

Phytochemical analysis and antimicrobial activity of *Dendrophthoe falcata* (Linn F.) Etting. leaves.

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ABSTRACT

Dendrophthoe falcata (Linn F.) Etting. commonly known as 'Vanda' belongs to family Loranthaceae. This is an evergreen parasitic plant grown on different host plant. This plant species is known to have medicinally important bioactive compounds. Phytochemical analysis is worthy step in detection of phytochemicals. It may add valuable informative data lead to novel drug discovery. Present investigation was carried out to investigate and examine phytochemical constituents and antimicrobial activity of *Dendrophthoe falcata* (Linn. f.) Etting. In this study extracts of leaves was utilized for phytochemical and antimicrobial screening using standard methods. The screening resulted in the detection of tannins, flavonoids, saponins, terpanoids, reducing sugars, anthraquinone and alkaloids. Leaves methanolic extract have been found to have in vitro antimicrobial properties at different concentrations.

Keywords: *Dendrophthoe falcata*, phytochemical analysis, antimicrobial screening

INTRODUCTION

Phytochemicals offers medicinal attributes to the plants frequently referred as secondary metabolites because the plants that manufacture them may have little need for them. Solomon, et al. (2013) stated that these phytochemicals are synthesized in all parts of the plant body; bark, leaves, stem, root, flower, fruits, seeds etc. i.e. any part of the plant body may contain bioactive compounds These chemicals work with nutrients and fibers to form an integrated part of defense system against various diseases and stress conditions (Thilagavathi *et al.*, 2015). Alkaloids, terpenoids, tannins, saponins and phenolic compounds are most important bioactive groups of plants (Edeoga *et al.*, 2005). The species *Dendrophthoe falcata* (Linn F.) Etting. belongs to family Loranthaceae. This genus is rich with different biological active compounds. The present investigation was undertaken to investigate and examine phytochemical

constituents and antimicrobial activity of *Dendrophthoe falcata* (Linn. f.) Etting.

METHODOLOGY

Plant Material: For present phytochemical and antimicrobial activity investigation a plant species *Dendrophthoe falcata* (Linn. F.) Etting. having variety of medicinally important phytochemicals is utilized.

Methodology: To carry out phytochemical and antimicrobial activity investigation following methods were adopted.

i) Extensive exploration: Frequent visit to different forest area of Ballarpur, Chandrapur district. Maharashtra, India were made to find out the *Dendrophthoe falcata* (Linn. f.) Etting. during the month of November 2015 to January 2016.

ii) Collection of plant material: Fresh plant of *Dendrophthoe falcata* (Linn. f.) Etting. growing on *Madhuca indica* was collected for further study. Naturally growing plant species under study was photographed along with host species. For the identification purpose plant species under study was photographed along with certain flowering twigs. Certain photographs of the flowers were also taken to make identification easier. During collection leaves along with stems were collected and brought to the laboratory for further study.

iii) Identification of collected plant species: Identification of collected plant species was carried out by referring different floras, books and relevant journal articles. Leaves of freshly collected plant species were selected for further study.

iv) Processing of Plant Material: Leaves were detached from the stems. Detached leaves were washed thoroughly with tap water to remove dust particles followed by distilled water in the laboratory. These leaves were allowed to shed dry for about two weeks. The dried leaves were grinded and sieved. The powder obtained was stored in zip-lock pouches and tested for the presence of various phytochemicals.

v) Extraction: Powdered plant material was subjected to successive solvent extraction. For the extraction Soxhlet extractor (Harborne, 1973) with methanol for

24 hrs method was adopted. The obtained crude mixture was evaporated and stored in closed container in the refrigerator. The condensed extracts were used for preliminary screening of phytochemical constituents.

vi) Antibacterial Activity: For screening of antimicrobial activity two bacterial cultures *Staphylococcus aureus* and *Escherichia coli* were selected for the present investigation.

a) Preparation of microbial inoculums: The fresh microbial cultures were prepared and used during the research period. The Nutrient Broth (NB) was prepared and poured into several tubes. Then pure microbial cultures were collected from the institute and inoculated in the tubes by using inoculation needles or loops. After these tubes were incubated (37°C for 24-28 hrs for bacteria). After incubation the cultures were used for the experiments.

