

## PHYTOCHEMICAL & MEDICINAL THERAPEUTIC PROPERTIES OF VINCA ROSEA

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### ABSTRACT

Ayurveda is the Indian traditional system of medicine which focuses on the medical potential of plants. Vinca rosea is one of the recognized well in Ayurveda. It is a tropical & grown as a pot ornamental plant for its Rosy or White flower. It is small in size Perennial herbaceous evergreen plant. It contains more than 400 alkaloids are present in the plant. Vinca alkaloids are a set of drugs obtained from the vinca rosea. vinca alkaloids having medicinal properties such as Vinblastine & Vincristine, Vinorelbin, Vindesine etc. The herbal product having less side effect than synthetic product & also less cost of herbal product. Vinca rosea have therapeutic properties such as Anti-cancer, anti-

diabetic, anti-oxidant, antimicrobial etc. Vinca rosea is not recommended for oral use because it may occur psychological problems hence it is used as intravenously. Recently some researches are going to increase yield of alkaloids as well as decreases toxicity of plant. this review gives an overview of the medicinal properties & rich source of life saving drugs present in Vinca rosea.

**KEYWORDS:** Vinca rosea, Perennial, Alkaloids, Anti- cancer.

### ❖ INTRODUCTION

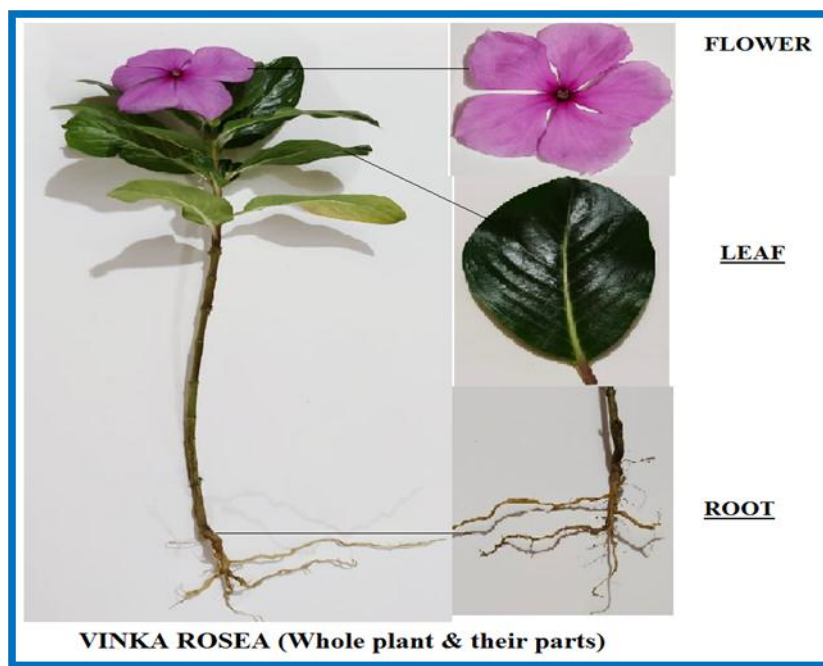
Vinca Rosea is an ornamental garden plant, which is used for Ayurvedic medicine. It is also called as Catharanthus Roseus or Periwinkle belonging to family Apocynaceae.<sup>[1]</sup>

### History

In 1910, the scientist *Peckolt* was described the use of an infusion of the Vinca rosea leaves to control hemorrhage, scurvy & as a mouth wash for tooth infection & also on the treatment for healing & cleaning of chronic wounds.<sup>[6,7]</sup>

It is native to the Indian Ocean Island (South Asia) of Madagascar. This is herbaceous evergreen plant growing about one meter in height. The leaves are oval shaped (2.5-9.5cm long & 1-3.5cm broad).<sup>[2]</sup>

The vinca rosea logo as a symbol for hope for cancer patient is used by national cancer council of Malaysia. it used for number of ailments like as high blood pressure, infection & diabetes mellitus. The alkaloids present in entire herb but leaves & root more alkaloids.<sup>[1]</sup>



