

Exploring Phytochemical Analysis, Antimicrobial and Anti-Oxidant Potential of *Catharanthus roseus*

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ABSTRACT

In order to combat oxidative stress and antibiotic resistance, caused by antibiotic misuse and overuse, creating a "Silent Pandemic" by 2050. Phytoactive compounds from medicinal plants offer potential alternative to synthetic compounds for treating diseases. *Catharanthus roseus* (Periwinkle or Sadabahar) from family Apocynaceae is rich in phytochemicals, especially alkaloids, with antioxidant and anti-bacterial properties is used for treating chronic diseases like cancer including malaria, dengue fever, and diabetes, etc.

OBJECTIVE

This study aims to investigate the antimicrobial and antioxidant properties of *Catharanthus roseus* (petals) against clinical pathogens. Additionally, a phytochemical analysis of the aqueous extracts will be conducted to assess its medical potential.

METHODOLOGY

Fresh petals of *Catharanthus roseus* were collected, weighed, dried, dehydrated, and stored at LIDIR, FUUAST. 5% Aqueous extracts (decoction and infusion) were prepared. Membrane filtration and direct inoculation are used for susceptibility testing. Antimicrobial activity was tested against five Gram-positive and five Gram-negative pathogenic bacteria and five fungal species by standard agar well diffusion assay using Mueller Hinton agar and Sabouraud dextrose agar (SDA). Standard antibiotics were also tested in order to check the antibiotic resistance in the clinical pathogens. Anti-oxidant activity of both the extracts was tested using 1, 1-diphenyl-2-picrylhydrazyl (DPPH). Phytochemical screening of both extracts were done for terpenoids, flavonoids and glycosides and phenolic compounds in the petals. Moreover, thin layer chromatography (TLC) was performed on extracts of both nature.

Table 1. Shows Zone of Inhibition Produced by Aqueous Extracts of *C. Roseus* Against Different Fungal Isolates.

Name of Isolates	Aspergillus Flavus	Aspergillus Niger	Penicillin spp.	Rhizopus	Fusarium spp.
Infusion	11mm	12mm	21mm	13mm	13mm
Decoction	18mm	20mm	13mm	16mm	11mm

Table 2. Shows Phytochemical screening of aqueous extracts of petals of *C. roseus* [2].

Phytochemicals	Alkaloids	Reducing Sugars	Flavonoids	Anthocyanin	Organic Acids	Benzoic Acid	Amino Acids
Infusion	+	-	+	+	+	-	+
Decoction	+	-	+	+	+	-	+

RESULT

The extracts showed anti-fungal and antioxidant activity. The highest anti-fungal activity of infusion was observed for Penicillin spp. showing a zone of inhibition of 21mm and lowest for *Aspergillus flavus* 11mm. The highest zone of 20mm is observed for decoction by *Aspergillus niger* and lowest by *Fusarium* spp. 11mm. Aqueous extract showed the percentage of inhibition 58.26% ,190.12% while the E50 values in ug/ml were 60.08, 185.12, respectively. The qualitative phytochemical screening showed the presence of alkaloids, amino acids, anthocyanin, organic acids and flavonoids while reducing sugars and benzoic acid were not found.

CONCLUSION

Increase in oxidative stress and progression of the upcoming silent pandemic due to antimicrobial resistance needs to be controlled. Nature has assisted humanity in various domains, particularly in pharmaceuticals and therapeutics. The various phytochemicals derived from the petals of *Catharanthus roseus* have demonstrated a promising antioxidant and antimicrobial efficacy against isolated organisms.

Keywords: Antimicrobial Properties, Aqueous Extracts, Chromatography, Oxidative Stress, Phytobioactive Compounds.