INTERNATIONAL JOURNAL OF CURRENT RESEARCH IN BIOLOGY AND MEDICINE
ISSN: 2455-944X
www.darshanpublishers.com
Volume 1, Issue 1, April - 2016

Original Research Article

Antimicrobial potential activity of leaf extracts of *Catharanthus roseus* against human pathogens under laboratory conditions.

V. Shanmugaraju[1*] and R.Bhakyaraj[2]

[1]Associate Professor and Head, Department of Biotechnology, Dr. N. G. P. College of Arts and Science, Kalapatti Road, Coimbatore – 641 048, Tamil Nadu, India
[2]Asst.Professor and Head, Dept.of Bioscience &Research, Shri Nehru MahaVidyalaya , College of Arts and Science, Coimbatore – 50, Tamil Nadu, India
*Corresponding Author

Abstract

The *Catharanthus roseus* **L**. plant leaf extracts were prepared by using solvents such as acetone, ethanol, and chloroform and tested against pathogenic microorganisms to determine their antimicrobial potential. *Catharanthus roseus* leaf extracts showed maximum antibacterial activity against all the pathogenic microorganisms. Among the solvents tested, ethanol showed maximum antibacterial activity of plant extracts *viz.*, *Catharanthus roseus* leaf when compared to acetone and chloroform extracts *viz.*, *Catharanthus roseus* leaf *Staphylococcus sp*were found to be more susceptible against *Catharanthus roseus* leaf extracts tested followed by *E.coli, Pseudomonas sp* and *Streptococcus sp.* The results of the present study clearly suggested the importance of *Catharanthus roseus* intreatement against infection disease causing pathogenic microorganisms. Moreover, the therapeutic potential of the plant should also be checked when used in combination with other herbal drugs.

Keywords: *Catharanthus roseus* **L.**, solvents, pathogenic microorganisms.

Introduction

The *Catharanthus roseus* **L**. plant leaf extracts were prepared by using solvents such as acetone, ethanol, and chloroform and tested against pathogenic microorganisms to determine their antimicrobial potential. *Catharanthus roseus* leaf extracts showed maximum antibacterial activity against all the pathogenic microorganisms. Among the solvents tested, ethanol showed maximum antibacterial activity of plant extracts *viz.*, *Catharanthus roseus* leaf when compared to acetone and chloroform extracts *viz.*, *Catharanthus roseus* leaf *Staphylococcus sp*were found to be more susceptible against *Catharanthus roseus* leaf extracts tested followed by *E.coli, Pseudomonas sp andStreptococcus sp.* The results of the present study clearly suggested the importance of *Catharanthus roseus* intreatement against infection disease causing pathogenic microorganisms. Moreover, the therapeutic potential of the plant should also be checked when used in combination with other herbal drugs

Catharanthus roseus (L.) which is an important medicinal plant of the family Apocynaceae is used to treat many of the fatal diseases. *C. roseus* also possess good antioxidant potential. There are about two common cultivars of *C. roseus* which is named on the basis of their flower color that is the pink flowered 'Rosea' and the white flowered 'Alba'. *C. roseus* is extensively cultivated in northern India in order to meet their commercial and the ever increasing demand in the indigenous systems of the medicine also their need to the pharmaceutical industry. However, certain

factors like the soil salinity hampers the cultivation of this plant very severely.*Catharanthusroseus* which is pridely known as the Madagascar periwinkle is found to be a species of *Catharanthus* native and also endemic to Madagascar. The synonyms of the plant name include *Vincarosea*, *Ammocallis rosea* and *Lochnera rosea*. Other English names occasionally used for the plant include Cape Periwinkle, Rose Periwinkle, Rosy Periwinkle and "Old maid"3. A traditionally used medicinal plant *Catharanthusroseus* is an erected procumbent herb or under the shrub containing latex. It grows widely to about 1m tall at the subtropical area. The leaves are found to be of oval to oblong, 2.5 – 9.0cm long and 1.0- 3.5 cm broad, glossy green, hairless, with a pale midrib and a short petiole of about 1.0- 1.8 cm long and they are arranged in the opposite pairs. The flowers looks white to dark pink with a darker red centre and a basal tube of 2.5 – 3.0 cm long with a corolla of about 2.0 – 5.0 cm diameter with five petals like lobes. The fruits are found to be a pair of follicles of about 2.0- 4.0 cm long and 3 mm broad4. This plant is found to be rich in their pharmacological actions that include antibacterial, antifungal, antioxidant, anticancer and antiviral activates. **(Gajalakshmi, *et al*, 2013).**

Plants have been used in the preparation of traditional medicine for a long time and most of these folk medicines were prepared from locally grown wild plants. Knowledge about the uses of plants was compiled by trial and error and passed down from one generation to another orally. Nowadays, world markets are turning to plants as the sources of ingredients in healthcare products. It offer alternative remedies with tremendous opportunities to generate income, employment and foreign exchange for developing countries. Many traditional healing herbs and their parts have been shown to have medicinal value and can be used to prevent, alleviate or cure several human diseases. Herbal drugs constitute a major part in all traditional system of medicines. It is a triumph of popular therapeutic diversity. In developing countries, it is estimated that about 80% of the population rely on traditional medicine for their primary health care. Most of the pathogens causing enteric infections have developed resistance to the commonly prescribed antibiotics. Bacterial resistance to antibiotics increases mortality, likelihood of hospitalization and the length of stay in the hospital. TSherefore, the research and reviews for new and effective anti-microbial agents with broad-spectrum of activity from natural sources is increasing day by day**(Monokesh KhmerSen.*et al*, 2013)**

Natural products including plants, animals and minerals have been the basis of treatment of human diseases. Use of plants as a source of medicine has been inherited and is an important com- ponent of the health care system. (Nayar *et al*., 1999). In recent years, many drugs have been isolated from natural source as the modern medicine system treats the symptoms and suppresses the disease but does little to ascertain the real cause. Toxic drugs which may suppress or relive some aliments usually have harmful side-effects. Drugs usually hinder the self-healing efforts of the body and make recovery more difficult. There, the current scenario is to isolate the active constituents present in the plant material to develop medicinally drugs which are haveing rare chances of adverse effects **(Mohammed *et al*., 2011).**

Medicinal plants grow naturally around us. Over centuries, cultures around the world have learned how to use plants to fight illness and maintain health. These readily available and culturally important traditional medicines from the basis of an accessible and affordable health care regime and are an important source of livelihood for indigenous and rual population **(Rajalakshmi *et al* 2013)**

The plant *Vincarosea* Linn (periwinkle) is an apocynaceous, ever-blooming, pubescent herb or sub-shrub which has been shown to be a source of many alkaloids. It has enjoyed a popular reputation in indigenous medicine in various parts of the world.Its alkaloids are Hypotensive, sedative and have tranquilising properties and are anti cancerous. It helps in relieving muscle pain, depression of central nervous system and wasps stings. It is used in case of nosebleed, bleeding gums, mouth ulcers and sore throats. It is also used internally for loss of memory, hypertension, cystitis, gastritis and enteritis, diarrhea and raised blood sugar levels**.(Hemamalini Balaji, 2014).**

Catharanthusroseus (Madagascar periwinkle) is a species of *Catharanthus* native and endemic to Madagascar. Synonyms include *Vincarosea* (the basionym), *Ammocallisrosea*, and *Lochnera rosea*; other English names occasionally used include Cape Periwinkle, Rose Periwinkle, Rosy Periwinkle, and "Old-maid". In India it is known as "Nithyakalyani".

