

# Pharmacological Activities of Catharanthusroseus

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**Abstract:** *Ayurveda is the Indian traditional system of medicine which focuses on the medical potential of plants. Catharanthusroseus is one plant recognized well in Ayurveda. It is known for its anti-diabetic, anti-microbial, wound healing, Anti-diarrhoeal, anti-oxidant and antiulcer. It is an evergreen plant first originated from islands of Madagascar. The flowers may vary in colour from pink to purple and leaves are arranged in opposite pairs. It produces nearly 130 alkaloids mainly vinceine, reserpine, vincristine, vinblastine and raubasin. Vincristine and vinblastine are used for the treatment of various types of cancer such as Hodgkin's disease, breast cancer, skin cancer and lymphoblastic leukemia. It has high medicinal values which need to be explored extensively. In this review paper we are focusing on the plant providing the various pharmacological activities by using various in-vivo as well as in-vitro models.*

**Keywords:** Alkaloids, Catharanthusroseus, Vinblastine, Vincristine, Vincristine, Anti-Cancer

## I. INTRODUCTION

Medicinal plants have a long history of usage in traditional medicine. The plant has spread all over tropical & sub tropical parts of India & grows wild all over the plains & lower foot hills in northern and southern hills of India. Stem produces a milky sap which is source for more than 70 indole alkaloids. Vincristine and vinblastine were isolated from this plant are well known anti cancer drug from Hodgkin's lymphoma and childhood leukemia. The genus Catharanthus consists of eight species of which seven are endemic to Madagascar and one, *C. pusillus*, is endemic to India. *Catharanthusroseus*, Madagascar periwinkle (hereafter MP), is an important floral species in horticulture and is one of the few pharmacological plants that have a long history. It could be traced to Mesopotamian folklore going as far back as 2600 BCE. This plant still plays a considerable role today in herbal and traditional medicine for treatment of various diseases. The therapeutic properties were ascribed to a number of chemicals in the alkaloid class sometime in the mid-1950s.



### 1.1 Scientific Classification

<b>Botanical Name(s):</b>	<i>Vinca Rosea(Catharanthusroseus)</i>
<b>Family Name:</b>	Apocynaceae
<b>Kingdom:</b>	Plantae
<b>Division:</b>	Magnoliophyta(Flowering plants)
<b>Order:</b>	Magnoliopsida(Dicotyledons)
<b>Family:</b>	Gentianales
<b>Class:</b>	Apocynaceae
<b>Genus:</b>	Catharanthus
<b>Species:</b>	<i>C.roseus</i>

### 1.2 Vernacular Names

- **English:** cayennejasmine,old maid
- **Hindi:** sadabahar,sadabahar
- **Kannada:** batlahoo, bilikaasi
- **Malayalam:** banappuvu,nityakalyani,
- **Marathi:** sadaphool,sadaphul,
- **Sanskrit:** nityakalyani, rasna,
- **Tamil:** cutkattumalli,
- **Telugu:** billaganneru
- **Gujarati:** Barmasi
- **Bengali:** noyontara
- **Dutch:** Rozemaagdenpalm
- **German:** Zimmerimmergrun
- **German:** Zimmerimmergrun
- **Spanish:** Chatas, Chula<sup>[4,5]</sup>

### 1.3 Potentially Active Chemical Constituents

Major being Alkaloids from 0.74 to 0.82% ; Important being vincristein, Vinblastin, Catharanthamine , Vincolin. Other Alkaloid Viz Deoxyvinblast Leurosine Pleurosine, Leurocristine, Leurosidine,Vincolinine, Vinacardine, Roseadine, Windolicine, Rosicine are isolated.

### 1.4 Geographical Distribution

Catharanthusroseus is originated from the Indian Ocean Island of Madagascar. It was believed to be an endangered plant in the wild. However in many tropical and subtropical regions worldwide, including the Southern United states, it is now a common plant<sup>[8,9]</sup>.

