

Sadabahar (*Catharanthus roseus*): A Review of its Medicinal Properties and Skin Benefits

Manisha Singh Jolan* (jolanmanisa@gmail.com),
Ms. Pragati Bailwal (Pragatibailwal90@gmail.com),
Dr. Yusra Ahmed (Ahmadyusra@gmail.com)

**Faculty of Pharmacy, Veer Madho Singh Bhandari, Uttarakhand
Technical University, Dehradun, Uttarakhand, 248007 (India)**

Abstract

Known by a variety of regional names, including Sadabahar, Madagascar Periwinkle, Rosy Periwinkle, *Vinca rosea*, *Ammocollis rosea*, *Lochnera rosea*, Cape Periwinkle, and "Old Maid," *Catharanthus roseus* is a popular ornamental and medicinal plant. This plant is significantly being used and examined in the field of Pharmacognosy, Ethnobotany and Pharmacology. The plant is from the family Apocynaceae and Genus *Catharanthus*. It grows in Madagascar natively but is now cultivated widely also and may found in many regions (tropical as well as subtropical) around the world. It is commonly sighted in Indian Gardens and also Cultivated in China, Indonesia, The Philippines, South Africa, The USA, and Australia. In particular, traditional medicine recognises *Catharanthus roseus* for its therapeutic qualities. It is utilised as a therapeutic plant in addition to being a decorative one. Traditionally, the plant was used to treat a variety of illnesses already, the idea of employing it in Modern System of Medicine came. It became the treatment for many diseases such as Hypertension, Cancer, Diabetes, Ulcer, Diarrhea, Skin Diseases, Alzheimer's Disease along with its Anti-Oxidant property, Anti-Helminthic activity, Reduced inflammation or the healing of wounds, and antimicrobial action, etc. Tests are being conducted to use it to create skincare products like creams, gels, serums, etc. because of its anti-microbial activity. The Review Article highlights the medicinal properties along with its benefits on skin with which it may be used as cosmetics too in the future paving the way in Skincare.

Keywords: Sadabahar, Catharanthus roseus, Phytochemicals, Medicinal Properties, Anti-Cancer Activity, Skin Benefits, Herbal Medicine**Introduction:**

Often referred to as Madagascar periwinkle or sadabahar, *Catharanthus roseus*, is broadly recognized as a therapeutic as well as an ornamental plant that has picked up noteworthy consideration within the areas of Ethnobotany, Pharmacognosy, and Pharmacology. It is from family Apocynaceae and is local in the island of Madagascar while it has gained naturalization and developed through both tropical and Subtropical districts around the world that includes India, China, The Philippines, and parts of South Africa and The USA and Australia. Characteristic assets counting home grown plants that contains huge range of phytochemicals encouraging as a conventional medication to cure inveterate and irresistible infections that have been considered as secure as well as successful options along with less side effects compared to engineered operators [1]. Truly, *Catharanthus roseus* has involved a fundamental put into the traditional medical systems like Ayurveda, Unani and Conventional Chinese Medication. In Ayurveda, the clears out, roots and extricates of the plant have been utilized for centuries to oversee afflictions such as Diabetes, Fever, Skin Diseases, and Wounds. The significance of *Catharanthus roseus* raised significantly within the mid-20th century with the separation of the pair of Anti-Cancer Alkaloids; Vinblastine and Vincristine which now are utilized world wide in Chemotherapy regimens as of now. The plant has illustrated Hypoglycemic, Anti-oxidant, Antimicrobial, Anti-inflammatory and Cardioprotective properties, assist highlighting its flexible pharmacological profile. This amazing plant is eminent because of its many alkaloids, which are recognized for their hypotensive, narcotic and anticancer impacts.

Vinblastine and vincristine are among the more than a hundred monoterpenoid indole alkaloids it creates, and these are essential elements in the fight against cancer.[2], [3]. *Catharanthus roseus* is highly valued for its adaptability and resilience, capable of thriving in a variety of climates and soil conditions. Additionally, the Sadabahar extracts have found increasing use in cosmeceuticals particularly for their skin-soothing, Anti-Aging, and wound-healing properties, which are supported by traditional knowledge and empirical research.