Studies in the 1950s revealed that *Catharanthusroseus* contained 70 alkaloids, many of which are biologically active. While initial studies for its use in diabetes mellitus were disappointing, the discovery that it caused myelosuppression (decreased activity of the

bone marrow) led to its study in mice with leukemia, whose lifespan was prolonged by the use of a *Vinca*preparation. The other scientific name for "*Vincarosea*" is *Catharanthusroseus* .Vincristine is Vinca Alkaloids from *Catharanthusroseus*. It is a mitotic inhibitor and used in cancer chemotherapy.

The leaf juice of *C. roseus* produced dose-dependent reduction in blood glucose of both normal and diabetic rabbits and comparable with that of the standard drug, glibenclamide. The results indicate a prolonged action in reduction of blood glucose by *C. roseus* and the mode of action of the active compound(s) of *C. roseus* is probably mediated through enhance secretion of insulin from the β-cells of Langerhans or through extra pancreatic mechanism .

The species has long been cultivated for herbal medicine and as an ornamental plant. In traditional Chinese medicine, extracts from it have been used to treat numerous diseases, including diabetes, malaria, and Hodgkin's disease. The substances vinblastine and vincristine extracted from the plant are used in the treatment of leukemia. This conflict between historical indigenous use, and recent patents on *Catharanthusroseus* derived drugs by western pharmaceutical companies, without compensation, has led to accusations of biopiracy. It can be dangerous if consumed orally. It can be hallucinogenic, and is cited (under its synonym *Vincarosea*) in Louisiana State Act 159.**(Parameswari.P,2015).**

Vincarosea has a variety of medicinal properties such as antibacterial (Carew *et al*., 1970), antifungal (Jaleel *et al*., 2007), antiviral (Farnsworth*et al*., 1968), anticancer (Ram *et al*, 2001). *Calotropis gigantea* has been reported to possess a number of medicinal properties and is used in toothache, earache, sprain, anxiety, pain, epilepsy, mental disorder and also it possesses anti- diarrheal, analgesic and CNS activity (Pathak & Argal, 2007). An extensive literature survey indicates antioxidant and antimicrobial activity in *Calotropis gigantea* and *Vinca rosea*. But only scanty information is available on such potential regarding the individual plant parts concerned (root, stem, leaf, flower & seed). In the present research study, the experiment was carried out in triplicate so as to compare the antioxidant and antimicrobial activities of the different parts of the two selected Indian medicinal plants and the values were compared with that of the previous reports. The concentration dependency of the antioxidant and antimicrobial activities was also investigated**(Jayakumar, *et al*, 2010).**

Catharanthusroseus possesses known antibacterial, antifungal, antidiabetic, anticancer and antiviral activities. The extracts have demonstrated significant anticancer activity against numerous cell types**(EL-Sayed and Cordell, 1981).**

The plant shows the presence of various alkaloids, viz. Vincristine, which binds to tubulin dimers, inhibiting assembly of microtubule structures. Disruption of the microtubules arrests mitosis in metaphase. The vinca alkaloids therefore affect all rapidly dividing cell types including cancer cells, but also intestinal epithelium and bone marrow (Graf et al., 1996). Vinblastine is an antimicrotubule drug used to treat certain kinds of cancer (Starling, 1976). Yohimbine (Procomil) is an alkaloid with stimulant and aphrodisiac effects found naturally in Pausinystalia yohimbine (Millon *et al*., 2002). *C. roseus* also shows the presence of this compound along with another flavonoide hirsutidin (Piovan and Fillipini, 2007). The different parts of *C. roseus* (leaf, stem, flower and root) were used and extracts were subjected to antibacterial assay. The extracts of *C. roseus* did not exhibit antibacterial activity against *Staphylococcus aureus*. Moreover, leaf, stem and flower extracts were also ineffective against *Pseudomonasaeruginosa*. The leave extract did not exhibit activity against *Corynebacteriumdiphtheriae*; similarly, the crude extract of stem did not shown activity against *Shigella* boydii. The most effective was the root extract, which exhibited broad-spectrum antibacterial activity against *Salmonella typhimurium* and *S. boydii*. The flower extract showed activity against *C. diphtheriae* (Perez *et al*., 1990). The present investigation is focused on screening of leaf extracts of the plant for its antibacterial potential adopting the routine antibacterial assay techniques**(Prajakta .J, *et al*, 2010).**

The research for new therapeutic treatments for various disease conditions is expanding. In many poor countries, plants have been looked at as a very promising source of new lead compounds for drug discovery and development (Kong *et al*., 2003). *Catharanthusroseus* is an important medicinal plant of family Apocynaceae. It is cultivated mainly for its alkaloids, which are having anticancer activities (Jaleel *et al.,* 2008). Worldwide attention has been shifted towards finding new herbal chemicals for the development of new drugs. These natural products can provide unique elements of molecular diversity and biological functionality, which is indispensable for novel drug discovery (Nisbet and Moore, 1997). Several research groups have shown that

Catharanthusroseus has a high potential for many varieties of medicinal properties, such as antibacterial (Carew and Patterson 1970), antifungal (Jaleel *et al*. 2007) and antiviral **(Farnsworth et al. 1968).**

Plant derived medicines are still the mainstay of about 80% of the world population, mainly in the developing countries, for primary health care because of better cultural acceptability, better compatibility with human body and fewer side effects (De Smet, 1997; Ullah and Khan, 2008). The quest for plants with antimicrobial properties continue to receive attention due to development of multiple drug resistance, an increased awareness of the limited ability of synthetic pharmaceutical products to control major diseases and adverse effects of synthetic products on host such as hypersensitivity, immunosuppression and allergic reactions. The relatively lower incidence of adverse reaction to the plant preparations compared to modern conventional pharmaceuticals, coupled with their reduced cost, is also encouraging both the consuming public and national health care institutions to consider plant medicines as alternative to synthetic drugs (Itokawa *et al.*, 2008). These are mostly the secondary metabolites. Plant based antimicrobial represents a vast untapped source of medicines and needed to be explored further. They have enormous therapeutic potential and are effective in treatment of infectious disease (Harborne *et al.*, 1998). In this context, **"**Medicinal plants are rightly said to be Tradition of yesterday and drugs of tomorrow**"(Abha Verma *etal* 2013).**

Taxonomy OF *C. roseus* L.:

Medicinal plants are classified according to the part used, habit, habitat, therapeutic value etc.besides the usual botanical classification. But the botanical classification is the most comprehensive and scientific classification. The botanical classificationof *C. roseus* L. is as following:

Kingdom	Plantae
Phylum	Magnoliophyta
Class	Magnoliopsida
Order	Gentianales
Family	Apocynaceae
Genus	Catharanthus
Species	C. roseus
Binomial name.	*Catharanthus roseus* **L.**

Aim and objectives

The main objectives of the present investigation are as follows:-

1. To extract the phytoactive compound present in the *Catharanthus rouses* leaf using solvent such as ethanol,chloroform and acetone.
2. To study the in vitro antimicrobial activity of different solvent extract against some human pathogens by disc diffusion method.
3. To determine the minimal inhibitory concentration (MIC) of solvent extracts by disc diffusion method.