### 1.5 Pharmacological Activities:

#### A. Anti Diabetic Activity

Diabetes is evolving as one of the most fatal diseases confronting humanity right behind cancer and cardiovascular diseases. Existing databases indicate its high prevalence, morbidity and mortality rate<sup>[1,2]</sup>. About 4 % population worldwide is dying by this deadly disease and this toll is likely to swell by 5.4 % in the year 2025<sup>[3]</sup> additionally diabetes is known to be risk factor for other diseases as well. India with its rising economy and rapidly urbanizing population is at a greater risk of this disease. The number of adults fighting with diabetes in India is projected to amplify threefold, from the existing 19.4 million in 1995 to 57.2 million in 2025. The world Health Organisation (WHO) estimated that worldwide, 346 million people have diabetes with more than 80 % of diabetics living in low and

middle-income countries. The number is expected to grow to double by 2030<sup>[4]</sup>. Recent studies on geographical and ethnic influences have revealed that people of Indian origin are highly prone to diabetes. Diabetes is characterized by hyperglycemia due to an absolute or relatively deficient insulin levels<sup>[5]</sup>. Although insulin therapy is widely used for management of diabetes mellitus, its many side effects such as, insulin resistance, anorexia nervosa, brain atrophy, and fatty liver after chronic treatment makes it a risky proposition<sup>[6,7]</sup>. Therefore, extensive research, which is still at a nascent stage, is required to find more effective and safer hypoglycemic agents. Medicinal plants are a rich source of anti-diabetic compounds and have been used for the treatment of diabetes in the form of compound drugs. Many of these plant-derived drugs against diabetes mellitus have received positive approval from WHO.

### **B. Antimicrobial & Wound Healing**

Antibacterial activity of crude extracts from various parts of the plant was tested. The efficacy of a leaf extract was significantly higher. The anti-bacterial activity of the plant's leaf extract was tested against microorganisms such as *Pseudomonas aeruginosa* NCIM2036, *Salmonella typhimurium* NCIM2501, and *Staphylococcus aureus* NCIM5021, and it was discovered that the extracts could be used as a prophylactic agent in the treatment of many diseases.

Wound healing activity was determined in rats, after administration ( $100 \text{ mg kg}^{-1} \text{ day}^{-1}$ ) of the ethanol extract of *C. roseus* flower, using excision, incision and dead space wounds models. The animals were divided into two groups of 6 each in all the models. In the excision model, group 1 animals were topically treated with carboxymethyl cellulose as placebo control and group 2 received topical application of the ethanol extract of *C. roseus* at a dose of 100 mg/kg body weight/day. In an incision and dead space model group 1 animals were given normal saline and group 2 received the extract orally at a dose of  $100 \text{ mg kg}^{-1} \text{ day}^{-1}$ . Healing was assessed by the rate of wound contraction, period of epithelization, tensile strength (skin breaking strength), granulation tissue weight, and hydroxyproline content. Antimicrobial activity of the flower extract against four microorganisms was also assessed<sup>[10]</sup>

### **C. Antidiarrhoeal Activity**

The anti-diarrheal activity of the plant's ethanolic leaf extract was tested in the Wistar rats with castor oil as experimental diarrhea inducing agent. *Catharanthus roseus* showed a dose dependent inhibition of the castor oil-induced diarrhoea.<sup>[11]</sup> *Catharanthus roseus* is a medicinal plant with various pharmacological properties. In this study, we investigated the in vivo antidiarrheal activity of *C. roseus* ethanolic leaf extract in Wistar rats. Castor oil was used to induce experimental diarrhea in rats pretreated with extracts administered at 200 and 500 mg/kg to determine antidiarrheal effect. Loperamide and atropine sulphate were used as standard drugs in the two experiments. Preliminary phytochemical screening of the extract revealed the presence of alkaloids, tannins, triterpenes, flavonoids and saponins. The antidiarrheal effect of ethanolic extract of *C. roseus* revealed a dose dependant inhibition of castor oil induced diarrhea at doses of 200 and 500 mg/kg. On comparison of the extract with the negative control, there was a significant difference at 200 mg/kg ( $P < 0.05$ ) and a more significant difference at 500 mg/kg ( $P < 0.001$ ). Test extract's effect was further evaluated on intestinal transit and it exhibited dose dependant inhibition of transit motility of charcoal meal. The results indicated that the ethanolic extract of *C. roseus* possesses significant antidiarrheal effect and corroborate the use of this herbal remedy as non-specific treatment for diarrhea in folk medicine.<sup>[12]</sup>

