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Antioxidant Potential, Anti bacterial activity and Phytochemical Tests of *Nithya Kalliyani (Catharanthus roseus)*

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Abstract

The present study was performed to evaluate the medicinal properties of commonly used Siddha plant Catharanthus roseus. Three different extracts (hexane, methane, and water) are prepared from the leaves and subjected to various screening such as Preliminary phytochemical screening, anti bacterial activity and antioxidant activity. Preliminary phytochemical screening of the crude extracts revealed the presence of phenols, alkaloids, Tannins and Flavanoides, Quinones and phenolics. DPPH assay showed Catharanthus roseus has potent antioxidant activitiy and anti bacterial property

Key words

Antioxidant, DPPH, *C.roseus*, Anti bacterial, Phytochemical.

1. Introduction

Siddha is an ancient system of medicines unique to the Tamil, Speaking community. Almost all the substances available in earth from plants, animals minerals and metal products are used as medicine in siddha system. The usage of **Catharanthus roseus** is drumented in various siddha texts. Catharanthus roseus is also known as vincarosea is native to the Caribben basin and has historically been used to treat a wide assortment of diseases., **Catharanthus roseus** has a variety of medicinal properties such as **anti bacterial, antifungal, antiviral and anticancer**. It has more than 400 known alkaloids, Some of which are approved as Antineoplastic agents to treat leukemia, Hodgkin's disease, malignant lymphomas, neuroblastoma, and other cancers. In the recent years interest in the study of the antioxidant activity of plant extracts and isolation from plants has grown due to the fact that the free radicals have been related to degenerative disease.

2. Material and Methods

The aerial parts of the fresh leaves and stem of *Catharanthus roseus* was collected from the sandy beaches of Kanyakumari. They were washed and air dried over a period of one month. The dried samples were milled into a fine powder by pounding manually with a clean, sterile mortar, stored in sterile cellophane bags in a cool dry place till further use.

100gram of aerial parts of the plant extracted in a soxhlet sequentially with 1000ml hexane, methanol and water. The process was run for 24hours after which the sample was concentrated using reduced pressure distillation under vacuum pump and freeze dried to powdered form. The dried extracts were weighed and kept in labeled sterile specimen bottles.

Extracts were primarily tested with four different bacterial strains in different concentrations. Bacterial strains were obtained from the Microbial Type Culture Collection (MTCC), Institute of Microbial Technology, and Chandigarh, India. *Bacillus subtilis*, *Clostridium perfringens*,*Escherichia coli*, *Klebsiellapneumoniae*, used as test organisms for investigating antimicrobial activity by the *Well diffusion assay*.

2.1 Preliminary phytochemical investigations

The major secondary metabolites of Alkaloids, tannins, flavonoids, phenol, were screened according to the common phytochemical methods.

2.2 Antioxidant activity (DPPH assay)

The Radical Scavenging Activity of different extracts was determined by using DPPH assay. The decrease of the absorption at 517nm of the DPPH solution after the addition of the antioxidant was measured in a cuvette containing 2.960 µl of 0.1mm ethanol DPPH solution mixed with 20 to 200µg/ml of plant extract and vortexes thoroughly. The setup was left in dark at room temperature and the absorption was monitored after 20 minutes. Ascorbic acid was used as references. The ability of the plant extract to scavenge DPPH radical was calculated by the following equation:

$$\% \text{ of DPPH Radical Scavenging Activity (\% RSA)} = \frac{\text{Abs. Control} - \text{Abs. sample}}{\text{Abs. control}} * 100$$

Abs. control is the absorbance of DPPH radical + ethanol; Abs. sample is the absorbance of DPPH radical + plant extract. Measurements were performed in triplicates. Absorbance values were corrected for radicals decay using blank solutions.