Materials and Methods

Collection of pathogenic microorganisms

The pathogenic microorganisms chosen for the present study were obtained from the Hubert Enviro Pvt. Ltd. Chennai.

The pathogenic microorganisms obtained are,
a)E.coli
b)Pseudomonas sp
c) Staphylococcus sp
d) Streptococcus sp.

The clinical isolates were confirmed by using Gram staining biochemical test and also inoculating them on selective media. The microorganisms were maintained on nutrient agar slant at 4˚C.

Collection of plant

Healthy leaves *Catharanthus roseus* were collected from Thellar,Thiruvannamalai district, Tamil Nadu, India.

The plant material like leaf were washed thorough with tap water and then with sterile distilled water for the removal of dust and sand particles. The leaf was shade dried and powered by hand crushing. The powdered samples were hermetically sealed in separate Polythene bags until the time of the extraction. This was used as the raw material for the extraction of antimicrobial compounds against the pathogenic microorganisms used.

Culture Medium

Nutrient agar medium (for bacteria) were used as growth media for these microorganisms in this study

Extraction of plant

Solvent extraction

The shade dried leaf, were used for the solvent extraction procedure. About 10 g of this powder was soaked in 100 ml of ethanol, acetone and chloroform for 48 Hrs. The contents were then filtered through whatman filter paper no.1. This dried extract was then dissolved in DSMO for testing its antimicrobial potential. Extracts were stored at 4°C until further use.

Antimicrobial activity

The antibacterial activity studies were carried out by disc diffusion technique (Newall *et al.,* 1996). The nutrient agar media was sterilized at 121°C under 15 lbs pressures for 30 minutes. After cooling to about 65°C, 25 ml of the medium was poured in Petri-dish. The plates kept at room temperature for solidification and stored at 4°C until using. Bacterial culture was spread over the nutrient agar plates by using separate sterile spreader. Holes were made in the medium by using 7 mm cork borer. The dried plant extract was dissolved in dimethylsulfoxide (DMSO) to final extract of 100 mg/ml. Each hole in each plate was filled with 50 µl of plant extract. DMSO was used as a negative control in one of the plates. The plates were incubated for 24-48 hours at 37°C along with negative controls.

The antibacterial activity of each extract was recorded based on the inhibition of bacterial growth by the extract at the end of incubation period. At the end of the incubation period the zones of inhibitions were measured to the nearest millimeter (Andrews et al., 2001). The inhibition zone is the area surrounded the hole and there is no growth of inoculated microorganism. For confirmation of the results each test was performed in duplicate.

Results

Confirmation of the pathogenic microorganisms

The pathogenic microorganism obtained fromHubert Enviro Pvt. Ltd. Chennai were confirmed as *E.coli,Pseudomonas sp, Staphylococcus sp, Streptococcus sp*on the basic of Gram staining and biochemical tests and their results are given in Table

In vitro antibacterial assay by disc diffusion method

The *in vitro*antibacterial activity of acetone, ethanol and chloroform extracts *Catharanthus roseus*L.leaf against four pathogenic microorganisms was carried out by disc diffusion method .It was found that the plant extract showed good inhibitory activity on almost all the pathogenic microbes tested. The results of antibacterial assay of different extracts are described as follows.

Antibacterial activity of *catharanthus roseus* leaf extracts

The antimicrobial activity of *Catharanthus roseus**L.* leaf extract against pathogenic microorganisms *viz*., *E.coli,Pseudomonas sp, Staphylococcus sp,*and *Streptococcus sp*was studied under *in vitro*condition with different solvent extracts *viz*., It was observed that inhibitory activity of three solvent extracts vary with the tested pathogenic microorganisms .Among the extracts tested,Acetone extract recorded highest antibacterial activity against pathogenic microorganisms, whereas the extract *viz*., Chloroform recorded lowest antibacterial activity. Ethanol extract were intermediary in their activity. The maximum antibacterial activity. The maximumantibacterial activity was observed against *Staphylococcus sp* (26mm) by ethanol extracts.

Interpretation of result of minimal inhibitory concentration (MIC)

Minimal inhibitory concentration of *Catharanthus roseus L.* leaf extracts were tested against two pathogenic microorganisms viz., *Staphylococcus sp* and *Pseudomonas sp*on the basis of results obtained by disc diffusion method. The two isolates were susceptible to the solvent extracts when compared to other pathogenic microorganisms.

*Staphylococcus sp*were found to be more susceptible to the plant extracts *viz., Catharanthus roseus* leaf extracts, since their growth was inhibited at relatively lowerConcentration *E.coli.* The plant extract *Catharanthus roseus* leaf extracts inhibited the tested pathogenic microorganisms *viz., Staphylococcus sp and Pseudomonas sp* with lowest concentration to a maximum level than other extracts.The *Catharanthus roseus* leaf extracts found topossess least MIC values and leaf extracts were found to be intermediary in their

action. The acetone extracts inhibited pathogenic microorganisms with lower concentrationthan ethanol and chloroform extracts.

Table:1 Antimicrobial activity of *Catharanthus roseus* leaf extracts against *pseudomonas sp* and *Staphylococcus sp.*

Microorganism Used	Concentration of Extract mg/ml	Average of Inhibition Zone (mm)
Staphylococcus sp	100	25
Pseudomonas sp	100	20

Table:2 Antimicrobial activity of *Catharanthus roseus* leaf extracts against *E.coli* and *Streptococcus sp.*

Microorganism Used	Concentration of Extract mg/ml	Average of Inhibition Zone (mm)
E.coli	100	15
Streptococcus sp	100	20

Antibacterial activity of *Catharanthus roseus* leaf extracts (mm)

Name of the Organism	**Acetone**	**Ethanol**	**Chloroform**
E.coli	*15*	*16*	*15*
Pseudomonas sp	20	17	18
Staphylococcus sp	25	26	22
Streptococcus sp	*20*	*15*	*15*

