

Preliminary Phytochemical Screening of Leaves Extract of *Catharanthus roseus* (L.) G. Don

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Abstract Ayurveda is the Indian traditional system of medicine which focuses on the medical potential of plants. *Catharanthus roseus* is one plant predictable well in Ayurveda. It is cultivated as an ornamental plant almost throughout the tropical world. It is known for its antitumour, anti-diabetic, anti-microbial, anti-oxidant and antimutagenic effects. More than 3000 plant species that have reportedly been used in the treatment of cancer and other diseases. Plant derived compound have played an important role in the development of several clinically useful anticancer agents. *Catharanthus roseus* evergreen plant first originated from islands of Madagascar. It produces nearly 130 alkaloids primarily ajmalicine, vinceine, resperine, 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. Aim of the present study is to investigate the phytochemical examination of methanol extracts of different percentage of *Catharanthus roseus*. Qualitative analysis of phytochemical screening reveals the presence of Alkaloids, Phenol, Saponins and Protein, terpenoids flavanoids, Quinine.

Introduction Medicinal plants have a extensive history of practice in traditional medicine. Ethno-botanical information on medicinal plants and their usage by native cultures is useful in the conservation of traditional cultures, biodiversity, community health care and drug development. *Catharanthus roseus* L. (G.) Don, is an important medicinal plant belonging to the Apocynaceae family; this plant is a dicotyledonous angiosperm and synthesizes

two terpene indole alkaloids: vinblastine and vincristine that are used to fight cancer. The reliable information of the usage of medicinal plants passed from one generation to another, after refining and addition.¹ *Catharanthus roseus* is an evergreen sub herb plant growing to 1 m tall. The leaves are oval to oblong, 2.5-9.5 cm. long and 1-3.5 cm. broad glossy green hairless with a pale midrib and a short petiole about 1- 1.8 cm. long and they are arranged in the opposite pairs. The flowers are white to dark pink with a dark red center, with a basal tube about 2.5-3 cm. long and a corolla about 2-5 cm. diameter with 5 petal like lobes. The fruit is a pair of follicles about 2-4 cm. long. and 3 mm broad.²



Catharanthus roseus are cultivated two common names, which is named on the basis of their flower colours, Pink: Rosea, White: Alba . Traditionally, leaves of *Catharanthus roseus* are used as medicine for the treatment of following diseases, they Menorrhagia, Rheumatism, Dyspepsia, Indigestion, Dysmenorrheal, Diabetes, Hypertension,

Cancer, Menstrual disorders, Skin diseases, Bleeding diarrhea and has sedative and antiviral properties. The flowers produced by these plants are planted for decorative purposes are of colours such as pink, purple and white Madagascar periwinkle is used traditionally for number of ailments such as high blood pressure, infection and diabetes mellitus.³

Scientific classification:⁴

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

Vernacular names:⁵

English :	cayenne jasmine, old maid, periwinkle
Hindi :	sada bahar, sadabahar
Kannada :	batla hoo, bili kaasi kanigalu, ganeshana hoo, kempu kaasi kanigalu
Malayalam:	banappuvu, nityakalyani, savanari, usamalari
Marathi :	sadaphool, sadaphul, sadaphuli
Sanskrit :	nityakalyani, rasna, sadampuspa, sadapushpi
Tamil :	cutkattu malli, cutukattu malli, cutukattuppu
Telugu :	billaganneru
Gujarati :	Barmasi
Bengali :	noyontara

Characteristics of Catharanthus roseus:⁶

- It is an erect branched deciduous herb woody at the base.
- The branching starts from the base.
 - The leaves are short stalked leathery, petiole generally orbate, rarely oblong elliptic having oblong tips.
 - The leaf blade ranges from 2 to 4 inch.
 - The younger leaves are particularly very soft, light green in colour.
 - Veins are prominent over the lower surface of the leaves
 - The colour of the upper surface of the leaves is deep green while of lower surface is much lighter in color
 - The seeds are black in colour and oblong in shape
 - Stem and leaves contain white latex
 - There are three variants in Catharanthus roseus rose purple flowered white flowered and white flowered with rose purple spots in the center.
 - All the parts of the plant contains about 200 indole monoterpene alkaloids
 - The plant is a self pollinating species, carries 2n=16 chromosome in the somatic cells.
 - The plant survives and flowers even in very hot weather and needed very little water to grow.
 - The way of propagation is through stem cutting or seeds
 - Very commonly grown in tropical and subtropical areas

