



PHYTOCHEMICAL AND PHARMACOLOGY PROPETIES OF CATHARANTHUS ROSEA

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ABSTRACT

Catharanthus roseus is a critical evergreen medicinal herb of Apocynaceae own circle of relatives used particularly for remedy of most cancers and diabetics. The plant become 1 m in peak and commercially grown broadly in India, Australia, Africa and Southern Europe. Alkaloids which include vincristine and vinblastine, flavonoids and phenolic are the primary additives of plant. The plant well known shows numerous organic homes which includes antibacterial, anticancer, antioxidant, antihyperglycemic, anti-hypertensive, antidiabetic and wound healing. In the existing examine we've got attempted to accumulate conventional uses, phytochemical components and pharmacological homes of plant. This examine ought to be used to recognize the fitness selling homes of this multipurpose plant and it can additionally offer clues for discovery of recent lead compound of pharmaceutical importance.

Keywords: - *Catharanthus rosea*, *Apocynaceae*, *phytochemical*, *pharmacological*, *alkaloids*, *Anti- Tumour*, *Vincristine*, *Alzheimer`s disease*.

1. INTRODUCTION

There are many obviously grown flowers round us which can be used for medicinal cause. Among the ones Catharantus roseus is the is palnt which globally determined in tropical areas. Catharanthus roseus linn is a perennial plant which might be commonly determined in Sothern asia ,tropical nations and are local to Madagascar [1,2]catharanthus roseus L. has many not unusual place names like vinca rosea, Madagascar periwinkle, vibrant eyes, Cape periwinkle, graveyard plant, vintage maid, crimson periwinkle, rose periwinkle myrtle, Nayantara .It is used for decorative cause which has one of a kind colorations of crimson, pink and white and it's also used as scientific plant.Kemunting Cina is the call that is domestically known as in Malaysia. The oldest organization of the plant alkaloids organizations that used to deal with most cancers are the vinca alkaloids . The stem of vinca rosea which produces a milky sap has a supply of over 70 one of a kind indole alkaloids. Among them there are anti –neoplastic compounds derived from flowers of vinblastin and vincristine .For Hodgkin`s lymphoma ,vincristin is used as a chemotherapeutic regime and for formative years leukemia ,vinblastin is used. The vinca alkaloid inhibits to the metaphase of the cell mitosis and their most important aspect outcomes are is peripheral neuropathy, hair loss, hyponatremia and constipation. They are specially used for hypertension,diabetits,blood most cancers, malaria, non-small-lung most cancers, Hodgkin`s lymphoma, enhance memory. It additionally has antimicrobial interest ,antioxidant interest, anti-diarrheal interest,hypolipidimic interest and additionally wound restoration interest.

2. HISTORY

Linneaus, created the genus Catharanthus (from the Greek katharos (pure) and anthos (flower).The Scottish botanist George Don turned into decided the botanical call of vinca turned into Cartharantus roseus which has been the concern of several questions and polemic debates approximately its denomination. Carl von Linneanus, a Swedish naturalist in 1759 turned into named beneathneath Vinca rosea, which turned into the primary of his genus. In 1828, the German botanist Heinrich Gottlieb Ludwig Reichenbach proposed the genus call Lochnera. . The species turned into renamed Lochnera rosea via way of means of an Austrian botanist, Stephan Ladislaus Endlicher in 1838. William Stearn showed the botanical call Catharanthus roseus as the suitable appellation of the Madagascan periwinkle. In addition, Stearn factors out in his chapter "Synopsis of the Genus Catharanthus" that the genus call Lochnera isn't always legitimate due to the fact it's miles too near the call of any other genus, Lochneria, posted in 1777 via way of means of the naturalist Giovanni Antonio Scopoli.

3. METHODOLOGY

In this evaluation the entire records of the plant has been amassed from numerous peer reviewed studies articles retrieved from many on line databases which includes Scopus, Pub Med, Med Line, Springer Link, Google Scholar, Research Gate, Google and Science Direct .The key phrases used for on line seek consists of Catharanthus rosea, Apocynaceae family, biology, distribution, diversity, ethanobotanical importance, pharmacological properties, bioactive constituents, antidiabetic activities, antioxidant activities, antimicrobial activities, unfavorable and anticancer activities. As C. rosea is used for medicinal cause for long term in acute and persistent diseases, it need to be therapeutically secure for medical cause.