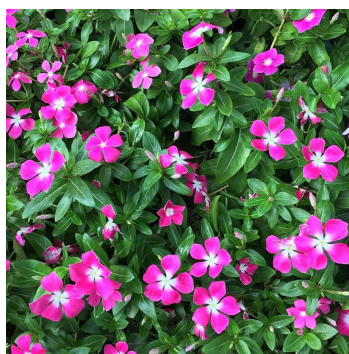


Fig. 1. *C. roseus* plant

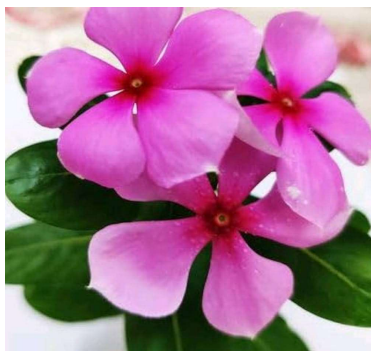


Fig. 2. *C. roseus* flower

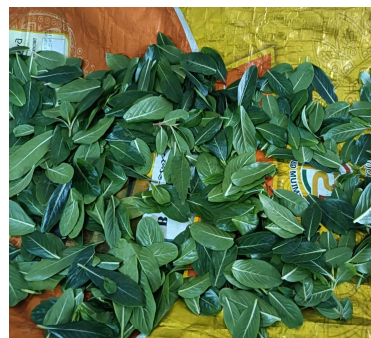


Fig. 3. *C. roseus* leaves

Researching plant extracts and their secondary metabolites is essential due to the fact that these natural sources provide a wide variety of bioactive compounds with a range of therapeutic applications.[4]. By demonstrating their strong anticancer effects in the 20th century, vinblastine and vincristine's extraction and identification significantly changed cancer treatment. As evidence of *Catharanthus roseus*'s contribution to modern medicine, the alkaloids are essential in order to treat lymphoma, leukemia, and other cancers because they prevent the production of microtubules inside cancer cells [5].

Biological Overview:

Taxonomy and Classification:

Kingdom	Plantae
Division	Magnoliophyta
Class	Magnoliopsida
Order	Gentianales
Family	<i>Apocynaceae</i>
Genus	<i>Catharanthus</i>
Species	<i>C. roseus</i>

Some English names for *C. roseus* include Cape Periwinkle, Rose Periwinkle, Rosy Periwinkle, and "Old Maid." Other names include *Vinca rosea*, *Ammocollis rosea*, and *Lochnera rosea*. The world's tropical and subtropical regions are home to its widespread cultivation and naturalization. This perennial plant can reach a height of approximately one meter. It has glossy, deep green foliage and blooms all summer. This plant's Flowers' centre is naturally purple and are faded pink in colour. Slow-growing plant, upright or prone. The stem is green.

Its glossy green, hairless leaves are oval to oblong, 1-3 inches long and 1-2 cm wide. They have a mid section and a short, opposite-paired petals that is about 1-2 cm long. From white to dark purple flowers with a dark reddish pink centre are produced by this plant. The corolla is around 2–5 cm in diameter and has fine, lobes that resembles, while the base tube is about 2-3 cm long and hollow. Different and turned up on one side, seeds measure 1-2 mm [9]. In equatorial regions, flowers bloom from spring till late autumn, but it can also occur in mild temperate regions throughout the year. [9] Soil that drains properly and receives adequate sunlight is ideal. Good flowering requires radiant light, including three to four hours in the sun per day. [9] Warm conditions can support its growth, but 20 to 35 degrees Celsius are ideal. [9] Water is needed regularly in tolerable amount.[9] As flowering begins, application of standard liquid fertilizer is required time by time. But it should be in limited because plants cannot tolerate excess fertilizer.[9]

