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Research Article

In-vitro study on antimicrobial activity and phytochemical analysis of *Catharanthus roseus* against selected bacteria and fungi

P.Komathi and K.Vanmathiselvi*

PG Research Department of Microbiology, Sri Akilandeswari Womens College, Wandiwash, Tamil Nadu, India
*Corresponding author: *kvmsel@gmail.com*

Abstract

The aim of the present study is to investigate the antimicrobial activity and phytochemical analysis of Acetone extract of *Catharanthus roseus* whole plant against the wound isolates. Two different solvents such as ethanol and methanol were used to extract the bioactive compounds from the whole plant of *Catharanthus roseus* and screened for their antimicrobial activity against the isolated wound pathogens under well diffusion method. The maximum antibacterial activity was observed in crude Ethanolic extract of *Catharanthus roseus* against *Pseudomonas aeruginosa*. Qualitative analysis of phytochemical screening reveals the presence of Flavonoids, Tannin, Alkaloids and Terpenoids.
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Keywords: *Catharanthus roseus*, Antimicrobial activity and Phytochemical analysis.

Introduction

Catharanthus roseus L (apocyanaceae) also known as *Vinca rosea*, is native to the caribbean Basin and has historically been used to treat a wide assortment of diseases. The major alkaloid is vincamine and its closely related semi synthetic derivative widely used as a medicinal agent, known as ethyl-apovincaminate or vinpocetine, has vasodilating, blood thinning, hypoglycemic and memory-enhancing actions. Rosinidin is an anthocyanidin pigment found in the flower of *C.roseus.*

Traditionally, *C.roseus* has been used in folk medication to take care of diabetes,high blood presure and diarrhoea. Though in modern medicine alkaloids and chemotherapeutic agents form *C.roseus* are known for their anticancer pain relieving and properties The present study aims to access the antibacterial unique bio-active compounds against human pathogenic bacteria.

Traditional uses

The species has long been cultivated for herbal medicine and as ornamental plant. In Ayurvedha (Indian traditional medicine) the extracts of its roots & shoot though poisonous, is used against several disease.

Over to different alkaloids, including vincristine and vinblastine, have been extract from *V.rosea*

.The active ingredients known as tannins,which are used for making medicines to treat a number of diseases.

In traditional chinese medicine extracts from it have been used against numerous diseaes, including dibetes, malaria & Hodgkin`s lympoma.

The subtances vinblastine and vincristine extracted from the plant are used in the treatment of leukemia and Hodgkin`s lymphoma.

Extracts from the dried or wet flowers and leaves of plants are applied as a paste on wounds in some rural communities.

The fresh juice from the flowers of *C.roseus* made into a tea has been used by Ayurvedic physicians. In India, for extranal use to treat skin problems, dermatitis, eczema and acne.

Daily supplements made with the active ingredients found in *vinca rosea* help to improve blood supply to the brain and increase the level of oxygen and glucose that the brain can effectively utilize.

Materials and Methods

Sterilization of plant material

The fresh plant (leaves and flowers) materials of *Catharanthus roseus* plants were collected from college campus, Vandavasi.The disease free and fresh plants were selected.About 2 g of fresh and healthy leaves were taken for each solvent extraction. They were washed with distilled water for three times. Then it is surface sterilized with 0.15 % mercuric chloride for 20 seconds. Again the leaves were washed throughly with distilled water for twice or thrice.

Preparation of plant extracts

Two grams of surface sterilized plant leaves & flowers were kept in the 10 ml organic solvents such as Ethanol, Methanol and Aqueous. Then they were ground well with the help of Morter and Pestle.The plant materials were subjected to centrifugation, for 10-15 min (at 1000 rpm) again it was filtered through whatmann No.1filter paper.The supernatened was collected and made to known volume, by adding sterile Ethanol, Methanol and Aqueous stored at 4ºC for further antimirobial screening purposes.

Antibacterial assay

The following bacterial strains were used in this study viz., *Staphylococcus aureus, Streptococcus pyogenes, Bacillus subtilis, Escherichia coli, Pseudomonas aeruginosa, Klebsiella pneumonia.*Well diffusion assay method was carried out by using standard protocol. Over night bacterial culture(10μl) was spread over Muller Hinton Agar plates with a sterial glass L-rod. (10μl) of the different extracts(Ethanol,Methanol and Aqueous) were loaded on wells the agar plate. different extracts(Ethanol,Methanol and Aqueous) was tested in triplicate and the plates were inoculated at 37°C for 24 hours.After incubation the millimetre of inhibition zones was measured.

Antifungal assay

The following fungal strains were used in the study viz., *Aspergillus flavus*, *Aspergillus niger* and *Fusarium sp*. Well diffusion assay method was carried out by using standard protocol. Over night fungal culture(10μl) was spread over Potato Dextrose Agar plates with a sterile glass L-rod. (10μl) of the different extracts(Ethanol,Methanol and Aqueous) were loaded on wells the agar plate. different extracts (Ethanol,Methanol and Aqueous) was tested in triplicate and the plates were inoculated at room temperature for 48-72 hours. After incubation the millimetre of inhibition zones was measured.

Phytochemical analysis

The plant extract was subjected to preliminary phytochemical tests and antimicrobial activity. Preliminary phytochemical screening was done by the standard methods described Harborne. Phytochemical analysis are followed the crude

phenols, Tannins, Alkaloids,Triterpenes, Flavonoids and Saponins.

To separate the active principle thin layer chromatography (TLC) technique was carried out for the Methenol extract. The antimicrobial agent was identified as Flavonoid compound.

Results and Discussion

The results of the antimicrobial activity suggested that maximum zone of inhibition *catharanthus roseus* was observed in leaf and flower ethanolic extract against *S.aureus*, followed by *S.pyogens*, *E.coli, P.aeuroginosa, K.pneumoni*a and *A.niger, Fusarium* species. The minimum zone of inhibition was observed in ethanolic extract against *B.subtilis, A.flavus.*

In addition, the quantitative phytochemical estimation were showed the presence of Tannins,Alkaloids,Triterpenes, Flavonoids and Saponins. India as a rich and diverse flora of flowering medicinal plants. Medicinal plants play a vital role in human health care about 80% of the world population role on the use of traditional medicine, concomitantly based on plant materials The results of maximum antibacterial activity was identified with Ethanolic and Methanolic (leaf and flower) extract of *Catharanthus roseus. Pseudomonas aeuroginosa and Staphylococcus aureus* shows more antimicrobial activity of the ethanolic extract might be due to the presence of unique phytochemical constituents.

The present learn also made an effort to identify the phytochemical constituents analysis and the results showed the presence of soluble sugars,reducing sugars, aminoacids, proteins, lipids, chlorophyll, phenol,ortho-dihydroxy phenols and this phytochemical constituents previously reported with several biological properties.

Moreover,several species of Apocyanaceae family plants has been widely used as main ingredient in traditional medicine.Hence the presently studied leaf and flower extract of *Catharanthus roseus* could be of considerable infers to the development of new life saving drugs. However further research in required to isolate the bioactive principle of this species as well as further studies on its bio efficiency against human pathogens.

It can be concluded from the present findings that, Ethanolic and Methanolic (leaf and flower) extract of *Catharanthus roseus* was showed potential antimicrobactivity source for various infects. Further studies is need to be conform and identified the particular compounds to use as a drug as main ingredient in the traditional medicine.

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