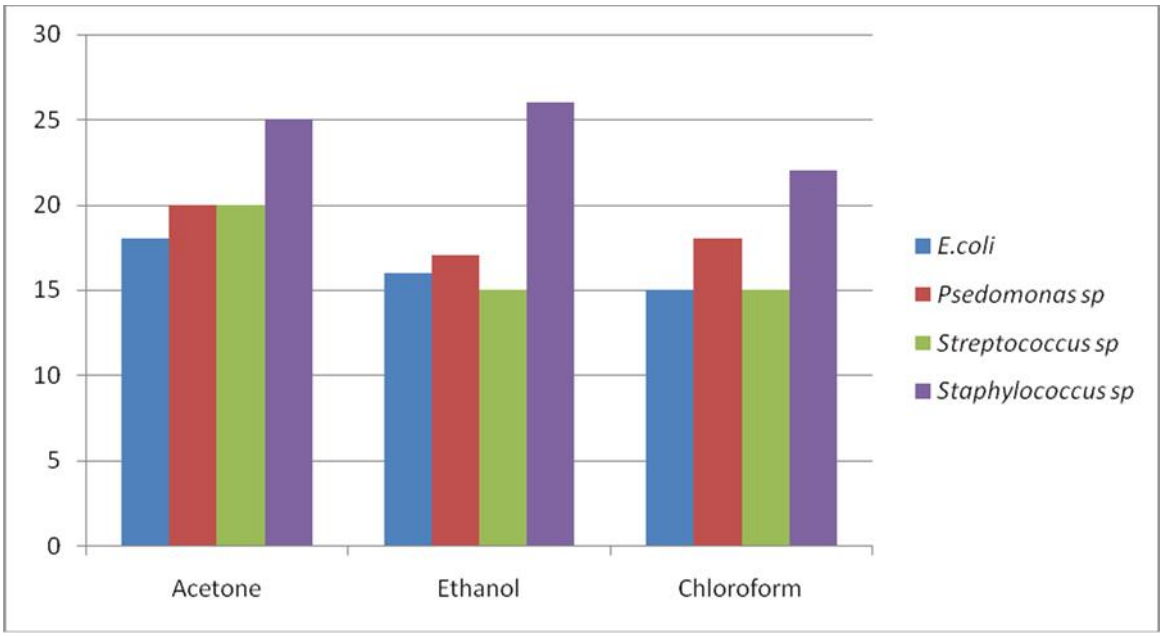
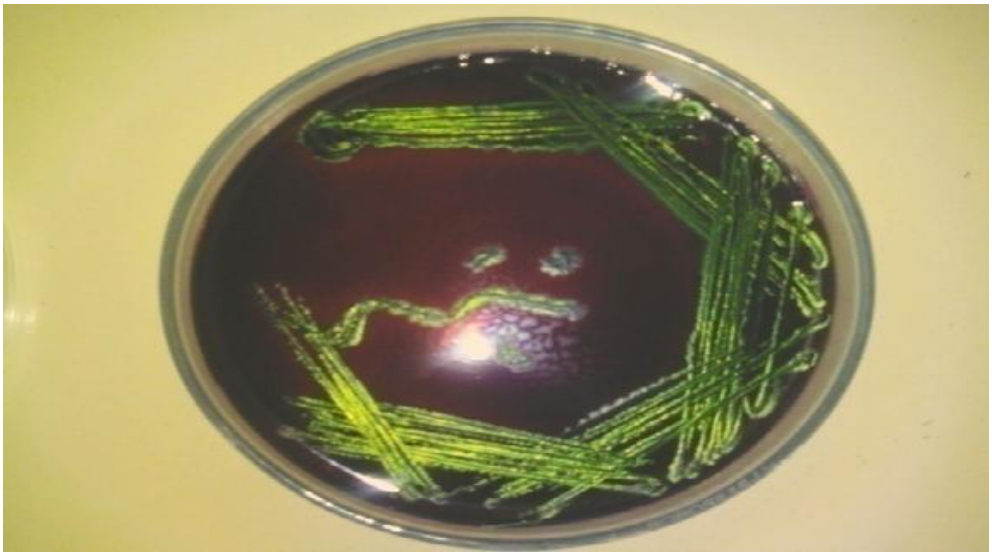


PLATE-1

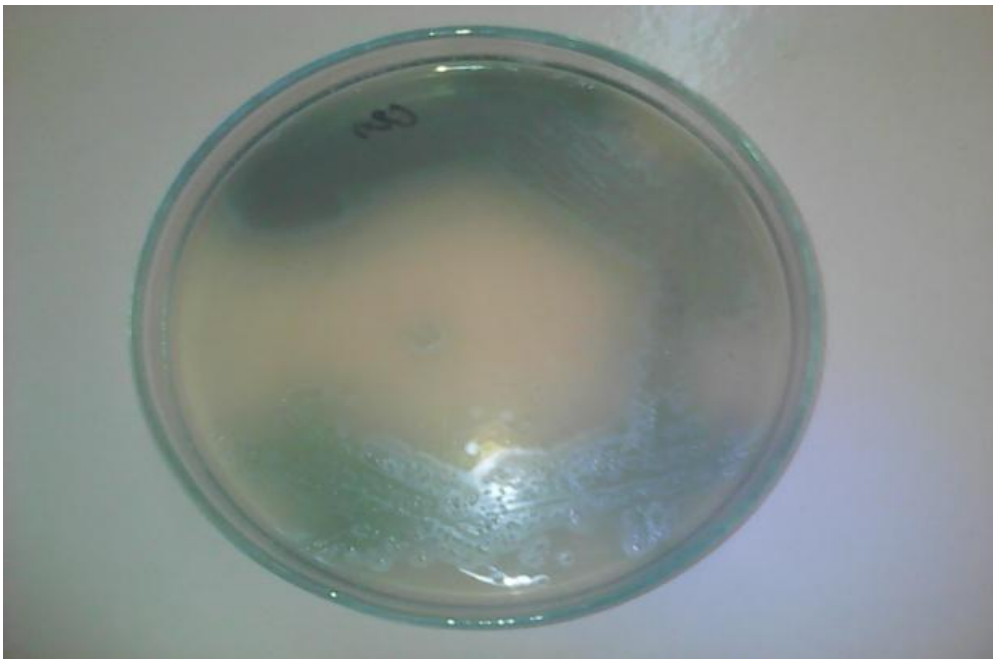
Catharanthus roseus plant *Catharanthus roseus* dry leaf