4. BOTANICAL DESCRIPTION

Morphology:

Catharanthus roseus is an annual, herbaceous, evergreen, dicotyledonous decorative flowering plant developing to a peak of 1m. Leaves of the plant are 2.5- 9.0 cm length and 1- 3.5 cm broad, hairless, glossy, and inexperienced in colour and midrib is light and form is oval to oblong, petiole is brief approximately 1- 1.8 cm, length and they're appositively organized in pairs. The floras are darkish white or red with darkish pink in centre. Basal tube is 2.5- 3 cm length and diameter of corolla changed into 2-5 cm with five petals like lobes. Fruits are organized in follicle shaving duration of 2-4 cm and width of three mm broad. The chromosome quantity for all *Catharanthus* species is $2n= 16$. However, tetraploid flowers develop quicker and the floras are stated to be larger in size.



Fig 1:- *Catharanthus rosea*

Table-1: Vernacular names of *Catharanthus roseus*

LANGUAGE	Vernacular names of <i>C.rosea</i>
ASSAMESE	NAYANTARA, PIRALI KUNWORI
ENGLISH	Madagascar Periwinkle
BENGALI	Nayantara
HINDI	Sadabahar,sadaphuli,sadasuhagi
TELUGU	Billaganneru
TAMIL	Nithyakalyani
MALAYALAM	Shayam naari
SANSKRIT	Nityakalyani, Rasna, Sadampuspa, Sadapushpi
OTHERS	Savanari,Periwinkle,Nithyakalyani,Cape periwinkle

Taxonomy:

Kingdom: Plantae

Division: Magnoliophyta (Flowering plants)

Class: Magnoliopsida (Dicotyledons)

Order: Gentianales

Family: Apocynaceae

Genus: *Catharanthus*

Species: *roseus*

Botanical name: *Vinca Rosea*

Binomial name: *Catharanthus roseus*

Table 2:- Different Alkaloids produced By Catharanthus roseus

Produced by	Alkaloids	Properties
Aerial parts like leaves	Vincristine	Anti-Tumour Properties
	Vinblastine	Anti-Tumour Properties
	Vindoline	Anti- Diabetic Properties
Root	Reserpine	Tranquilizers
	Ajmalicine	Cardio- Vascular Disease And High Blood Pressure
	Catharathine	Anti- Diabetic properties
	Raubasine	Pain Relieving Properties
	Serpentine	Cardio- Vascular and High BP

Cultivation Principles:

C. roseus prefers sunny and warm situations and grown broadly in sandy loams in complete daylight to element shade. The flower blooms at some stage in the summer time till frost appears. *Vinca minor* and *Vinca important* are evergreen veining floor flora and there are propagated thru cuttings. The plant calls for normal moisture however keep away from over head of watering. Seeds are produced within side the plant 12-sixteen weeks earlier than the remaining frost. The flora are self propagated in nature from seeds and the seeds require overall darkness to germinate. Cutting of the flora have been taken in past due summer time season and that they have been additionally succesful to increase roots. Flowering isn't endorsed in excessive fertility soil and flora drop off after blooming.

Geographical Distribution:

Vinca roseus is a local plant Indian Ocean, Island of Madagascar cultivated broadly in tropical and subtropical regions global which include Southern United states, Philippines, Cuba Jamaica, Bahamas, Mauritius and Malaysia. The plant changed into grown commercially in Australia, Africa, India and Southern Europe for medicinal cause and at some point of the tropical and subtropical areas of globalwide as decorative cause.

Chemical Constituents:

Catharanthus roseus carries numerous phytochemicals of pharmacological significance along with carbohydrate, flavonoid, tannin, saponin, glycoside, terpenoid, protein, phenol and alkaloids [24]. The plant carries approximately four hundred alkaloids and alkaloids are the maximum probably energetic chemical additives of the plant utilized in pharmacological activities, taste and fragrance, ingredients, meals additives, insecticides and agrochemicals. More than one hundred monoterpene indole alkaloids (TIA) are produced through those flora in extraordinary organs. Aerial elements of the plant incorporate numerous alkaloids like vindesine, vindoline, tabersonine, vinblastine, vincristine, actinoptidimeric while basal or root elements of the plant carries raubasine, reserpine, catharanthine, vincamine, vinamine, and ajmalicine. Heijden et al., stated that vindoline (0.5%) is the precept issue different compounds are reserpine, vincamine, alstonine, 22-oxovincaloblastine (vincristine), leurocristine, ajmalicine, vinine, vincaloblastine (vinblastine), vintisine, leurosine, vinomine, vinosine. *C. roseus* is wealthy in alkaloids, tannins, coumarin, quinine, carbohydrates, flavonoids, triterpenoids and phenolic compounds. Leaves are wealthy in alkaloids and carbohydrates. Flowers of plant had been wealthy in tannins, triterpenoids and alkaloids had been chargeable for diabetic wound restoration property. Flowers of *C. roseus* incorporate an anthocyanidin pigment rosinidin. Terpenes or terpenoids indole alkaloids were diagnosed as energetic anti-cancer, anti-inflammatory and anti-bacterial anti-protocidal and anti-malarial agents in lots of pharmacological studies. Table-2 confirmed extraordinary sorts of alkaloids produced through *Catharanthus roseus*.