Irrigation: They require proper dampness but not excess watering, and must be irrigated appropriately throughout the season but not excessively, yet they are drought resistant once established. After a proper watering, they can recover. [9]

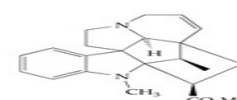
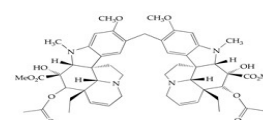
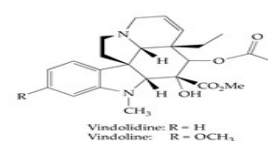
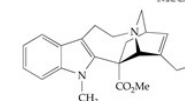
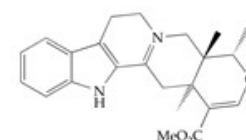
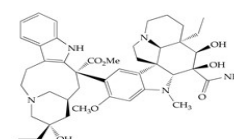
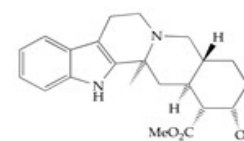
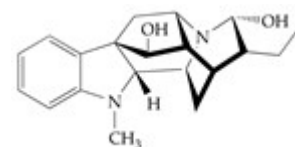
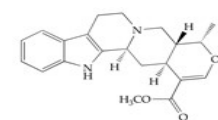
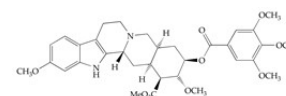
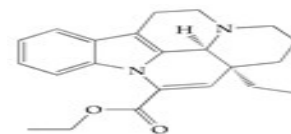
Fertilization: These plants don't reproduce a lot. Apply a reasonable amount of liquid fertilizer once a week or once a month, if required. If the plant is overfertilized, it will produce a lot of leaves rather than flowers. [9]

Phytochemistry of *Catharanthus roseus*:

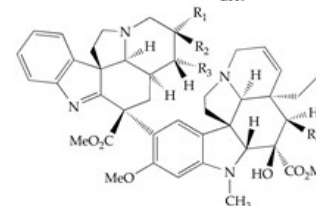
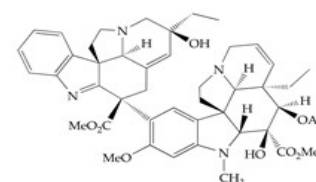
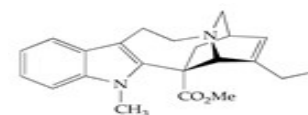
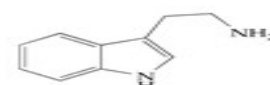
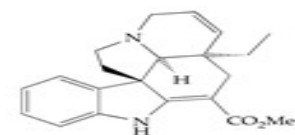
A large number of alkaloids (organic compounds that contain nitrogen but do not include peptides, amino acids, purines, their derivatives, antibiotics, or amino sugars) [10], have been found in *C. roseus*. The chemical structure of alkaloids determines whether they are heterocyclic or non-heterocyclic.

Alkaloids in *Catharanthus roseus*

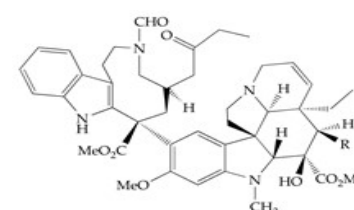
Alkaloids	Part of plant	References.
Vincristine	Leaf, Stem, Root	[11]
Vinblastine	Leaf, Stem, Root	[11]
Vinpocetine	Leaf, Stem, Root	[11]
Reserpine	Leaf, Stem, Root	[11]
Ajmalicine	Leaf, Stem, Root	[11]
Ajmaline	Leaf, Stem, Root	[11]
Yohimbine	Leaf, Stem, Root	[11]
Vindesine	Leaf, Stem, Root	[11]
Serpentine	Leaf, Stem, Root	[11]
Catharanthine	Leaf	[12], [13]
Vindolidine	Leaf	[11], [14]
Vindoline	Leaf, Stem, Root	[11], [14]
Vindolicine	Leaf	[14]
Vindolinine	Leaf	[14]
Catharoseuomine	Whole plant	[15]