Different solvent extractof *Catharanthus roseus* leaf

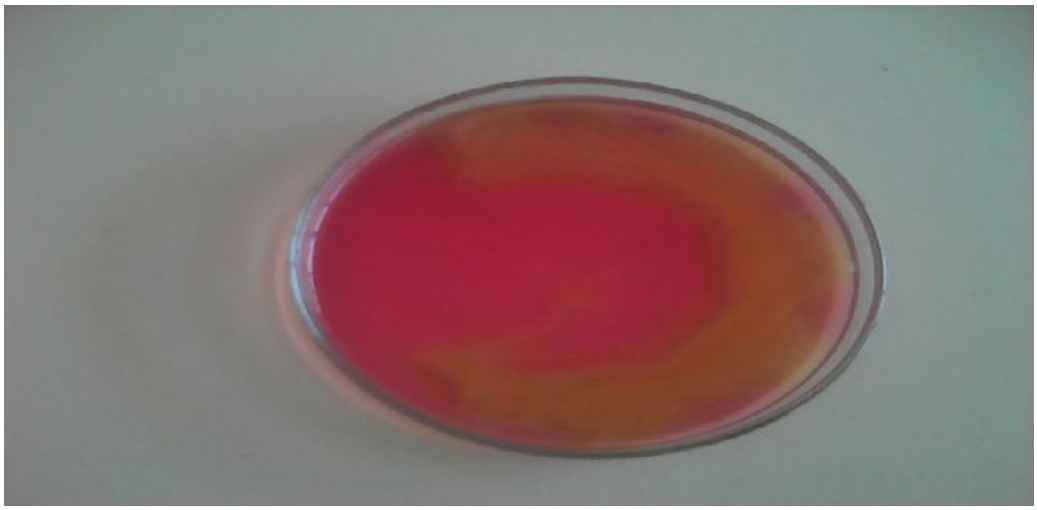
PLATE-2



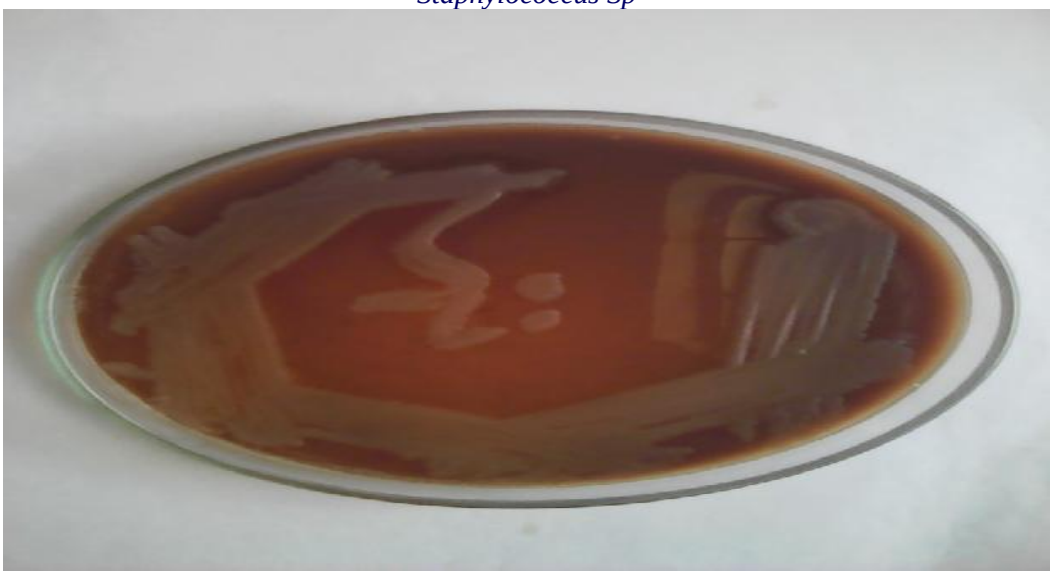
E.coli



Pseudomonas Sp



Staphylococcus Sp



Streptococcus sp.

PLATE-3 Biochemical test for some microorganisms

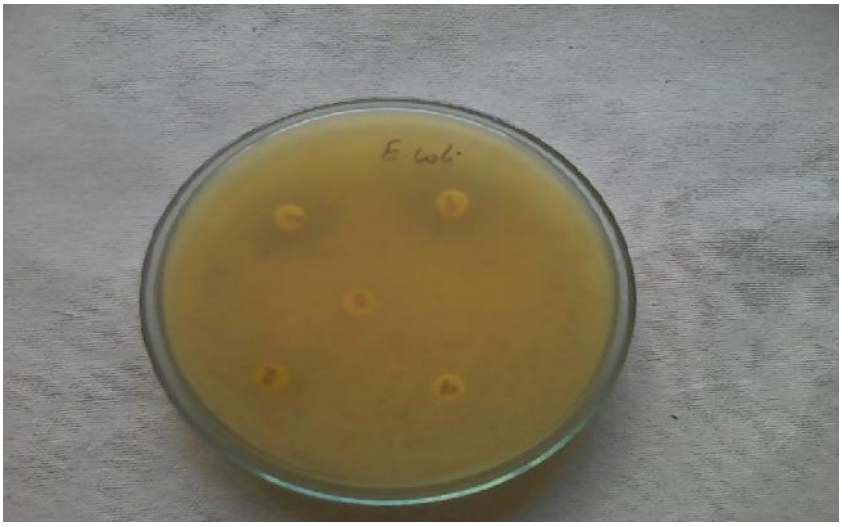
E.coli

Pseudomonas sp

Staphylococcus sp

Streptococcus sp

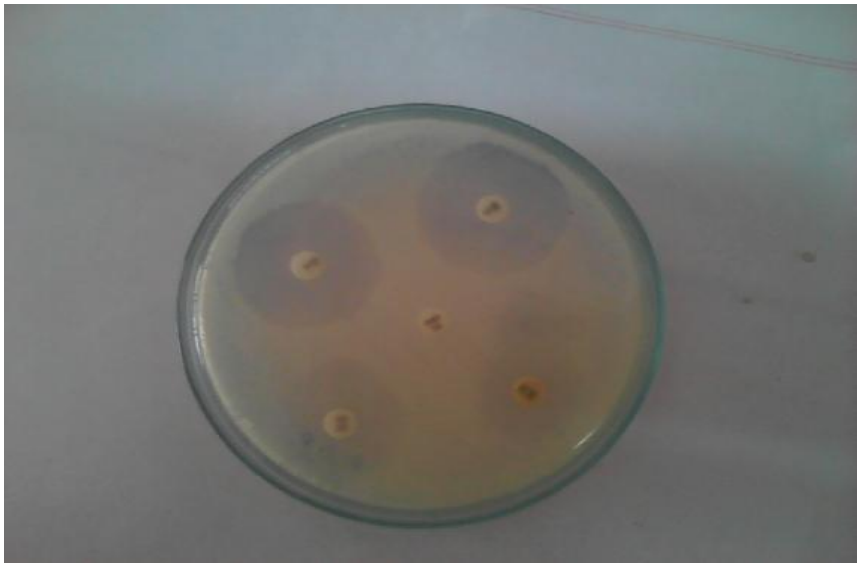
PLATE-4 Antibiotic disc plate for some microorganisms