Pharmacological Applications:

The plant confirmed vast spectrum of pharmacological residences which indicates its medicinal importance. Vinblastine and vincristine are energetic additives remoted from the leaf and stem components and confirmed inhibition belongings in opposition to human tumours. Vinblastine an alkaloid remoted from plant used considerably in remedy of neoplasms and endorsed for remedy of Hodgkin's disease, chorio carcinoma. Vincristine is used experimentally for curing leukemia in children. Vinblastine is commercially bought as velban or vincristine as oncovin. The leaf extract become examined and is getting used as prophylactic agent in opposition to numerous diseases. The cerebro-vasodilatory and neuro-defensive pastime become discovered on vincamine alkaloid gift on plant leaf. Experimentally leaves of the plant extract confirmed anti-ulcer pastime and become proved in opposition to gastric harm in rats. Due to presence of enormous phytochemical ingredients the plant may be used as an critical healing resource in future.

Anticancer Properties:

In scientific practice, the management of *C. roseus* is carried out intravenously, and then they may be in the end metabolized via way of means of the liver and excreted. Hair loss, peripheral neuropathy, constipation and hyponatremia are the important facet results of this drugs. To improve the healing index, Semi-artificial Catharanthus alkaloids which include vinorelbine and vinflunine had been developed. Vinorelbine and vinflunine exert their antitumor impact via way of means of binding to tubulin. These alkaloids have increase inhibition have an effect on a few human tumors. Vinblastine is used experimentally for remedy of neoplasmas and is suggested for Hodgkin's disease, chorio carcinoma. *C. roseus* became discovered to reveal the big anticancer hobby in opposition to several mobileular sorts in vitro situation and specifically greatest. hobby became discovered in opposition to the multidrug resistant tumor sorts. Vinca alkaloids additionally known as as mitotic spindle poisons they inhibit meeting of the spindle paperwork from microtubules, there via way of means of inhibiting mitosis in mobileular cycle. Vinca alkaloids consequently successfully save you most cancers cells from dividing. Different Vinca alkaloids have their very own particular properties.

Anti-diabetic activity :

Vinca rosea of plant life and leaves have ethanolic extracts that is just like the usual drug glibenclamide that is a hypoglycemic agent. The Hypoglycemic motion has been arosed because of the end result of the growth glucose usage within side the liver [7,8,9]. Due to usage of glucose in liver, hypoglycemic hobby is been discovered. Dichloromethane: methanol extract [1:1] has hypoglycemic hobby on leaves and twigs of vinca in streptozotocin which set off diabetic rat version on the dose of 500mg/kg that is been admistered orally for 7-15days. . 48.6 and 57.6% hypoglycemic hobby became discovered and in addition remedy for a duration of 30 days has furnished whole safety towards STZ challenge (seventy five mg/kg/i.p.). Glycogen synthase, glucose 6-phosphatedehydrogenase, succinate dehydrogenase and malate dehydrogenase are the enzyme sports which lower the liver of diabetic animals and it's far been advanced after the remedy with extract at a dose of 500mg/kg oral for 7 days. it shows the growth within side the metabolized glucose within side the rats which can be been dealt with accelerated lipid in line with oxidation levels.

Anti-Diarrheal Activity

Kyakulaga et al. suggested that leaf ethanolic extract of the *Catharanthus roseus* confirmed mighty anti-diarrheal interest as examined on wistar rats with castor oil as an experimental diarrhea inducing agent further to pretreatment of the extract. Loperamide and atropine sulphate turned into taken as fashionable and ethanolic extracts of *Catharanthus roseus* on the doses of two hundred and 500 mg/kg confirmed the dose structured inhibition of castor oil brought about diarrhea. It has been suggested that during wistar mice at two hundred and 500 mg/kg of ethanol leaf extracts of *C. rosea* confirmed anti-diarrheal interest.