Traditional use of Catharanthus roseus:⁷

- **Diabetes:** It is useful in treating gastritis, cystitis, enteritis, diarrhea, diabetes, etc when taken internally.
- **Cancer:** Sadabahar leaves and stems are a source of alkaloids that have anti tumor and anti cancer properties. **Fluid retention.**
- **Nosebleeds :** Sadabahar controls nosebleeds, bleeding gums, mouth ulcers and sore throats
- **Increasing blood circulation:** Despite serious safety concerns, periwinkle is used

for “brain health” (increasing blood circulation in the brain, supporting brain metabolism, increasing mental productivity, preventing memory and concentration problems and feebleness, improving memory and thinking ability, and preventing early aging of brain cells).

- **Cough.**
- **Lung congestion.**
- **Sore throat.**
- **Eye irritation, when applied to the eye.**
- **Skin infections, when applied to the skin.**
- **Stopping bleeding, when applied to the skin.**

Side Effects & Safety of Catharanthus roseus⁷: Periwinkle is unsafe for everyone to use, but people with certain conditions are particularly vulnerable to adverse side effects.

- **Pregnancy and breast-feeding:** Periwinkle is uncertain. Don't use it.
- **Constipation:** Dark skin has a drying effect on the tissues. This means that it can make constipation worse. Don't use it.
- **Low blood pressure:** Periwinkle can lower blood pressure. If you already have low blood pressure, you can use the periwinkle too low. Don't use it.
- **Surgery:** Periwinkle can lower blood pressure. There is a concern that it may interfere with blood pressure control during and after surgery. Stop using periwinkle at least 2 weeks before a scheduled surgery.

Phytochemical test:

Phytochemicals are basically divided in two groups that are primary and secondary metabolites according to their functions in plant metabolism. Primary metabolites comprise of common sugar, amino acids, proteins, whereas Secondary metabolites alkaloids, flavonoids, and tannins. The phytochemical screening of different solvent

the crude plant extracts revealed the presence of various secondary metabolites. Phytochemicals are non-nutritive plant chemicals that have protective or disease preventive properties. Plant produces these chemicals to protect itself but recent research demonstrates that many phytochemicals can protect humans against diseases.⁸ India has about 45,000 plant species and among them many have been claimed to possess medicinal properties. The need for scientific validation of these useful medicinal plants is very essential. Many of these medicinal plants possess a number of properties such as antidiabetic, antioxidant, anticancer and anti-inflammatory etc. Many plant based chemopreventive agents are recognized as valuable and cost effective approach to control oral cancer incidence. Although, modern synthetic drugs are mostly used in developed countries, the use of herbal drugs in the Western world is well accepted and a continuously high demand for plant material and extracted natural products can be observed. The importance of ethno pharmacological investigations in the discovery of new therapeutic agents from plants has been discussed extensively^{9,10}

Materials and methods:

Collection of the Plant Samples: Fresh plant parts were collected randomly from Bhopal (M.P.). The plants were identified and studied according to their families Fresh plant materials were collected and washed under tap water, shade dried and then homogenized to fine powder and stored in airtight bottles.

Preparation of Plant Extract: 10.7 gm of dried powder was taken in 100 ml of Methanol in a conical flask, plugged with cotton wool and then kept on a rotary shaker at 190-220

rpm for 24 h. After 24 h, the extracts were centrifuged at 5000 rpm for 10 min, the supernatant was collected, solvents were evaporated and the dry extract was weighed and stored at 4⁰C in airtight bottles. The extraction was done at least three times for each plant.