E.coli

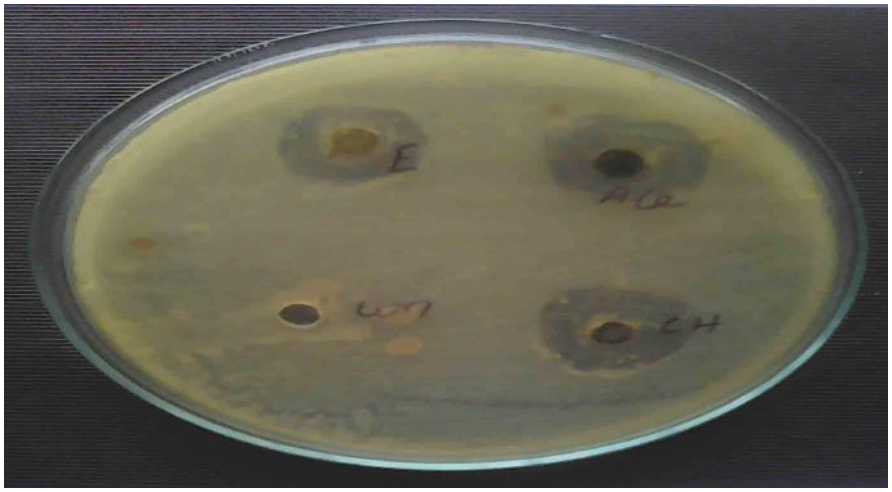
Pseudomonas sp

Staphylococcus sp

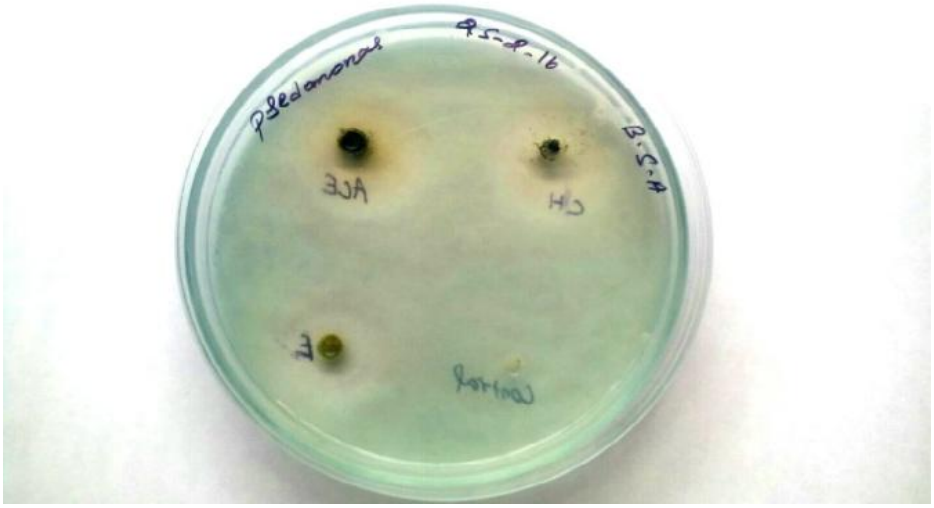


Streptococcus sp.

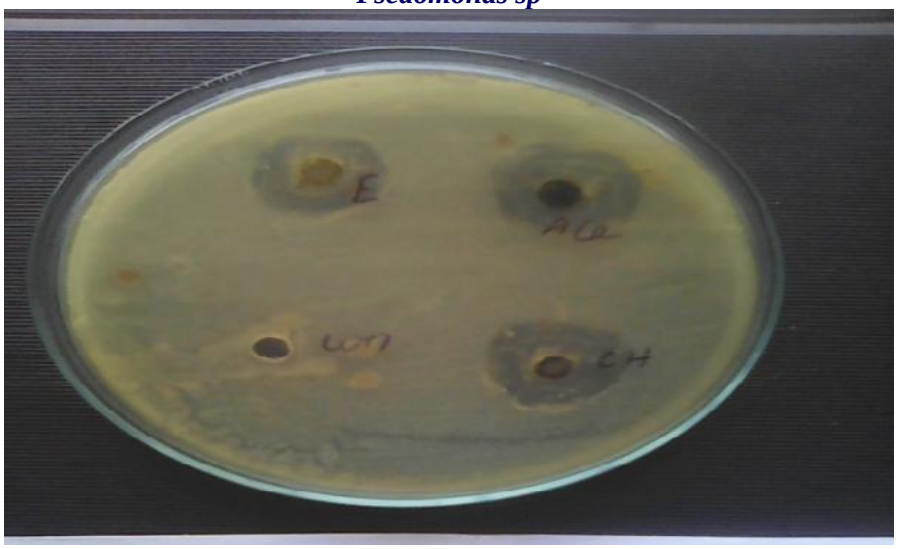
PLATE-5 AGAR WELL DIFFUSION TEST PLATES



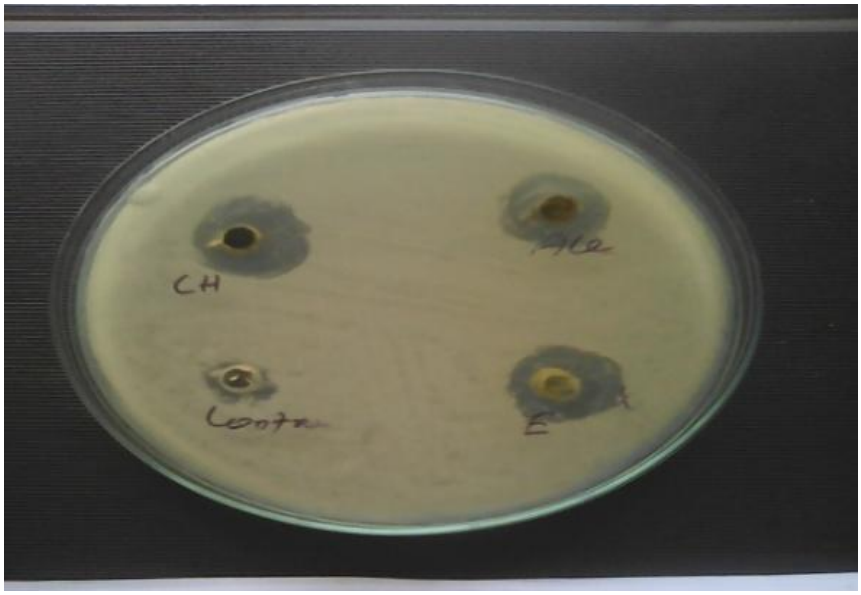
E.coli



Psedomonas sp



Staphylococcus sp



Streptococcus sp

Discussion

Medicinal plants are very important and widely available resource for primary healthcare and complementary healthcare systems. The literature in this area of research showed that plant kingdom contain many species of plants harboring substances of medicinal value that have yet to be discovered; though large numbers of plants are constantly being screened for their antimicrobial effects (Pankaj *et al*.2008). These plants show that they are very rich source of compounds with possible antimicrobial activities, but more pharmacological investigations are necessary. The present study reveals the antimicrobial activity of ethanol leaf extracts of *Catharanthus roseus.* The antimicrobial activity of *Catharanthus roseus* leaf extract was tested against two pathogenic bacteria, *Staphylococcus sp* and *pseudomonas sp*.

The tested extract showed very strong antimicrobial activity against these pathogenic microorganisms. The antimicrobial activity was evaluated by measuring the zone of inhibition. The strongest inhibition activity of the leaf extract was observed against *Staphylococcussp* (25 mm zone) at 100 mg/ml of leaf extract followed by *pseudomonas sp*which showed 20mm inhibition zone at 100 mg/ml leaf extract. The results of this work are in agreement with other studies that the leaf extracts of this plant was has significant antibacterial activity against Xanthomonas campestris (Satish *et al.* 1999).

This study illustrate that a Gram-positive bacteria were more susceptible to this extract as compared to Gram-negative bacteria species. This is probably due to the differences in chemical composition and structure of cell wall of both types of microorganisms (Pankaj *et al*.2008). The extraction of antimicrobial substances by organic solvents is better as compared to aqueous extracts (Thongson *et al*. 2004).

In-vitro **antibacterial activity of *catharanthus roseus* plant extracts**

In the present study, the in vitro antibacterial activity of *Catharanthus roseus* showed the inhibitory action against the tested microorganisms. All the plant extracts inhibited the microorganisms to a significant level. When comparing among extracts, the leaf extracts showed maximum antibacterial activity .in general, the leaf extracts of *Catharanthus roseus* was found to possess less antibacterial activity when compared to other plant extracts.

When comparing among different solvent extracts, ethanol of *Catharanthus roseus Viz.,* leaf showed maximum antibacterial activity than acetone and chloroform extracts. The acetone extracts were found to possess least antibacterial activity among the solvent extracts.

Staphylococcus aureus were found to be more susceptible when compared to other viz., *E.coli*, *Pseudomonas sp* and *Streptococcus sp.* All the plant extracts showed antibacterial activity against both Gram positive and Gram negative organisms and this was conformity with earlier findings (Pratheeba *et al* ., 2013., Abbas *et al.*,Mahadev *et al.*, 2014).