**Fig: 1 Vinca rosea(Catharanthus Roseus or Periwinkle)**

**Table 1: Scientific Classification of Vinca Rosea.**

<b>Botanical Name</b>	<b>Catharanthus roseus</b>
<b>Kingdom</b>	Plantae
<b>Division</b>	Magnoliophyta(Flowering plant)
<b>Class</b>	Magnoliopsida(Dicotyledons)
<b>Order</b>	Gentianales
<b>Genus</b>	Catharanthus
<b>Species</b>	C.roseus <sup>[8,5]</sup>
Morphological feature: · This is perennial plant · The colour of leaves is green & arranged in opposite manner · The flowers are pinkish white & red colour · Roots are pale grey in colour · Odour- vinca rosea has characteristic odour · Taste – vinca has bitter in taste · Fruits of vinca are follicle with numerous black seed. <sup>[16]</sup>	

### ❖ Chemical constituents

Vinca rosea posses carbohydrate, flavonoid, saponin, Terpenoids, protein & alkaloids. Alkaloids are the most potentially active chemical constituents of Vinca rosea more than 400 alkaloids are present in the plant, which is used as pharmaceuticals, agrochemicals, Flavors & Fragrance, ingredients, food, additives & pesticides. The terpenoids indole alkaloids have been anti-cancer, anti inflammatory & antibacterial & anti malarial agents in many pharmacological studies.<sup>[5]</sup>

### ❖ Traditional uses of Vinca Rosea in different countries

#### 1. India

The juice of leaves is used as application to bee sting or wasp sting.

#### 2. Philippines

The decoction of leaves is used in diabetes & decoction of young leaves is used in stomach cramps.

The root decoction is used for intestinal parasitism.

Crude leaf extract & root used as cancer treatment.

Roots used for dysentery.

#### 3. Madagascar

The leaves are bitter & astringent used for vomitive.

The roots are used as purgative, homeostatic & toothache remedies.

#### 4. West Indies & Nigeria

The plant is used in diabetes.

#### 5. Cuba & Jamaica

Flower extract is used for eyewash in infants

#### 6. Bahamas

The decoction of flower is used in asthma, tuberculosis.

#### 7. Malaysia

The plant is used in diabetes, hypertension, insomnia, & cancer.

#### 8. Hawaii

The extraction of boiled plant is used to arrest bleeding.

#### 9. America

The gargle of plant is used in sore throats, chest ailments & laryngitis.

#### 10. Africa-The leaves are used for rheumatism.<sup>[15]</sup>



Vernacular names-  
 Hindi : Sada bahar  
 Marathi : Sadaphuli  
 English : Periwinkale  
 Telugu : Billa ganneru  
 Bengali : Nayantara  
 Gujarati : Baramasi  
 Sanskrit : Nitya kalyani<sup>[1]</sup>

**Fig: 2** Gardan plant of *Vinca rosea*.

**Table 2:** Plant parts used for extraction of alkaloids.

<b>Leaf</b>	Catharanthine, Vindoline, vindolidine, vindolicine, vindolinine, vinblastine, Vincristine
<b>Stem</b>	Leurosine, Catharanthine, vindoline
<b>Root</b>	Ajmalacine, Serpentine, Catharanthine, vindoline, Reserpine, Leurosine
<b>Flower</b>	Catharanthine, vindoline, leurosine, Tricine(flavones) <sup>[13]</sup>

**Table 3:** Name of vinca alkaloids, brand names & its therapeutic uses.

<b>Vinca alkaloid</b>	<b>Branded drug names</b>	<b>Therapeutic uses</b>
<b>Vinblastin</b>	Velban	Hodgkins disease, testicular germ cell cancer
<b>Vincristine</b>	Oncovin	Leukemia, lymphomas
<b>Vinorelbin</b>	Navelbine	Lung cancer
<b>Vindesine</b>	Eldisine	Acute lymphocytic leukemia <sup>[13]</sup>

#### ❖ Alkaloids

Alkaloids are occurring large group of naturally such as produced from plants, bacteria, fungi & animals, chemical compounds.