b) Preparation of nutrient agar medium: 1000ml of Nutrient agar medium is prepared; P^H was adjusted to 6.8. The medium is sterilized by using autoclave at 121 °C for 15 lbs pressure for 15 minutes and allowed to cool.

c) Screening for antibacterial activity (agar well diffusion method): The antibacterial activities of the plants were tested against the selected bacterial cultures. The 20 ml of sterilized Nutrient agar medium was poured into each sterile petriplates and allowed to solidify. The test bacterial cultures were evenly spread over the appropriate media by using a sterile cotton swab. Then a well of 6 mm are made in the medium by using a sterile cork borer, 150 µl of extracts were transferred into separate wells. After these plates were incubated at 37 °C for 24-28 hours. After incubation period, the results were observed and measure the diameter of inhibition zone around each well.

d) Antibiotic sensitivity test on bacteria (positive control): The antibiotic sensitivity test using standard antibiotics (kanamycin, methicillin and ampicillin) were analyzed by the method of Bauer *et al.*, (1966). The sterilized nutrient agar medium was poured into each sterile petriplates and allowed to solidify.

By using a sterile cotton swabs, a fresh bacterial culture with known population count was spread over the plates by following spread plate technique. Then the selected standard antibiotic disc was placed on the

bacterial plates. Then the plates were incubated for 24 hours at 37 °C. After the incubation period, the results were observed and the diameter of the inhibition zone was measured around the isolates.

RESULTS AND DISCUSSION

The extract subjected to phytochemical screening showed positive tests indicating their presence for Tannins, Saponins, Reducing sugars, Alkaloids, Terpenoids, Flavonoids and Anthraquinon. Tests for Cardiac glycosides and Phenols of the extract were negative showing their absence in the extract (Fig. 1 and Table I.)

Antimicrobial activity of *Dendrophthoe falcata* (Linn. f.) Etting. leaves methanolic extract have been found to have *in vitro* antimicrobial properties at different concentrations. It was observed that the extract was active against strains of *S. aureus* (Fig. No. 2 and Table II) and was less active against *E.coli* (Fig. No.3 and Table II). The extract exhibited zone of inhibition against *S. aureus*.

The extract was active against *S. aureus* showing zone of inhibition at different concentration as at 100 mg/ ml 15 mm of zone of inhibition was found while at 50 mg/ml observed zone of inhibition was 13 mm (Fig. No. 2 and Table II).

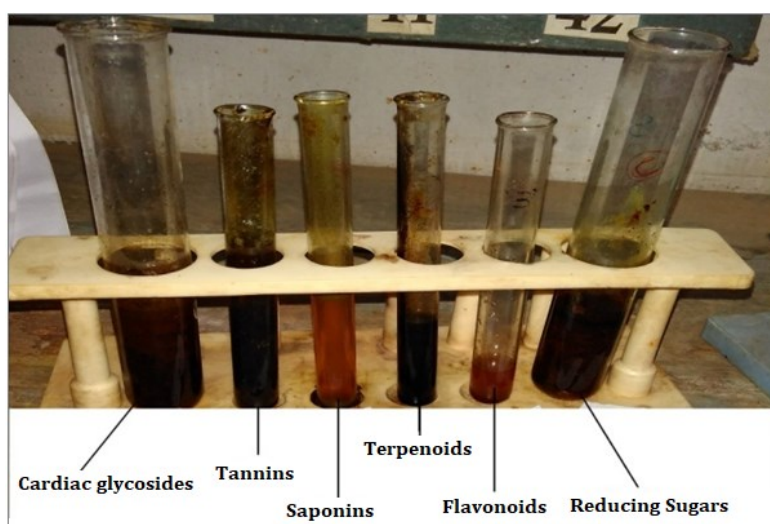


Fig. 1: Test for phytochemical constituents of *Dendrophthoe falcata* (Linn. F) etting. Leaves extracts

Table 1: phytochemical constituents of *Dendrophthoe falcata* (Linn. F) etting. Leaves extracts

