a range of secondary metabolites onto their surfaces that may offer a chemical barrier to insect herbivores or to attack by fungi and other pathogens. Although these leaf wax exudates may contain unusual fatty acids, triterpenes and other terpenes, hydrophobic flavonoids and other phenols, there is little evidence for the secretion of alkaloids onto the plant surface. [4]

Vinca alkaloids derived from *Vinca rosea* (*Catharanthus roseus*) consists of first-generation (vincristine, vinblastine), second-generation semi-synthetic derivatives (vinorelbine, vindesine), and third-generation (vinflunine). Vinflunine has also been classified by some as a second-generation agent. [2]



1) Vincristine



2) Vinblastine

**PHARMACOLOGICAL ROLE-****ANTIOXIDANT EFFECT-**

The anti-oxidant nature of the plant extract is due to the presence of tannins, phenolic and flavonoids. They help in eradicating the reactive oxygen species harmful to our body. [1]

**ANTICANCER EFFECT-**

The monoterpene indole alkaloids (MIAs) of Madagascar periwinkle (*Catharanthus roseus*) continue to be the most important source of natural drugs in chemotherapy treatments for a range of human cancer. The anticancer active ingredients Vinblastin and Vincristine are derived from the leaf and stem of vinca. They inhibit the growth of human tumors. Vinblastine is used experimentally or treatment of neoplasms and for Hodgkin's disease, choroid carcinoma. Vincristine and other active ingredients are used for leukemia in children [3]

Antineoplastic vinca alkaloids are used to treat conditions such as: Acute lymphoblastic leukemia (a type of cancer of the blood and bone marrow)

- Non small cell cancer.
- Testicular cancer
- Squamous cell carcinoma of head and neck
- Hodgkin's lymphoma (cancer of the lymphatic system)
- Kaposi's sarcoma (cancer that develops from the cells that line the lymph or blood vessels)
- Histiocytic lymphoma (a rare, aggressive type of non-Hodgkin's lymphoma)
- Mycosis fungoides (a rare form of T-cell lymphoma of the skin)
- Bladder cancer
- Letterer-Siwe disease (a severe disease in which histiocytes start to multiply and attack the tissues or organs, starting in infancy with a scaly, sometimes itchy rash on the scalp, ears, abdomen, and creases of the neck and face) [8]

### ANTIDIABETIC ACTIVITY

Different extracts of *C. roseus* have the ability to improve blood supply to the brain resulting in enhanced oxygen and glucose supply to brain. This also limits the nonessential blood clotting. It has been found that this plant is capable of increasing insulin production and utilization of sugar and utilization of sugar in blood. An alkaloid Alstonin found in bark has been used to regulate blood pressure. For diabetic treatment *C. roseus* alkaloid has been marketed under the proprietary name Vinculin.[5] The ethanolic extracts of the leaves and flower of *C. roseus* showed a dose dependent lowering of blood sugar in comparable to the standard drug. Lowering of blood sugar in comparable to the standard drug glibenclamide. The Hypo glycaemic effect has appeared due to the result of the increase glucose utilization in the liver. The aqueous extract was found to lower the blood glucose of about 20% in diabetic rats when compared to that of the dichloromethane and methanol extracts which lowered the blood glucose level to 49-58%. The hypoglycaemic effect has appeared due to the result of the increased glucose utilization in the liver.[12]

### ANTI HELMINTHIC PROPERTY-

*Catharanthus roseus* was being used traditionally for a long period as an anti helminthic agent. The anti helminthic property of *C. roseus* has been evaluated by using *Pherithema postuma* as an experimental model and with Piperazine citrate as the standard reference. The ethanolic extract at the concentration of 250 mg/ml was found to show the significant anti helminthic activity[6]

### ANTI-DIARRHEAL PROPERTY

Anti-diarrheal property is tested in wistar rats by the ethanolic leaf extracts and castor oil as an experiment of diarrhoea has pretreatment extract. The effect of anti-diarrheal was shown by the dose dependent inhibition of the castor oil induced diarrhoea[10]

### ANTI BACTERIAL PROPERTY-

Crude extracts from different parts of the plant was tested for anti bacterial activity. Extract from leaves showed significantly higher efficacy. The anti bacterial activity of the leaf extract of the plant was checked against micro organism like *Pseudomonas aeruginosa* NCIM2036, *Salmonella typhimurium* NCIM2501, *Staphylococcus aureus* NCIM5021 and was found that the extracts could be used as the prophylactic agent in the treatment of many of the disease.[13]

### MEMORY ENHANCEMENT PROPERTY-

Vinpocetine has been reported to have a variety of actions that would hypothetically be beneficial in Alzheimer's disease (AD). The only study investigating this agent in a well-defined cohort of AD patients found no benefit. Metaanalysis of older studies of vinpocetine in poorly-defined dementia populations concluded that there is insufficient evidence to support its clinical use at this time. Vinpocetine has been well tolerated at doses up to 60 mg/d in clinical trials of dementia and stroke, and no significant adverse events. [11]

### OTHER ACTIVITIES-

There is a contraindication with Vinpocetine and other blood thinning agents such as warfarin, aspirin along with other dietary supplements such as ginkgo, vitamin E and garlic.

### SIDE EFFECTS

Vinca alkaloids are contraindicated during pregnancy, have been planning for pregnancy or during breast-feeding as it may cause birth abnormalities. Patients should not receive any vaccinations while taking this medication. Vincristine may also cause weakness of immunity system and can lead to an illness. Patients should notify their clinician in prior about any prescription drugs taken concurrently and also suffering with any other medical conditions, such as, herpes zoster infection, gout, kidney stones, chickenpox, infections, liver disease, nerve or muscle disease.

Hematological Toxicity

Renal Toxicity

Hepatic Toxicity

Pulmonary Toxicity

Gastrointestinal Toxicity

Cardiovascular Toxicity

### CONCLUSION-

In this review literature we are discussed about the vinca. *Vinca Catharanthus roseus* was investigated from the ancient time for their phytochemical components and their therapeutic effect and one of the most available plants and it has the life-saving property. In vinca plant constitute of vinblastin and vincristine, on the chemotherapy medication it is used for several types of cancer.

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