In the vinca rosea having Indole & Dihydro-indole group had been isolated & characterized from different plant parts of *Vinca rosea*.

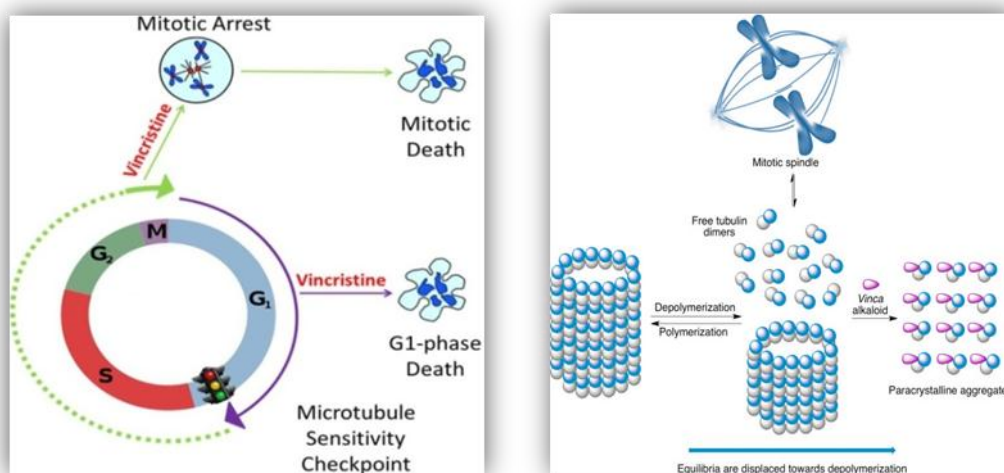
#### ***Vinblastine(VBL)***

Vinblastine is very important alkaloid extracted from leaf part of vinca rosea. The previous period cost of extraction & purification of vinblastine was very high now recent period advanced various biotechnological invention of new protocol for rapid production have been

developed. The vinblastine is used to treat specific types of cancer such as Hodgkin's disease, breast cancer, advanced testicular cancer.<sup>[10]</sup>

### **Vincristine:(VCR):-Synonym–Leurocristine**

VCR is plant alkaloid extracted from *Vinca rosea*; it is normally used in cancer chemotherapy medication. The chemical structure of vinblastine & vincristine are very similar but their pharmacological effect is not same. It is used in the treatment of acute lymphoblastic leukemia (ALL), brain tumor.<sup>[10]</sup>



**Fig: 3 & 4 Mode of action of Vincristine & Vinblastine.**

### ❖ **Therapeutic activities of vinca rosea**

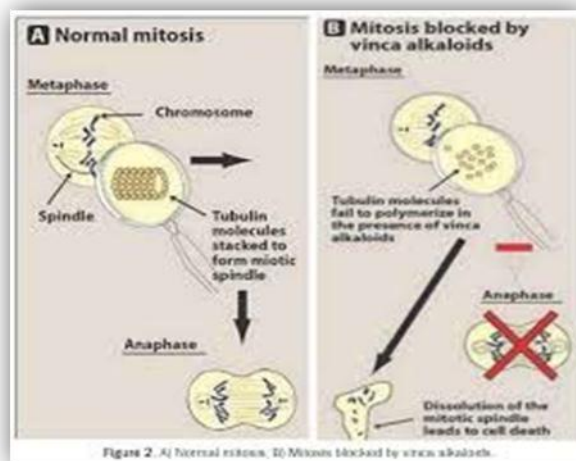
#### ➤ **Anti-Cancer Activity**

The anti-cancer alkaloids are derived from stem & leaf of *vinca rosea*. These vinca alkaloids such as vinblastine & vincristine are used in chemotherapy for cancer.

These are categorized of cell cycle a specific cytotoxic drug that works by inhibiting the ability of cancer cells to divide. Act on tubulin for preventing form in to micro tubules.