Anti-ulcer property:

There are alkaloids that have anti-ulcer assets which include Vincamine and Vindoline . Vincamine has hobby of cerebrovasodilatory and neuroprotective with the aid of using the plant leaves however they prompted gastric harm in rats.

Enhancement of memory :

There is one alkaloid named Vinocetine which has assets to enhance mind feature and reminiscence that is useful to Alzheimer's disease. Vinocetine while subjected to a well-tolerated dose as much as 60 mg/d in scientific trials of dementia and stroke proved no full-size damaging events.

Hypolipidimic activity:

There is a discount of serum degrees liketotal cholesterol, triglycerides, LDL-c, VLDLc, that is an anti-atherosclerotic interest that is via way of means of the leaf juice of vinca . Thus resulted as anti-oxidant effect of flavonoid, vinpocetin like compound gift within side the leaf juice of vinca.

Anti-Microbial Activity:

Phytochemical and antimicrobial research found out the presence of lively compounds like steroids, phenolics, tannins and saponins, alkaloids and flavonoids in *Catharanthus roseus*. Antibacterial pastime became proven towards not unusualplace human pathogens together with *Styphylococcus aureus*, *Escherichia coli*, *Vibrio cholerae* and *Streptococcus faecalis* within side the methanol, ethanol, acetone and chloroform extracts. Aldehydes and phenolic compounds of the plant extract confirmed vast antimicrobial activities. Patil and Ghosh suggested antibacterial pastime from the crude extracts from one of a kind elements of *Catharanthus roseus* towards *Pseudomonas aeruginosa* NCIM2036, *Salmonella typhimurium* NCIM2501, *Staphylococcus aureus* NCIM5021 and located that the leaf extract confirmed excessive antibacterial pastime. The antibacterial pastime of *C. rosea* became examined in ethanolic leaf, stem, root and flower extracts and located maximum pastime in leaf part. *C. rosea* extract confirmed antiviral pastime towards herpes simplex virus (type1). Yohimbine famous antifungal pastime towards *Candida albicans*. It has been suggested that vincristine and vinblastine compound remoted from *C. rosea* confirmed antiparasitic pastime towards *Trypanosoma cruzi* that reasons trypanosomiasis in humans. Wang et al., remoted a mono terpenic indole alkaloid, catharoseumine from entire plant of *C. rosea* that confirmed powerful inhibitor towards protozoan parasite falcipain-2 (that reasons malaria) displaying an IC50 price of 4.06 μ M.

Wound healing property:

Ethanolic extracts of 100mg/kg/day is given for rats that have wound gealing property. There is a lower in epithelization duration which has excessive fee of wound contraction, that is marked as an boom in dry weight and hydroxyproline . There is an boom within side the tensile electricity in conjunction with hydroxyproline which enables in control of wound recovery together.

Hypotensive interest:

Extract received from the leaves of the *Vinca roseus* plant made significant extrade in hypotensive property. Remarkable antihyperglycemic and hypotensive interest of the leaf extracts (hydroalcoholic or dichloromethane-methanol) were mentioned in laboratory animals.

Safety aspects:

The drug used historically in prescribed doses can be considered safe. The LD50 for vinblastine in mice is 17 mg/kg iv and for vincristine in mice is 5.2 mg/kg ip.

Dosage:

Expressed juice: 10 to 20 ml; Paste: 10 g.

Other activities:

There is a contraindication with Vinpocetine and different blood thinning dealers together with warfarin, aspirin in conjunction with different dietary supplements together with ginkgo, nutrition E and garlic.

5. CONCLUSION

Traditionally used medicinal flora play an crucial position in fitness area because of its extensive abundance supply of bioactive compounds. The flora have been broadly utilized in peoples treatment for remedy of numerous diseases. In the beyond few years the call for of *C. rosea* is being expanded because of its alkaloid carries and used for curing of most cancers and different diseases. To satisfy the call for of plant at industrial stage researchers would possibly awareness at the pharmacological have a look at and additionally its conservation. This evaluation can be useful for evaluation of lively phytochemicals and to research the plant for improvement of recent drug for the betterment of human kind.

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