Minimal inhibitory concentraction of plant extracts

Among four isolates, two pathogenic microorganisms' viz.,*Staphylococcus sp*and*Pseudomonassp*were screened for further MIC studies on the basis of maximum antibacterial activity obtained by disc diffusion method.Gram positive organisms were more susceptible than Gram a negative organismswhich correlates with the earlier reports of Vital and Rivera (2009). This might be due to the difference in sensitivity between Gram positive andGram negative could be ascribed to the morphological differences between these microorganisms (ElAstral al., 2005)

Microorganisms, including Gram positive and Gram negative bacteria, have been recognized as the main causative agent of various human infections. Though effective antimicrobias have been developed over the years, there has been increased development of antimicrobial drug resistance to presently available antimicrobials(Chopra, 2007). The fight against bacterial infection has resulted in the development of a wide variety of antibiotic, after years of misue and overuse of antibiotics, bacteria are becoming antibiotic resistant, leading to a potential global health crisis.

Acceptance of medicines from plant origin as an alternative form of healthcare is increasing because they are serving as promising sources of novel antibiotic prototypes (Koura et al. 2006). Some of the phytochemical compounds e.g. glycosides, saponin, tannin, flavonoids, trepenoid, alkaloid have variously been reported to have anti-microbial activity (Okeke et al., 2001); Rahman *et al.*, 2010).

The complication in the antimicrobial activity of propolis could be due to differences in its chemical components. It has also been reported that the samples collected from different geographic origin with

different climates and vegetations show different antibacterial activates.

The present study shows that the acetone, ethanol and chloroform extracts have inhibitory activity against most of the pathogenic microorganisms. The inhibition of the growth of these organisms in vitro by the pathogenic microorganisms. The inhibition of the growth of these organisms in vitro by the extracts may be due to the presence of some active constituents in the extracts. These active principles may have acted alone or in combination to inhibit the growth of the bacterial organisms. The medicinal uses of these plants to heal diseases including infection one has been extensively applied by people. The problem of microbial resistance is growing and the outlook for use of antimicrobial drug in the future is still uncertain. Therefore, action must be taken to develop research to better understand the genetic mechanisms of resistance and to continue studies to develop new drug, either synthetic or natural. The ultimate goal is to offer appropriate and efficient antimicrobial drugs to the patient.

In the present study it was generally observed that*Catharanthus roseus*have brought about the possibility of utilization of plant extract, which has provided scientific evidence for the development of antibacterial products and treatment of bacterial infection in the future.

Conclusion

Since all the tested of *Catharanthus roseus*were highly effective against the testedpathogenic microorganisms. The antimicrobial activity can be enhanced if the phytoactive components are purified and adequate dosage determined for proper administration. As the global scenario is now changing towards the use of nontoxic plant products having traditional medicinal use, development of modern drug from *Catharanthus roseus*should be emphasized for the control of pathogenic microorganisms. The presentresults of *Catharanthus roseus*have provided scientific evidence for the development of antibacterial products and the treatment of bacterial infection in the future.

References

Abdul Mateen Khattak., I. Ahmad, N.U. Amin, F. Wahid and H.U. Rahman. (2011). Effects of different amended organic media on the growth and development of *Vinca roesa* victory. Sarhad J. Agric. 27(2): 201-205

Abha Verma, Prakash Joshi and Arvind Arya (2013) Screening of eight plants extracts for their antimicrobial properties Int.J.Curr.Microbiol.App.Sci (2013) 2(8): 315-320

Amjad Khalil (2012). Antimicrobial Activity of Ethanol Leaf Extracts of *Catharanthusroseus* From Saudi Arabia2nd International Conference on Environment Science and Biotechnology. V48. 2: 6-11

Bhutkar M. A, Bhise S. B(2011).Comparative Studies on Antioxidant Properties of *Catharanthus rosea a*nd *Catharanthus alba*.International Journal of PharmTech Research.vol.3 (3):1551-1556.

Cheruth Abdul Jaleel, Ragupathi Gopi, Paramasivam Manivannan, Rajaram Panneerselvam (2008) Soil salinity alters the morphology in *Catharanthus roseus* and its effects on endogenous mineral constituents .Eurasian Journal of Biosciences 2, 18-25

Christopher Larbie and Office Abboah-Offei (2014) AnticancerProperties of SomeOrnamental plantson Knust campus,Kumasi, Ghana. International Journal of Phytopharmacology. 5(5), 366-370.

CH.S.D. Phani Deepthi Yadav, N.S.P. Bharadwaj, M. Yedukondalu, CH. Methushala,Ravi Kumar (2013) Phytochemical Evaluation of Nyctanthes Arbortristis, Nerium Oleander and *Catharathnusroseus*. Indian Journal of Research in Pharmacy and Biotechnology Volume 1(3): 333-338

Durgesh Thingujam, Rekha K, Megala J and Usha B (2015). Antioxidant and anticancer properties of *Catharanthus pusillus*, 48-51

Dr.Hemamalini Balaji (2014) Versatile Therapeutic effects of *Vinca rosea* Linn. International Journal of Pharmaceutical Science and Health Care Issue 4, Vol 1. ISSN 2249 – 5738:59-76

F.M. El-Domyati, A.Z. Abdel Azeiz, A. Atef, A. Elhalwagi, J.S.M. Sabir, A.M. Ramadan, N.O. Gadalla1, S. Edris, M.N. Baeshen, N.H. Hajrah, M.A. Al-Kordy, A.S.M. Al-Hajar, C.C. Akoh and A. Bahieldin ,(2014)Functional genomics analysis for overproduction of key torpedoed indole alkaloids in mature leaf of *Catharanthus roseus* Life Science Journal ;11(10) ;1213-1220

Gajalakshmi.S, Vijayalakshmi.S and Devi Rajeswari.V (2013) Pharmacological Activities of *Catharanthus roseus*. International Journal of Pharma and Bio Sciences ISSN 0975-6299; 4(2): (P) 431 – 439

Gangadhar A. Meshram, Shraddha S. Khamkar, Ganesh S. Metangale, Tanushri S. Kulkarni, (2014) Characterization ofcampesterol, Stigmasteroland β-Sitosterolfrom *Vinca rosea*leaves by gc-msand

biologicalevaluationworld Journal of Pharmaceutical Research Volume 3, Issue 4,.ISSN 2277 – 7105; 2038-2042

Gita Bisla, Shailza Choudhary, Ekta Singh and Vijeta Chaudhary (2013) Hyperglycemia and hyperlipidemia mitigating impact of *Catharanthus roseus* (Sadabahar) leaves aqueous extract on type diabetes mellitus subjects. Asian Journal of Plant Science and Research, 2013, 3(4):170-174

Jayakumar, S. Jhancy Mary and R. Jaya Santhi (2010) Evaluation of antioxidant potential and antibacterial activity of *Calotropis gigantea*and Vinca *rosea* using invitro model: Indian Journal of Science and Technology ISSN: 0974- 6846: 720-723

Jayshree Nellore , Cynthia Pauline P, Surya Prabha Mohanan, Ramya Ravikumar, and Ragavi Chidambarathanu Pillai (2013) *Vinca rosea* Normalizes Oxidative Stress and Inhibits Hyperglycemia Induced Increase in VEGF in Zebrafish Retina. Research Journal of Pharmaceutical, Biological and Chemical Sciences Volume 4 Issue 4 ISSN: 0975-8585: 927-936

