RESEARCH ARTICLE

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Effect of *Glomus fasciculatum* on Biochemical Composition of *Catharanthus roseus* L.

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Abstract

Catharanthus roseus was selected for the present investigation because it is the most important medicinal plant in India. It consists of abortifacient effect, acid phosphatase inhibition, acid phosphatase stimulation anti-ascariasis activity, antibacterial activity, antidiuretic activity, antihyperglycemic activity, antihypertensive activity, anti-inflammatory activity, antimitotic activity, antispasmodic anti-viral activity, cardiotonic activity, cytotoxic activity, hyperglycemic activity, hypotensive activity, insect sterility induction activity, leucopenic activity, uterine stimulant effect, as well as, weight loss activity, etc. The purpose of this study was to observe the effect of mycorrhizae, like *Glomus fasciculatum* on *C. roseus* and its different biochemical composition. The leaves of *Catharanthus* showed good antioxidant activity (82.17%) and UV-visible spectra show a growth factor of plant. These observations are suggested that the use of mycorrhiza, like *G. fasciculatum* for the growth of the plant, is useful and also shows a positive effect on the biochemical composition of plant *C. roseus.*

Keywords: Antioxidant, Biochemical changes, *Catharanthus roseus*, *Glomus fasciculatum*.

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Introduction

During the present investigation, the effect of *G. fasciculatum* fungi on the growth of medicinal plants, like *C. roseus* was studied. Medicinal plants, like *C. roseus* L. family Apocynaceae, were selected for the present study because they are common, seasonal, and medicinally most important. It is native and endemic to Madagascar. Periwinkle is cultivated as an ornamental, as well as, medicinal purpose throughout the tropical and subtropical world. Plant flowering occurs throughout the year, upper leaf axils are tubular, 1.5–4 cm long, five-lobed, color may be white, crimson eye, or lavender-pink. It has the main source of drug vincristine.[1,2] The roots of the plants consist of various drugs. They are popular to possess toxic and stomatic properties. This plant has importance as an alkaloid. Roots of *Catharanthus* have ajmalicine. The alkaloids possess hypotensive, sedative, and tranquilizing properties (Jain, 2008).[3]

It consists of abortifacient effect, acid phosphatase inhibition, acid phosphatase stimulation anti-ascariasis activity, antibacterial activity, antidiuretic activity, antihyperglycemic activity, antihypertensive activity, anti-inflammatory activity, antimitotic activity, antispasmodic anti-viral activity, cardiotonic activity, cytotoxic activity, hyperglycemic activity, hypotensive activity, insect sterility induction activity, leucopenic activity, uterine stimulant effect, as well as, weight-loss activity, etc. Due to the number of medicinal properties, *Catharanthus* is selected for pot culture experiment. The purpose of this study was to observe the effect of mycorrhizae, like *G. fasciculatum*, on plants and their different biochemical composition.[4]

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Material and Method

To test the effect of *G. fasciculatum* mycorrhiza on the chemical composition of the medicinal plant, plant extract prepared from the leaves and twigs of respective plants after 40 days of sowing of the seedling. *G. fasciculatum* culture isolated from rhizosphere soil of maize in the laboratory.

Analysis of *Catharanthus* Extract

Sample Plantation and Collection

The purpose of this study was to observe the effect of mycorrhiza on plants and their different biochemical composition. *Catharanthus* sample was planted in the soil

of the botanical garden of New Arts, Commerce and Science College, Parner (Ahmednagar, Maharashtra), in the period of June and July 2018, and grows under observation. Plants grow in soil which contains mycorrhiza (experimental) and another one (control) is grown under normal soil condition.[5]

Sample Preparation

The sample was prepared in the research lab of our college. *Catharanthus* leaves are taken and cleaned by using distilled water and dried using distilled water. Exactly 1-gram of leaves weighed and taken into motor and pestle and prepared paste of it. The paste was transferred into the solvent extraction cell and added 50 mL methanol and extracted twice. Collected extract into 100 mL volumetric flask and make up the final volume to 100 mL with methanol.

