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A comparative phytochemical analysis of *Bougainvillea glabra* and *Catharanthus roseus*

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Abstract
The present study was undertaken to find out the phytochemicals present in *Bougainvillea glabra* leaves extract and comparative study between *Bougainvillea glabra* and *Catharanthus roseus.* Fresh leaves was collected and were processed for preparation of plant extract using specified technique. The plant extract was then subjected for different qualitative chemical test to investigate the chemical profile of *B.glabra* and *Catharanthus roseus* extract. Analysis show the presence of alkaloid, Flavonoids, phenolic compound and tannins in the extract as confirmed by implying different qualitative tests specified for these phytochemicals.

Keywords: Phytochemical analysis, *Catharanthus roseus, Bougainvillea glabra,* antimicrobial activity

Introduction
Phytochemicals are bioactive substance of plants that have been associated in the protection of human health against chronic degenerative diseases [2]. The major group of phytochemicals that may contribute to the total antioxidant capacity (TAC) of plant foods include polyphenols, carotenoids and the traditional antioxidant vitamins such as vitamin C and vitamin E. The vitamins are, however, not the only phytochemicals that can have positive effects on the health of consumers [1, 4]. There are other phytochemicals present in plant foods that may have positive effect on the health of consumer and need further investigation. These phytochemicals may be present in small amounts but may be very important to the health of consumer [1, 4].
"Phyto" is the greekword for plants. There are many "families" of phytochemicals and they help the human body in a variety of ways. Phytochemicals may protect humans from a host disease. Phytochemical are non-nutritive plant chemicals that have protective or disease preventive properties. Plants produce these chemicals to protect it but recent research demonstrates that many phytochemicals can protect human against disease. There are many phytochemicals in fruits and herbs and each works differently.
Bougainvillea is a very common ornamental plant grown almost all over the world in tropical and subtropical gardens. It is grown as a shrub as well as a climber. It belongs to the family Nyctaginaceae which has ten species, but only 3 species are horticultural important. The bougainvillea flower is a true, perfect flower that is surrounded by showy, vibrant brackets the colourful bracts are in fact, not petals but modified leaves, adapted to attract pollinator to colourless and acentless flowers residing on the upper surface. The leaves of *Bougainvillea glabra* are reported to have anti-inflammatory activities anti hyperglycaemic activity, anti insecticidal activity, antihyperglycaemic activity, anti ulcer, antimicrobial activity [5]. And its antiviral protein was characterized. *Bougainvillea glabra* have been used by practitioner of Mandsaurin for varieties of disorders like diarrhoea, reduces acidity, cough and sore throat decoction of dried flowers for the blood vessels and leucorrhoea and decoction of stem in hepatitis. The main part used is leaves. Hence, the present study has been made to investigate the phytochemical screening of *Bougainvillea glabra* and comparative study of *Catharanthus roseus*.
Catharanthus roseus is an important medicinal plant of the which have more than 70 different type of alkaloids and chemotherapeutic agents that are effective in treating different type of cancers-breast cancer, lung cancer, uterine cancer, melanomas, Hodgkin's and non-Hodgkin's lymphoma [3]. It is known as *Catharanthus roseus*, Ammocallis roseus and Lochnera roseus. *Catharanthus roseus* is an Indian herb which grows in the Indian subcontinent [6]. *Catharanthus roseus* are cultivated and has two common names, which is named of their flower colours, Pink: Roseus, White: Alba [7]. Leaves of *Catharanthus roseus* are used for the treatment of some diseases like, Menorrhagia, Rheumatism, Dyspepsia, Indigestion,

Dysmenorrheal, Diabetes, Hypertension, Cancer, Menstrual disorders, Skin diseases, Bleeding diarrhoea has sedative and antiviral properties.

Material and methods

Bougainvillea glabra and *Catharanthus Roseus* leaves along with bract were collected from the college premises and at central bank of India Solapur. The leaves were removed from the stem and weight was taken then the leaves were oven dries and powdered and weights of powder were taken and the powders were stored in sterile container for further use.

Extraction preparation

Then dried powder was taken into soxhlet apparatus for 54 hrs according to successive solvent extract using hydroalcoholic like methanol and water (50:50) solvent. Afterwards, the solvent were removed and the extracts obtained were stored.

Phytochemical studies

Test for steroids

2ml of acetic acid was added in 0.5 ml of ethanolic extract and then 2ml of concentrated sulphuric acid were added. A blue or green colour or a mixture of these two shades was regarded as positive for the presence of steroidal compounds.

Test for Terpenoids

In 5ml of solvent extract, 2ml of chloroform was added and then 3ml of concentrated sulfuric acid was added carefully. A reddish brown coloration of the interface was regarded as positive for the presence of terpenoids.