Phytochemical Analysis (Qualitative Method): Phytochemical analysis of the plant extracts was undertaken using standard qualitative methods. The plant extracts were screened for the presence of biologically active compounds such as alkaloids, flavonoids, carbohydrates, phytosterols, proteins, phenolics, tannins, and saponins.

Table 1: Qualitative Analysis of Phytochemicals

S.No	Test	Observation
1	Test for Alkaloid	
	1.0ml of plant extract was taken and then adds 1.0 ml of saturated solution of picric acid was added.	Yellow colour appears
2	Test for Tannins	
	About 0.5 g of the extract was boiled in 10 ml of water in a test tube and then filtered. A few drops of 0.1 fecl ₃ was added	Brownish green or blue-black coloration.
3	Test for Saponins	
	0.5g of extract was added in 5ml of distilled water in a test tube. The solution was shaken vigorously. The frothing was mixed with 3 drops of olive oil and shaken vigorously.	Stable persistent froth appears. Formation of an emulsion
4	Test for Cardiac Glycosides	
	0.5g of extract was diluted to 5 ml in water was added 2 ml of glacial acetic acid containing one drop of feCl ₃ . This was under laid with 1 ml of conc. Sulphuric acid.	A brown ring at the interface. A violet ring was appeared below the brown ring. Greenish ring may form just above the brown ring.
5	Test for Tarpenoids	
	5 ml of extract was mixed with 2 ml of chloroform and 3 ml of conc. H ₂ SO ₄ was carefully added to form a layer.	A reddish brown coloration of the interface was formed.
6	Test for Phenol	
	2 ml of extract was taken and add 2 ml of Folin’s reagent.	Appearance of violet or Brown color.
7	Test for Flavonoids	
	5 ml of dil. Ammonia solution were added to a portion of the crude extract followed by addition of conc. H ₂ SO ₄ .	Yellow coloration occurs.
8.	Test for Carbohydrates	

	10 ml H ₂ O was added in 2 ml of extract and 2 drops of ethanolic α- naphthol were added which was followed by addition of 2 ml of conc. H ₂ SO ₄ .	Reddish violet ring at the junction appears.
9	Test for Steroids	
	1 ml extract mixed with 1 ml chloroform and conc. H ₂ SO ₄ sidewise.	Red color presence at the lower chloroform layer.
10	Test for Quinine	
	1 ml extract added 1 ml of 1% NaOH and mixed well	Appearance of Blue green and red color

Results and discussion: Medicinal plants were the effective source of various new pharmaceutical products that shows causing potent pharmacological effect on the human beings. Instead of using the side effects causing chemical drugs, the ancient medicine could be explored to identify the novel drug formulations that are more effective with lesser side effects and also cheaper cost. In the present study plants were collected and were authenticated. Then they were shade dried and powdered and were subjected to phytochemical screening antimicrobial activity. The dried powdered leaves of *Catharanthus roseus* subjected to cold maceration with methanol. The qualitative chemical tests for the extracts were performed. The investigation showed that *Catharanthus roseus* contain alkaloids, tannin, saponin, cardiac glycosides, quinine and protein, terpanoids, sterol, flavanoids were present. carbohydrate were absent.

Table 2: Results of phytochemicals screening in the methanol leaves extract of *Catharanthus roseus*

S.No.	Phytochemical	Indication
1	Alkaloid	+
2	Tannins	+
3	Saponins	+
4	Cardiac glycosides	+
5	Tarpenoids	+
6	Phenol	+
7	Flavonoid	+
8	Carbohydrate	-
9	Steroids	+
10	Quinine	-

+ symbol indicates presence and- indicates absence with respect to extractive solvents



Conclusion: The phytochemical screening and standardisation study is not only an important tool for identification of plant part but also it informs quality control and product formulation development. In the present study phytochemical screening of *Catharanthus roseus* leaves extracts was done by using the extracts which were obtained by cold maceration method. The screening of phytochemical constituents of plants *Catharanthus roseus* indicated the presence of tannins, alkaloid, flavonoid, terpenoid and Cardiac glycosides were present, which may be conscientious for the experiential activities.

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