3. Results

3.1 Phytochemical Tests

The preliminary phytochemical screening tests for the crude methanol extract of *Catharanthus roseus* were revealed the presence of Phenols, flavonoids, quinones, Glycosides and tannins. Phenols were present predominantly and flavonoids, quinones, tannins were present in minor amount. Phenols were present in large quantity

Table 1: Phytochemical screening of crude methanol extract of aerial parts of *C. roseus*

Phytochemical compounds	***C.roseus***
Alkaloids	+
Flavonoids	+
Phenols	+++
Tannins	+
Glycosides	+
Reducing sugars	+
Proteins	-
Saponins	-

Quinones	-
Steroids	-
Amino acids	-
Terpenoids	-

3.3 Antibacterial activity

The methanol extracts of Catharanthus roseus was found to be active against Escherichia coli, klebsiella pneumonia, *Bacillus subtillis* and clostridium perfringens, where as water extract was found to be active against Clostridium perfringens and *Bacillus subtillis* hexane extract was found to be active only aganist Bacillus subtillis.

Table 2 : Anti bacterial activity of crude aerial part of Catharanthus roseus

Name of the extract	Conc. of extract (µg)	Zone of Inhibition (mm)			
		Micro organisms			
		E.c	K.p	B.s	C.p
Hexane	250	-	-	-	-
	500	-	-	15	-
	750	10	-	17	-
	1000	11	-	19	-
Methanol	250	-	-	-	13
	500	16	10	10	16
	750	12	12	11	17
	1000	13	14	12	18
Water	250	-	-	-	-
	500	-	-	10	-
	750	-	-	11	11
	1000	-	-	15	13

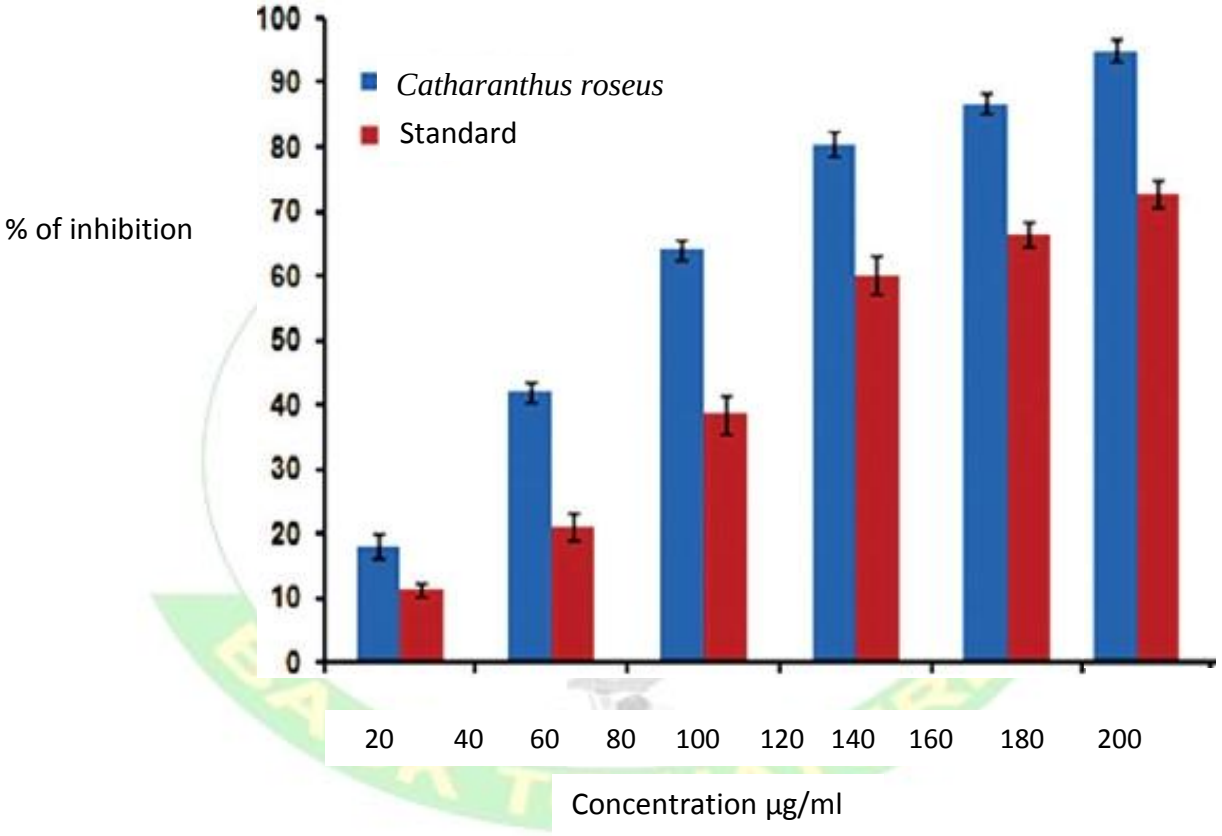
3.4 Antioxidant Activity

The results of the antioxidant activity of methanolic extract of aerial parts of *Catharanthus roseus* determined by DPPH assays at different concentrations are given in graph 1. It was evident that aerial part of *Catharanthus roseus* show moderate antioxidant

activity when compared to with standard antioxidant L-ascorbic acid whose antioxidant activity at different concentrations like 100 to 200µg were 60%, 70%, 80%, and 85%.