Structure

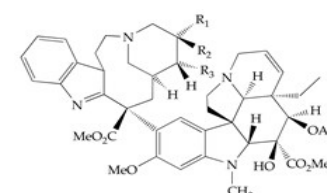
Alkaloids	Plant Part	Reference
Tabersonine	Root (hairy)	[13]
Tryptamine	Root (hairy)	[13]
Catharanthamine	Leaf	[16]
14',15'- Didehydrocyclovin blastine	Whole plant	[17]
17- Deacetoxyvinblastine	Whole plant	[17]
Cycloreosine	Whole plant	[17]
17- Deacetoxyvinamidi ne	Whole plant	[17]
Vinamidine	Whole plant	[17]
Leurisine	Whole plant	[17]
Leurosine	Whole plant	[17]
Catharine	Whole plant	[17]
Cathachunine	Whole plant	[18]



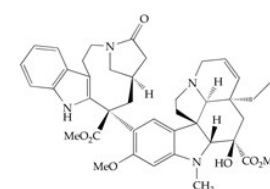
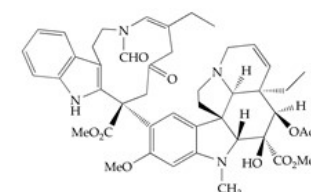
17-Deacetoxyvinblastine: $R_1 = \text{Et}$, $R_2 = \text{OH}$, $R_3 = R_4 = \text{H}$
Cycloreosine: $R_1 = R_3 = -\text{O}-$, $R_2 = \text{Et}$, $R_4 = \text{OAc}$



17-Deacetoxyvinamidine: $R = \text{H}$
Vinamidine: $R = \text{OAc}$



Leurosine: $R_1 = R_3 = -\text{O}-$, $R_2 = \text{Et}$
Leurosine: $R_1 = \text{OH}$, $R_2 = \text{Et}$, $R_3 = \text{H}$



Pharmacological Approach:

Anti-Cancer Activity: The administration of *Catharanthus roseus* in clinical practice, is executed intravenously, after which they eventually gets metabolized by liver and then excreted. The major impacts of this drug are hair loss, peripheral hyponatremia neuropathy and constipation. Half-synthetic alkaloids from *Catharanthus*, like Vinorelbine and Vinflunine, were created to enhance the therapeutic index. The anti-tumor effect of Vinorelbine and Vinflunine is achieved through their tubulin-binding properties. It was discovered that this plant exhibits anticancer activity against a variety of different kinds of cells in in-vitro. Alkaloids found in vinca effectively stop cancer cells from proliferating. The characteristics of each Vinca alkaloids are distinct [21].

Anti-diabetic Activity:

Methanolic portions of Sadabahar leaves and flowers have shown the hypoglycemic impacts in the induced diabetic rats. It is believed that the alkaloid ajmalicine enhances insulin sensitivity and glucose uptake. Traditional uses of *Catharanthus roseus* in managing type II diabetes are supported by emerging preclinical evidence.

Anti-oxidant Activity:

Flavonoids and phenol compounds present in this plant exhibits strong free radical scavenging activities, thereby reducing oxidative stress. This contributes to cellular protection against lipid peroxidation and DNA damage. Oxidative stress-related illnesses obtained more focus in the last few years. Cardiovascular, metabolic, neurodegenerative, and even cancerous mitochondrial disorders are among the most enduring [25] & [26].

Throughout the trial, the ethanol-based extract of Periwinkle root types demonstrated a decent shielding action via concentration-related way; nevertheless, later research revealed that *C. roseus* shows more anti-oxidant activity than *C. alba* [33].

Antimicrobial activity: It has been said that this plant is a valuable natural origin of the active chemotherapeutic medicines, with a greater emphasis on prevention. It also suggests a wide range of action [34]. Since the majority of bacterial infections are becoming resistant to many of the recently released antimicrobial medications, Periwinkle is a significant therapeutic plant for new pharmaceutical products. A wide range of active and effective chemotherapeutic compounds have been demonstrated to be found in plants, making them important natural resources [35].