### **D. Anti oxidant Activity**

The anti oxidant potential of the ethanolic extract of the roots of the two varieties of *C. roseus* namely rosea (pink flower) and alba (white flower) was obtained by using different system of assay. The result obtained proved that the ethanolic extract of the roots of Periwinkle varieties has exhibited the satisfactory scavenging effect in the entire assay in a concentration dependent manner but *C. roseus* was found to possess more antioxidant activity than that of *C. alba*. The antioxidant activity of *C. roseus* was assured by DPPH assays at distinct concentrations (200, 400, 600, 800 and 1000  $\mu\text{g}$ ). Among the five concentrations tested, 800  $\mu\text{g}$  shows the apex antioxidant activity<sup>[13,14]</sup>

### **E. Anti Ulcer Activity**

The plant's vincamine and vindoline alkaloids demonstrated anti-ulcer activity. Vincamine, an alkaloid found in plant leaves, has cerebrovasodilatory and neuroprotective properties. activity. The plant leaves demonstrated anti-ulcer

activity in rats against experimentally induced gastric damage.<sup>[15]</sup> Ulcers are sores on the outside of the skin or a mucous membrane characterized by a shallow loss of tissue. Ulcers are most normal on the skin of the lower furthest points and in the gastrointestinal tract, despite the fact that they might be experienced at practically any site. There are numerous kinds of ulcer, for example, mouth ulcer, throat ulcer, peptic ulcer, and genital ulcer. The peptic ulcers are disintegration of covering of stomach or the duodenum. The two most regular sorts of peptic ulcer are designated "gastric ulcer" and "duodenal ulcer." The name alludes to the site of ulceration<sup>1</sup>. Gastric ulcers are situated in the stomach, described by soreness; Eating may build pain instead of soothe pain. Other indications may comprise nausea, vomiting, and weight reduction. Despite the fact that patients with gastric ulcers have typical or reduced acid production, yet ulcers may happen even in complete nonattendance of acid. Duodenal ulcers are found toward the start of small digestive tract and are portrayed by serious pain with burning sensation in upper abdomen. In the duodenum, ulcers may appear on both the anterior and posterior walls. In some cases, peptic ulcer can be dangerous with manifestations like bloody stool, extreme stomach torment and cramps along with vomiting blood.<sup>[16,17]</sup>

## II. CONCLUSION

Catharanthus roseus is a medicinal plant with various pharmacological properties. In this study, we investigated the in vivo antidiarrheal activity of *C. roseus* ethanolic leaf extract in Wistar rats. Castor oil was used to induce experimental diarrhea in rats pretreated with extracts administered at 200 and 500 mg/kg to determine antidiarrheal effect. Loperamide and atropine sulphate were used as standard drugs in the two experiments. Preliminary phytochemical screening of the extract revealed the presence of alkaloids, tannins, triterpenes, flavonoids and saponins. The antidiarrheal effect of ethanolic extract of *C. roseus* revealed a dose dependant inhibition of castor oil induced diarrhea at doses of 200 and 500 mg/kg. On comparison of the extract with the negative control, there was a significant difference at 200 mg/kg ( $P < 0.05$ ) and a more significant difference at 500 mg/kg ( $P < 0.001$ ). Test extract's effect was further evaluated on intestinal transit and it exhibited dose dependant inhibition of transit motility of charcoal meal. The results indicated that the ethanol extract of *C. roseus* possesses significant antidiarrheal effect and corroborate the use of this herbal remedy as non-specific treatment for diarrhea in folk medicine.

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Catharanthusroseus is the most exclusive source of life saving drugs for majority of the world's population. Its plant also possess various property such as anti cancerous, anti diabetic, anti helminthic, anti diarrheal, memory enhancement etc. its above plant to reveal the unknown mysteries which would help the need of the present pharmaceutical world.

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