Phytochemical	Tests	Inferences*
Tannins	Ferric chloride test	+
Saponins	Foam test	+
Reducing Sugars	Fehling solution test	+
Alkaloids	Mayers reagent test	+
Terpenoids	Chloroform test	+
Flavonoids	Ammonia test	+
Cardiac glycosides	Glacial Acetic acid test	-
Anthraquinone	Conc. Sulfuric acid test	+
Phenols	Ferric chloride test	-

* +(Positive) and - (Negative)

Table 2: Antimicrobial activity at different concentration of leaves extracts

Plant species	Concentration (Mg/ml)	Zone of inhibitions of bacteria (mm)	
		<i>S. aureus</i>	<i>E.coli</i>
<i>Dendrophthoe falcata</i>	100 mg/ml	15 mm	No inhibitions
	50mg/ml	13 mm	No inhibitions

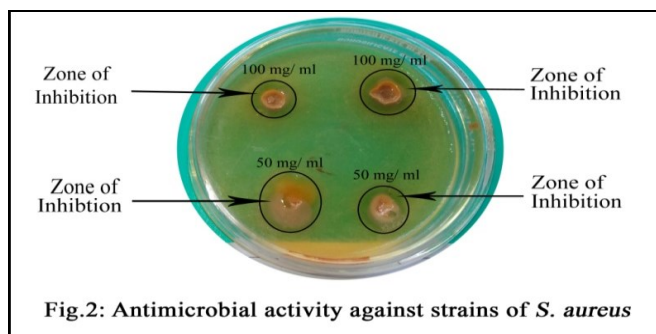


Fig.2: Antimicrobial activity against strains of *S. aureus*

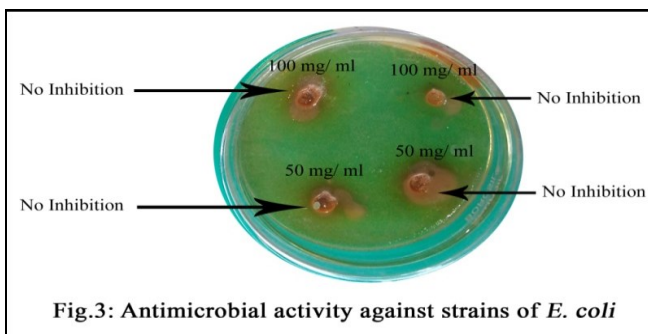


Fig.3: Antimicrobial activity against strains of *E. coli*

The phytochemical analysis and antimicrobial study of *Dendrophthoe falcata* (Linn. f.) Etting. indicates the presence of medicinally important phytochemicals and extract of leaves was active against the microorganisms used. These results are in accordance with the findings of previous researchers.

The phytochemical analysis of *Dendrophthoe falcata* (Linn. f.) Etting. reveals the presence of such important phytochemicals including Tannins, Saponins, Reducing sugars, Alkaloids, Terpenoids, Flavonoids and Anthraquinon. Sinoria et al. (2011) studies *Dendrophthoe falcata* (Linn. f.) Etting. for various aspects and reported the presence of these phytochemicals. Pandey and Dravyaguna (2004) stated medicinal importance of the plant species. They also suggest a drug extracted from this plant species is useful in urinary diseases. Many workers reported the presence of medicinally important phytochemicals in *Dendrophthoe falcata* (Linn. f.) Etting. Some of them mentioned their medicinal properties and uses. The present study reveals the antimicrobial activity against the leaf extract of *Dendrophthoe falcata* (Linn. f.) Etting. The results of this study suggest the extract was active against strains of *S. aureus* while it is less active against *E.coli*. Antimicrobial activity of the plant under study was undertaken by Pattanayak and Sunita (2008). They also found the extract of present plant species is active against microorganisms.

CONCLUSION

The present investigation on phytochemistry and antimicrobial activity of *Dendrophthoe falcata* (Linn. f.) Etting. suggests that the plant has many bioactive compounds. From this investigation and previous literature survey, it may conclude that the plants *Dendrophthoe falcata* (Linn. f.) Etting. is found to be rich

in Phenols, Tannins, Saponins, Flavonoids, Alkaloids etc. and shows the antimicrobial properties hence, plants are useful for the medicinal purpose. Therefore, further studies may be carried out to prove the potential of this plant.

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