Anti-Helminthic activity: In order to create two concentrations, the synthesized chemicals, such as aqueous, ethanol, ethyl acetate, and methanol, were created with the least amount of water possible. The control for it was regular saline. Three earthworms of almost equal size took for every concentration and placed in Petri dishes at room temperature. The water, ethanol, methanol, and ethyl acetate extracts of *Catharanthus roseus* were found to exhibit anthelmintic action. [35]

Anti-Ulcer Property: Vincamine and vindoline (alkaloids) have antiulcer effects. The leaves exhibited Anti-ulcer properties in rats with chemically induced stomach damage [36].

Property related to hypertension: The plant's leaf extract significantly reduced blood pressure. 150 beneficial alkaloids and other pharmacologically active substances have been found in the leaves. Leaf extracts (hydro alcoholic or dichloromethane-methanol) is reported to have notable low blood pressure and hyperglycemic impacts in experimental animals [37].

Anti Diarrheal Property: Ethanolic extracts from the plant have showed a decrease that was dose-dependent of diarrhea caused by castor oil [38].

Wound-Healing property: Catharanthus roseus is used to promote wound healing due to its higher hydroxyproline content, wound contraction, and tensile strength [39].

Hypolipidemic effect: Catharanthus roseus (Linn.) G. Donn leaf juice was used in a trial that demonstrated anti-atherosclerotic behaviour by lowering serum levels of LDL-c, triglycerides, and total cholesterol and histology of the kidney, liver, and aorta [40].

Alzheimer Disease (Memory Enhancement Activity): Research has demonstrated that Vinpocetine possesses a number of qualities that may benefit those suffering from Alzheimer's disease (AD). Research has shown that Vinpocetine has a number of beneficial effects on memory and brain function, especially when Alzheimer's disease is present. Clinical studies for dementia and stroke showed no crucial adverse effects when Vinpocetine was given at a well-accepted dose of up to 60 mg/d. [42]

Additional Activities: Vinpocetine should not be taken with any blood thinners, including aspirin, warfarin, or certain dietary supplements, such as garlic, ginkgo, or vitamin E. [8]

Conclusion: Sadabahar (*Catharanthus roseus*) is much more than a decorative garden plant. It is a plant with prolonged history in traditional healing systems and an impressive range of scientifically supported medicinal properties. Over the years, researchers have discovered that this simple plant contains a highly rich variety of bioactive compounds, which includes powerful alkaloids: vincristine and vinblastine, they are extensively utilized in cancer treatment. Apart from its role in oncology, *Catharanthus roseus* has shown significant potential in managing chronic conditions because of its antibacterial, anti-inflammatory (wound-healing), and antioxidant qualities, which help treat conditions like microbiological infections, diabetes, and hypertension. One of the most exciting and emerging areas of interest is Sadabahar's potential in skincare. Its ability to reduce inflammation, combat bacterial growth, promotion in wound healing, and protection against oxidative stress makes it an attractive natural ingredient for treating various skin conditions. Sadabahar shows a gentle yet effective solution on problems from minor wounds and irritations to more obstinate issues like acne or eczema, that aligns well with the growing demand for plant-based and chemical-free skincare products. Despite these promising researches, many of the current evidences comes from in-vitro studies and animal research. To fully realize Sadabahaar's potential in modern medicine and skincare, more humane clinical trials are needed. These should focus not only on confirming its safety and effectiveness but also on determining appropriate dosages, possible side effects, and the best ways to deliver its benefits—whether through extracts, oils, creams, or supplements, etc.

In conclusion, Sadabahar offers a compelling mixture of tradition and science. Its multiple healing properties makes it a strong candidate for further development in therapeutic as well as cosmetic fields and with continued research and thoughtful innovation, *Catharanthus roseus* could develop from a traditional remedy into a mainstream natural treatment option that would be benefiting health, wellness, and skin care as well.

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