Plant Extract

Di phenyl picryl hydrazyl (DPPH) assay was performed according to recommended methods of and interpretation measurement mentioned by Philip Molyneux. Each plant extract sample's stock solution (1 mg/mL) was diluted to a final concentration of 1,000 µg/mL in methanol. Volume was made up to 2 mL with methanol. 2 mL of 0.004% of DPPH was added to the sample solution. These were test samples. 2 mL of methanol was added to the sample solution of different concentrations. These were blank solutions. 2 mL of DPPH solution was added to 2 mL of methanol and used as a negative control. The blank for this solution was methanol. Similarly, ascorbic acid as DPPH is sensitive to light, it was exposed to the minimum possible light.[6-9] These solutions were kept at room temperature in dark for 30 minutes to complete the reaction (Shamim *et al*., 1994). The absorbance was measured at 518 nm and converted into the percentage antioxidant activity using the following equation[10]:

$$\text{Scavenging capacity (\%)} = \frac{(\text{Absorbance of negative control} - \text{Absorbance of test}) \times 100}{\text{Absorbance of negative control}}$$

Results and Discussion

During the result, we have observed UV-visible spectroscopic analysis and antioxidant activity.

UV-Visible Spectroscopic Analysis of *Catharanthus* and its Interpretation

The UV-visible spectra of *Catharanthus* show absorption at 543.6 nm, which shows it contains chlorophyll-a, for experimental extract it contains absorption of 1.252 and that of control sample is 1.018, absorption at 613.3 nm corresponding chlorophyll-b, for experimental extract it contains absorption of 1.617 and that for control sample is 1.135, and absorption at 668.2 nm also corresponding to chlorophyll-a, for experimental extract it contains absorption of 2.760 and that of control sample is 2.515, it clearly shows that impact of mycorrizha on formation of these biochemical substances in the *Catharanthus* plants (Karthikeyan *et al*., 2009)[5,6] (Figure 1).

Antioxidant Activity

DPPH Assay

An antioxidant is a molecule that inhibits the oxidation of other molecules. Oxidation reactions can produce free radicals. In turn, these radicals can start chain reactions that damage cells. Antioxidants terminate these chain reactions by removing free radical intermediates and inhibit other oxidation reactions. They do this by being oxidized themselves. The antioxidant effectiveness of indigenous medicinal plant *Catharanthus* leaves extract, and fraction with a solvent, like methanol, was assessed for DPPH radical scavenging activity. The *Catharanthus* extracts and fractions contained appreciable levels of the antioxidant activities of leaves of *Catharanthus*.[7] The leaves of *Catharanthus* showed good antioxidant activity (82.17%) as compared to control. The result tallies with Akerele *et al*., 1991. Nilima S. Rajurkar (2011)[8] was reported that the phenolic content in the extracts showed a much higher correlation with reducing power than with the radical scavenging activity. It was estimated that the phenolic compounds present in the extracts act as antioxidants directly through the mechanism of the reduction of oxidized intermediate in the chain

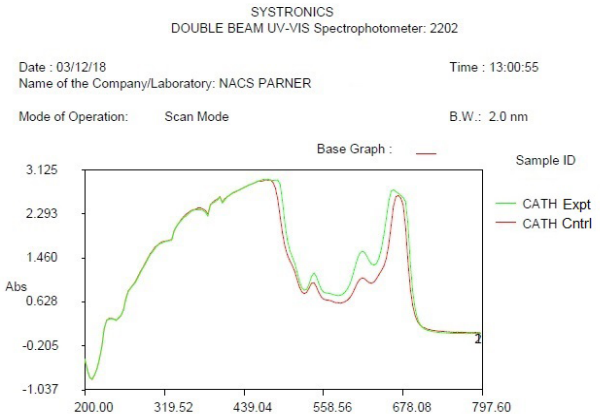

Figure 1: Absorbance

Table 1: Antioxidant activity

	% inhibition at time (min)					
Sample/standard	*5*	*10*	*15*	*20*	*25*	*30*
Catharanthus, experimental	70.83	72.45	74.88	76.9	77.71	82.17
Catharanthus, control sample	62.72	63.94	67.18	67.99	76.09	78.93
Ascorbic acid	74.88	77.71	79.34	80.15	82.29	87.03

reaction of extract. Analysis of the phytochemical contents and antioxidant activities of crude extracts from *Tulbaghia* species observed by Samkeliso *et al*., (2018).[9] Biochemical screening showed flavonoids, terpenoids, glycosides, saponins, and steroids were present in the *Tulbaghia* species. The total phenolic acid and flavonoid contents varied in the different plant extracts (Table 1).[11,12]

Conclusion

The plant extract of *Catharanthus* showed good antioxidant activity (82.17%) and UV-visible spectra show a growth factor of plant. These observations are suggested that the use of *G. fasciculatum* mycorrhiza for the growth of the plant is useful and also impact on biochemical composition of plant *Catharanthus*.

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