The vinca alkaloid molecules bind to the building blocks of protein (tubulin) inhibiting its formation. The drugs work in the metaphase of cell formation. Tubulin protein works in the cells to create spindle fibres(microtubules). These microtubules provide cells flexibility. They need to divide & replicate without microtubules provide cells cannot divide.

Vinca alkaloids are used as drugs in cancer therapy. The compounds included Vinblastine, Vincristine, Vindesine the mechanism of vinca alkaloids block the tubulin structure & prevents dividing the cancer cells.<sup>[2]</sup>



**Fig: 4 Cell cycle in chemotherapy of cancer.**

#### ➤ **Anti-oxidant activity**

Anti oxidant that inhibit oxidation. It is a chemical reaction that produces free radical, the ethanolic extract of roots of the varieties of vinca rosea (pink & white colour) was obtained. The anti-oxidant free radical scavengers are the substances that can prevent or slow damage to cell caused by free radicals in the body, such as inflammation or external.

The plant based antioxidant produced naturally by the body to protect against free radicals generated inside the body.

Exogenous antioxidant is taken as dietary supplement from outside the body. Antioxidant can neutralize the free radicals inside bodies & results in to improvement of overall health.<sup>[9]</sup>

#### ➤ **Anti-diabetic properties**

Those drugs are used to control glucose level in the blood.

Vinca rosea extract to bring insulin releasing effect. Histopathologically studied to stimulate the healing of pancreas, by vinca rosea extract. The hypoglycemic activity of alkaloids isolated from vinca rosea have been studied pharmacologically & natural remedy derived from plant has been marketed under the proprietary name vinculin as a treatment for diabetes.<sup>[3,13]</sup>



➤ **Anti-helminthic activity**

Anti-helminthic drug used to treatment of kill worms.

Helminthes infections are the chronic illness, affecting human beings & cattle. The anti-helminthic activity of vinca rosea was using earth worm *pheretima posthuma* as an experimental & the control drug piperazine citrate showed more potent in anthelmintic property compare to menthol or ethanol.<sup>[6]</sup>

➤ **Anti-diarrheal activity**

Anti-diarrheal agent or drugs help to control the diarrhea & slow passages of stool through intestine. The leaf ethanolic extract of vinca as tested in the rat(*wistar*) with castor oil & it showed inhibition of castor oil induced diarrhea.<sup>[4]</sup>

➤ **Anti-hypotensive activity**

Anti-hypotensive drug used to treat lowering of blood pressure. Leaves extract of vinca rosea plant made significant change in hypotensive. The leaves contain many useful alkaloids in between have other pharmacologically active compounds significant hypotensive activity of the leaf extracts (hydro alcoholic or dichloro methane –methanol) have been reported in laboratory animals.<sup>[14]</sup>

➤ **Anti-hypolipidemic activity**

Those drugs or agent are used to treatment of abnormal level of lipid in the blood. There is reduction of serum level like as total cholesterol, triglyceraldehydes & histology of liver & kidney. Which is a anti-atherosclerotic activity. using leaf juice of vinca rosea.<sup>[14]</sup>

❖ **Toxicity & Side effects**

Vinca rosea is not recommended for oral administration because it may side effects including psychological influences. The adviced route for Vinca rosea & its derivative are intravenous administration. many side effects have been reported for these drugs comprising abdominal pains, constipation, nausea or vomiting, ulceration of the mouth, cell destruction, kidney damage, hypotension & hypertension hence route of administration & accurate quantity of dosage to be taken carefully for avoid or reduces to side effects.<sup>[13]</sup> Several researches are going on recently to decrease the toxicity of vinca alkaloids & increase the yield of alkaloids in the plant by developing new varieties & to improve its therapeutic effect.<sup>[17]</sup>

## ❖ CONCLUSION

It is concluded that, *Vinca rosea* is reach source of life savings such as vinca alkaloid which used to produce anti-cancer drug. This plant used for so many diseases such as cancer, kidney. It has anti-oxidant, anti-hypotensive, anti-diarrheal, anti-helthmic properties, so this plant is very important for medicinal purpose.

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