Test for Tannins

About 0.5 g of leaf powder was weighed into a beaker and 20 ml of distilled water added. The mixture was boiled for five minutes. Two drops of 5% $FeCl_3$ were then added. Production of greenish precipitate indicated the presence of tannins.

Test for Flavonoids

2ml of sodium hydroxide was added in 2ml of solvent extract. Appearance of yellow colour was regarded as the presence of flavonoids.

Test for Alkaloids

A little amount of picric acid solution was added in 2ml of solvent extract. Formation of orange colour showed the presence of alkaloids.

Test for Saponins

About 1ml of solvent extract was introduced into a tube containing 1 ml of distilled water, the mixture was vigorously shaken for 2 min, and formation of froth indicated the presence of saponins.

Test for Phenols

2ml of ferric chloride solution was added in 2ml of solvent extract. Formation of deep bluish green solution indicated the presence of phenols.

Test for Anthraquinones

0.5g of crude powder was added in 10ml of benzene and filtered. Then 0.5ml of ammonia solution was added in the filtrate and shaken well. Violet colour in the layer phase indicated the presence of anthraquinones.

Test for cardiac glycoside

0.5g of extracts was dissolved in 2ml of glacial acetic acid containing 1 drop of ferric chloride. Then 2ml of conc. sulphuric acid was added under layered. Brown ring was formed at interphase indicated the presence of deoxy sugar which is the characteristic of cardiac glycoside.

Test for Phlobatannins

Few drops of 1% hydrochloric acid was added in 1ml of solvent extract and boiled. Red precipitate was formed indicated the presence of phlobatannins.

Test for Cardenolides

2ml of benzene was added to 1ml of solvent extract. Turbid brown colour was observed indicated the presence of cardenolides.

Test for Volatile oils

2ml of extract solution in which 0.1ml of sodium hydroxide and small quantity of dilute HCl was added and shaken well. White precipitate was formed with volatile oils.

Bacterial Cultures and Media

Bacterial isolates of *Bacillus, Klebsilla, Proteus vulgarius, Pseudomonas aeruginosa, Rhizobium* were obtained from the Department of Microbiology, College of Pharmacy, Solapur. All bacteria were grown on nutrient agar (NA) at 37°C. For antibacterial assays, bacteria were inoculated into nutrient broth and incubated overnight at 37°C.

Antibacterial assay

Antibacterial assay of the extracts was carried out by disc diffusion method. Briefly, freshly grown liquid culture of the test pathogens were seeded over the nutrient agar plates with a sterile swab. Sterile filter paper discs of eight mm diameter were soaked with 50mg/ml the extracts and air dried to evaporate the solvent and the discs were applied over the seeded NA plates at equidistance. The plates were incubated at 37°C for 18 to 24 h. After the incubation period, the plates were observed for a clearance zone around the discs which indicates a positive antibacterial activity of the respective extracts. The clearance zones formed around each disc were measured. Each experiment was carried out in triplicates. The mean ± SD of the inhibition zone was taken for evaluating the antibacterial activity of the extracts.

Results and Discussion

In the present study the phytochemicals occurring in the solvent extracts of *Bougainvillea glabra* leaves (methanol and aqueous extracts) were analyzed qualitatively by phytochemical screening. The results revealed the presence of various secondary metabolites of therapeutically importance. The major phytochemicals found were phlobatannins, saponins, flavonoids, terpenoids, cardiac glycosides and alkaloids.

However, all extracts tested showed the absence of sterols, anthraquinones, cardenolides and volatile oils. Ethanol extract yielded maximum phytochemicals (Table1). Alkaloids were present only in methanol extract. Flavonoids were found in chloroform and ethanol extracts. Saponins were present in all the extracts except chloroform. Phlobatannins were present only in ethyl acetate extract. Terpenoids were present in chloroform and water extract. When compared to leaf extracts, the flower extract showed very less number of phytochemicals.

The present work reveals the antimicrobial activities of hydro alcoholic solvent extracts of *Bougainvillea glabra* flower against different bacterial and fungal strains (Tables 2 and 3). Their antimicrobial potency was assessed by the presence or absence of inhibition zones and zone diameters (mm). It was observed that the antimicrobial effect of plant extract varies from one plant to another in different researches carried out in different regions of the world. The present work reveals the antimicrobial activities of different solvent extracts of *Bougainvillea glabra* flower against different bacterial and fungal strains (Tables 2 and 3). Their antimicrobial potency was assessed by the presence or absence of inhibition zones and zone diameters (mm). It was observed that the antimicrobial effect of plant extract varies from one plant to another in different researches carried out in different regions of the world. This may be due to many factors such as, the effect of climate, soil composition, age and vegetation cycle stage, on the quality, quantity and composition of extracted product, different bacterial strains. Moreover, different studies found that the type of solvent has an important role in the process of extracting. Several authors have reported the antimicrobial activity of crude extract of various plants. In the present study, a considerable antimicrobial activity was observed in *B. glabra*. All flower extracts of *B. glabra* inhibited the growth of few of the bacterial strains tested with varied effectiveness. The ethanol extracts have shown relatively greater activity. This may be due to the presence of flavonoids and saponins present in their extracts the antimicrobial activity of flavonoids. The observed antibacterial effects on the isolates are believed to be due to the presence of flavonoids which have been shown to possess antibacterial properties.