Radical Scavenging Activity of *Catharanthus roseus.*

Graph 1:



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4. Discussion

The preliminary phytochemical analysis showed. The presence of phenols, flavnoids quinones in considerable quantity. The presences of alkaloids interesting as significant quantities are used as antimalarials, analgesics and stimulants. The presence of glycosides moietics like saponins, glycosides and flavonoids, which are known to inhibit tumor growth and also serve to protect against gastrointestinal infections are one of the pharmacognostic importances and give evidence for the use of the plant in medicine. The methanol extracts of Catharanthus roseus was found to be active against Escherichia coli, klebsiella pneumonia, *Bacillus subtillis* and clostridium perfringens, where as water extract was found to be active against Clostridium perfringens and *Bacillus subtillis* hexane extract was found to be active only aganist Bacillus subtillis.

5. Conclusion

The result of the present study very clearly indicate that **Catharanthus roseus** posses potent anti oxidant and anti bacterial properties.

This gives a proper scientific understanding of Catharanthus roseus usage in traditional siddha medicine. however, further studies are required to have a complete contemporary understanding of this traditionally used siddha plant.

List of Abbreviations

DPPH - 1, 1-dipheny 1-2 picryl hydrazyl

IC50 - Inhibitory Concentration

E.C- Escherichia coli

K.P - Klebsiella Pneumoniae

B.S - Bacillus subtillis

C.P - Clostridium Perfringens

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REFERENCES :

1. Indian Medicinal Plants, Vol. II, Pg.No. 31
2. Dictionary of Medicinal Plants, Pg. No. 474
3. Carew DP and Patterson BD (1970) The effect of antibiotics on the growth of catharanthusroseus tissue culture. lloydia. 33, 275 – 277
4. Jaleel CA, Monivannan P and Sankar P (2007) Introduction of drought stress tolerance by ketoconazole in catharanthus roseus is mediated by enhanced antioxidant potential and secondary metabolite accumulation. Colloids surfaces. B. Biointerfaces. 60, 201 – 206
5. Fransworth NR, Svoboda GH and Blomster RN (1968) Antiviral activity of selected catharanthus alkaloids. J. Pharmacol. Sci. 57, 2174 – 2175.
6. Ram VJ and Kumarin S (2001) Natural products of plant origin as anticancer agents. Drug News perspect, 8, 465 – 482.
7. Fischhof PK, Moslinger - Gehmayr R, Herrmann WM, Friedmann A Russmann DL : Therapeutic efficacy of Vincamine in dementia antioxidant Activity of Plant Extracts Containing Phenolic Compounds. journal of Agricultural and Food Chemistry 47: 3954 – 3962(1999).
8. Hindmarch I, Fuchs HH, Erzigkeit H: Efficacy and tolerance of vinpocetine in ambulant patients suffering from mild to moderate organic psychosyndroms. Int Clin Psychopharmacol 19991 6(1) : 31 – 43.
9. Willcox JK, Ash SL and Catignani GL (2004) Antioxidant and prevention of chronic disease. Crit. Rev. Food Sci. Nutrition. 44, 275-295.
10. Eloff JN (1998). A sensitive and quick method to determine the minimal inhibitory concentration of plant extracts for bacteria. PlantaMedica 64: 711-713.
11. Cos P, Vlietinck AJ, Berghe DV, Maes L. Anti-infective potential of natural products: how to develop a stronger in vitro 'proofof- concept'. J Ethnopharmacol 2006; 106:290-302.
12. Harborne, J.B., Phytochemical Methods: A guide to modern techniques of plant analysis 3rd edn. Chapman and Hall, New York, 1998 pp. 1-150.