Jony Mallik , Hafsha Begum Chowdhury , Abdullah Al Faruq , Sourav Das (2013) Pharmacological Profile of *Catharanthus roseus*(Apocynaceae)Asian Journal of Pharmaceutical Research and Development Vol.1 (3);01-06

Krishnaveni.B and Priya.P (2014) Green synthesis and antimicrobial activity of silver nanoparticles from *Calotropis gigantea, Catharanthus roseus*, Chitin and Chitosan International Journal of Chemical Studies ISSN: 2321-4902 Volume 1 Issue 6: 10-20

M. A. Favali1, R. Musetti2, S. Benvenuti3, A. Bianchi1, and L. Pressacco (2004) *Catharanthus roseus* L. plants and explants infected with phytoplasmas: alkaloid production and structural observations. Protoplasma 223: 45–51

Malar Retna and P. Ethalsha (2014) Phytochemical Tests, Antioxidant Potentialand TLC Analysis of ipomoea pes caprae and *Catharanthus roseus*International Journal of Natural Products Research 2014; 4(2): 58-64

Meenakshi Koul, Neha S. Lakra, Ramesh Chandra and Sheela Chandra (2013) *Catharanthus roseus*and prospects of its endophytes: A New Avenue for Production of bioactive metabolites. International Journal of Pharmaceutical Sciences and Research Vol. 4(7) E-ISSN: 0975-8232; P-ISSN: 2320-5148): 2705-2716

Monokesh Kumer Sen, A. N. M. Mamun-Or-Rashid and Nayeem ,.Md. Towfique.(April-2013) Ethnomedical Profiles of different plant part of *Catharanthus roseus*Journal of Drug Discovery and Therapeutics 1 (4) 2013, 01-07

Muhammad Liaquat Raza , Muhammed Nasir , Tanveer Abbas , Baqir Shyum Naqvi (2009) Antibacterial Activity of Different Extracts from the *Catharanthus roseus*Volume 3, 81 –85

Monika Grzeszczuk, Janusz Wilas, Anna Wałejko, Ewelina Sitarz Content of Biologically Active Compounds in water extracts of Periwinkle (*Catharanthus roseus*(L.) G. DON) 117-124

Mohammed Ibrahim, Syeda SughraMehjabeen, and Mangamoori Lakshmi Narsu (2011)Pharmacological Evaluation of *Catharanthus roseus*.International Journal of Pharmaceutical Applications ISSN 0976-2639. Vol 2, Issue 3, 2011, pp 165-173

Murugan and D. Dhanavel Effect of Ethyl Methane Sulphonate (EMS) on Germination Behavior and Seedling Survival of *Vinca rosea* (L.) G.Don. Internatiol Journal of Current Research in Chemistry and Pharmaceutical Sciences (p-ISSN: 2348-5213: e-ISSN: 2348-5221)2(3):(2015):24–27

Palwasha Abbasi, Sadia Tabassum Abbasi, Sadia Kazi, Haji Khan Khoharo, Mozna Talpur, Shomail Siddiqui (2014) Blood Glucose Lowering Effect of*Catharanthus roseus* in Alloxan Induced Diabetic Rats European Journal of Molecular Biology and Biochemistry 63-66

Parameswari.PAnti-Microbial Activity of plant Extracts of*Catharanthus roseus*(2015) International Journal Of Pharmacy & Technology ISSN: 0975-766X CODEN: IJPTFI :9124-9132

Prajakta J. Patil and Jai S. Ghosh (2010) Antimicrobial Activity of *Catharanthus roseus*British Journal of Pharmacology and Toxicology 1(1): ISSN: 2044-2467;40-44

Prasad, A., Mathur, P., Shrivastava, M., Kumar, D and Sharma E (2014) Larvicidal Efficacy of *Catharanthus roseus*Leaves and Flowers Against the Malaria vector Anopheles Stephensiliston (INSECTA:DIPTERA: CULICIDAE) International Journal of Recent Scientific Research Vol. 5, Issue, 9, pp.1620-1623,

Rajalakshmi, N.Poongodi, .T.Sasikala, .Banuraviganesh (2013) Antimicrobial Activity and Phytochemical Screening of *Catharanthus roseus* International Journal of Scientific Research Volume:2,Issue:10, ISSN No 2277 – 8179; 1-2

Ravi Kumar and Deepukoushik Yadav (2013)Antibacterial Activity of Nyctanthes Arbortristis , Nerium Oleander and *Catharanthus roseus*.International Journal of Research in pharmacy and chemistry 3(2),ISSN: 2231-2781; 509-512

Rumana Ahmad, Neelam Misra(2014) Evaluation of Phytoremediation Potential of *Catharanthus roseus* with Respect to Chromium Contamination. American Journal of Plant Sciences, 5, 2378-2388.

Shabi Ruskin. R; Aruna. S.R.(2014). In-vitro and In-vivo Antitumor Activity of *Catharanthus roseus.* Int. Res J Pharm. App Sci. 4(6):1-4.

Sheeraz Ahmadwagay, Sudhansud Dhar Dwivedi, Manik Sharma, Jagrati tripathi, Mushtaq Ahmad (2013).Antimicrobial Activity of *Catharanthus roseus*. Chemistry and Materials Research ISSN 2224- 3224 (Print) ISSN 2225- 0956 : 61-65

Sonam Rajwar, Pankaj Khatri, Rakesh Patel, Shakti Dwivedi and Anup DwivediInternational Journal of Research in pharmacy and chemistry: 202-210

Sonia Chaman, Garima Sharma, Shalini, Anil K Reshi (2013) Study of Antimicrobial properties of *Catharanthus roseus* by agar well diffusion method. International Research Journal of Pharmaceutical and Applied Sciences (IRJPAS)3(5):65-68

Syarifah Masyitah Habib Dzulkarnain, Nurhidayah Ab. Rahim, Rafedah Abas, Romanize Abdul Rahim, Ishak Mat (2015) Determination of Protein Expression on Jurkat Cells Treated With *Catharanthus roseus* Advances in Environmental Biology , 9(25) Pages: 66-71

Leena Muralidharan (2014).*Catharanthus roseus* Leaves as an Antidiabetic and Hypolipidemic Agents in Alloxan- Induced Diabetic Rats.American Journal of Phytomedicine and Clinical Therapeutics.[2][12]:1393-1396

Lenin and M. Jayanthi (2012) Efficiency of plant growth promoting Rhizobacteria (PGPR) on Enhancement of growth, Yield and Nutrient content of *Catharanthus roseus*. International Journal of Research in Pure and Applied Microbiology; 2(4): 37-42

Qifang Pan, Mohd Zuwairi Saiman , Natali Rianika Mustafa , Robert Verpoorte , Young Hae Choi (2014) Metabolomic characteristics of *Catharanthus roseus* plants in time and space; 55-73

.

Access this Article in Online	
	Website: www.darshanpublishers.com
Quick Response Code	**Subject:** Ayurvedic Medicine

How to cite this article:
V. Shanmugaraju and R.Bhakyaraj. (2016). Antimicrobial potential activity of leaf extracts of *Catharanthus roseus* against human pathogens under laboratory conditions. Int. J. Curr. Res. Biol. Med. 1(1): 35-51.