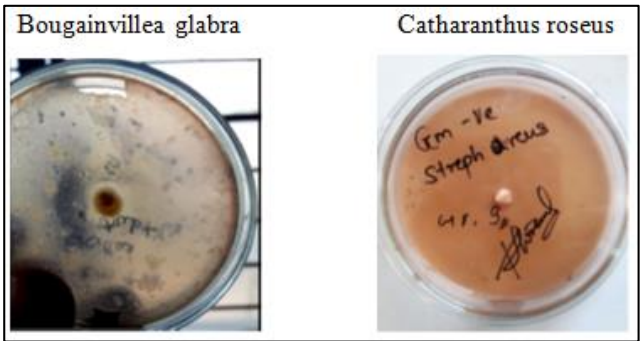
Table 1: Preliminary phytochemical analysis of *Bougainvillea glabra and Catharanthus roseus* leaf extracted with ethanol as solvent

Phytochemicals	***Bougainvillea glabra***	***Catharanthus roseus***
Alkaloids	-	-
Flavonoids	+	+
Saponins	-	-
Phlobatannins	-	-
Terpenoids	-	-
Steroids	+	+
Phenol	-	-
Tannins	+	+
Cardinolides	-	-
Volatile oils	-	-

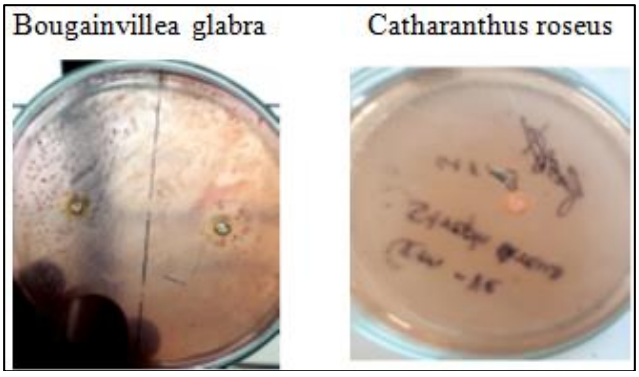
Table 2: Antibacterial activity of leaf extracts of Bougainvillea glabra and Catharanthus roseus 50mg/ ml concentration.

Bacteria	***Bougainvillea glabra***	***Catharanthus roseus***
1. *Staphylococcus aureus*	8mm	R
2. *Bacillus subtilis*	7mm	R
3. *E. coli*	9mm	3mm

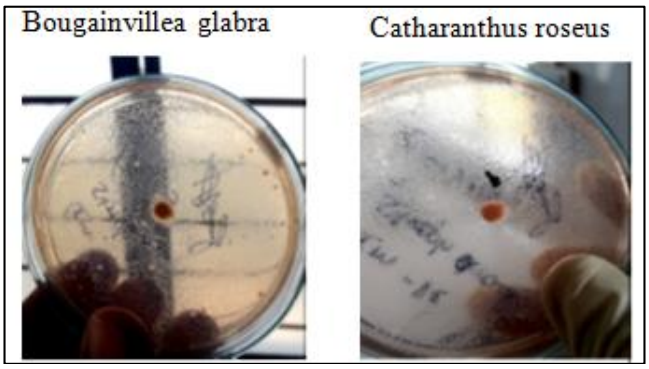
R = Resistance



1. *Stephlococcus aureus*



2. *Bacillus subtilis*



3. *E. coli*

Conclusion

In conclusion, the screening and scientific evaluation of plant extracts against microbes may provide new antimicrobial substances. Also, plant-based antimicrobials have enormous therapeutic potential as they can serve the purpose with lesser side. The selected two medicinal plants are the

Source of the phytochemicals plays a vital role in preventing various diseases. The phytochemical analysis of the medicinal plants is also important and has commercial attention in both research institutes and pharmaceutical companies for new drugs manufacturing. Thus we hope that the important phytochemical properties acknowledged by our study in the local plant of *Catharanthus roseus* and *Bougainvillea glabra* leaves will be helpful in the managing different diseases. So, the need to discover and develop *Catharanthus roseus* and *Bougainvillea glabra* plant is crucial, especially in the view of the rapidly growing need for improvement in the medicine. More so, the Plant, if developed can be of immense use to both pharmaceutical and cosmetic industries, since it contains bioactive compounds. Both the drugs showed the presence of phenolic compounds and flavonoids which encouraged for further study of antioxidant activity of these drugs.

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