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ANTIMICROBIAL AND ANTIOXIDANT POTENCY OF *DENDROPTHOE FALCATA* LINN.

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ABSTRACT: The World Health Organization survey indicated that about 70-80% of the world's populations rely on non-conventional medicine, mainly of herbal sources, in their primary healthcare. Among them parasitic plants are well known, 20 different species are belonging to the genus *Dendroptaoe falcate* (Loranthaceae) found all over the world, seven of which are found in India. The hemiparasite, *Dendroptaoe falcate* (L.f.) is one of the seven species present in India. It is used in the treatment of ulcer, asthma, pulmonary TB, wound healing, menstrual disorder, also used as an aphrodisiac. The water extract of *Dendroptaoe falcate* showed satisfactory antimicrobial activity against gram-positive strains *Staphylococcus aureus*, *Bacillus subtilis* and gram-negative strains *Escherichia coli*; while methanolic extract of *Dendroptaoe falcate* shows satisfactory antioxidant activity.

INTRODUCTION: For most of the developing world, the main issue of public health is still the acute need for basic health care, which is sadly lacking even at the most elementary level. This is true in both the rapidly growing cities and the rural areas. In many developing countries traditional medicine is one of the primary health care systems^{1, 2}. The WHO estimates that more than 80% of the world's population rely either solely or largely on traditional remedies for health care. Plant *Dendroptaoe falcate* (Loranthaceae), seen in **Fig. 1** and **Fig. 2**, is found in tropical regions especially in India, Srilanka, China, Australia, Bangladesh, Malaysia and Myanmar³. *Dendroptaoe falcate* is a large bushy parasitic shrub with grey bark, thick usually opposite leaves, orange-red or scarlet flowers and ovoid-oblong berries⁵.

Chemically, quercitrin (Quercetin - 3 - O - Rhamnoside) is a major constituent in *Dendroptaoe falcate* on different host plants⁶. The three cardiac glycosides are also isolated from the plant, viz. Strosposide, odoroside F and neritaloside are reported from the leaves⁷. Flavonoids found are quercetin, kaempferol, quercitrin, hyposide, and rutin from different parts of plant tannins comprising of gallic and chebulinic acid^{8, 9}. Ethnobotanically, it is used in the treatment of ulcer, asthma, pulmonary TB, menstrual disorder, the contraceptive activity of methanol extract of *Dendroptaoe falcate* stem in male albino rats¹⁰. A decoction of the plant is used by women as an antifertility agent, also have anti-cancer activity¹¹. It is also used as an aphrodisiac, healing of wounds. It also shows anti-inflammatory activity. *In-vitro*, antioxidant activities were also investigated by using *in-vitro* antioxidant model¹².

The alcoholic extract of the plant was found to have antidiuretic activity, and the hepatoprotective activity and the preliminary cytotoxic activity of the plant was tested by the brine shrimp assay¹³. The phytochemical screening of the plant alcoholic

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extract and the antimicrobial activity also tested against the *S. aureus*, *Bacillus subtilis*, *E. coli*, and the recently the plant is found to have antifertility activity in the rats. Members of genus *Dendrothoe*

are reported to have antioxidant, anti-microbial, anticancer and anti-diabetic activity¹⁴. It treats kidney stones¹⁵ also have diuretic and antilithiatic activity¹⁶.



FIG. 1 AND 2: PHOTOGRAPH OF *DENDROTHOE FALCATA*⁴

The Principle of Anti-Microbial Activity: It is well established that several secondary metabolites synthesized by the plants play a central role in plant defense against microbial attack. The plant extracts have been found to possess a wide range of action on different gram +ve and gram -ve microorganisms. The extract selected under the present study was the water extract which showed the inhibition of the microbial colonies on the nutrient medium¹⁷.

The Principle of Antioxidant Activity: Antioxidants play an important role in the removal of free radicals. Free radicals and other oxygen derivatives are constantly generated *in-vivo* both by accident of chemistry and for specific metabolic purposes. The reactivity of different free radicals varies with many causing inflammation or even severe damage to DNA, lipids, proteins. Antioxidants are the substances used in a small amount which prevent or greatly retard oxidation of easily oxidizable material. These have various mechanisms such as suppressing formation of active species by reducing hyper peroxides, by sequestering metal ions scavenging active free radicals, etc.¹⁸

MATERIALS AND METHODS:

Plant Material Collection: The plant material of *Dendrothoe falcata* (Loranthaceae) was collected from the botanical garden of Sigma Institute of Pharmacy, Bakrol; Baroda in November 2009. The plant material was cleaned thoroughly with water

and made free from soil and dust. Then these fresh plant leaves were used for extraction.

Preparation of Extract for Antimicrobial Activity: The fresh leaves (100 g) were cut into small pieces and extracted with 500 ml of water for 6 h. Then the extract was filtered and concentrated to obtain the residue. The residue was collected and weighed. The % yield was found to be 17.34% (w/v).

Antimicrobial Activity: The antimicrobial activity was performed using gram-positive strains *Staphylococcus aureus*, *Bacillus subtilis* and gram-negative strains *Escherichia coli*. The assay was done by agar disk method. The concentrations 200, 400, 800 µg/ml was prepared in 1% DMSO solution. Agar medium was sterilized. The test microorganisms were spread on top of agar medium in the flame sterilized area.

The discs containing dilutions of above-mentioned concentrations of solutions were placed on the agar plates. All the plates were incubated in an incubator at 32 °C - 35 °C for 24 h. A zone reader recorded zone of inhibition after 24 h of incubation¹⁹.

Preparation of Extract for Antioxidant Activity: The fresh leaves (100 g) were cut into small pieces and cold macerated with 100 ml of methanol for 24 h. Then the extract was filtered and evaporated to dryness. The residue was collected and weighed. The % yield was found to be 5.57% (w/v).

Antioxidant Activity: 1 ml of different concentrations of extract (10, 25, 50, 100 µg/ml), were taken. 2.5 ml of phosphate buffer (0.25M) was added to each one of it. 2.5 ml of potassium ferricyanide (1% w/v) was added to each one of it. These solutions were then incubated at 50 °C for 20

min. 2.5 ml of TCA was added and centrifuged at 3000 rpm for 10 min. Then 2.5 ml of the supernatant was taken and 2.5 ml of distilled water and 0.5 ml of ferric chloride solution (0.1% w/v) were added to it. The absorbance was measured at 760 nm^{20,21}.

RESULTS AND DISCUSSION:

TABLE 1: DESCRIBES COMPARISON OF ANTIMICROBIAL ACTIVITY OF AQUEOUS EXTRACT WITH STANDARD SHOWING¹⁹

Solvent	Conc. (µg/ml)	Zone of inhibition (mm)		
		<i>S. aureus</i>	<i>B. subtilis</i>	<i>E. coli</i>
Negative control	10000	1.3	1.1	1.0
Positive control	20	12.1	14	12
Aqueous extract	200	13	10.9	10.5
	400	6.5	6.4	6.0
	800	6.7	6.6	6.2

TABLE 2 AND FIG. 3: SHOWS COMPARISON OF ANTIOXIDANT ACTIVITY OF ALCOHOL EXTRACT WITH STANDARD SHOWING²¹

S. no.	Sample	Conc. (µg/ml)	Absorbance (at 700 nm)
1	Ascorbic acid	10	0.090
		20	0.122
		30	0.141
		40	0.162
		60	0.191
2	Alcohol extract	80	0.224
		10	0.445
		25	0.827
		50	1.420
		100	2.197

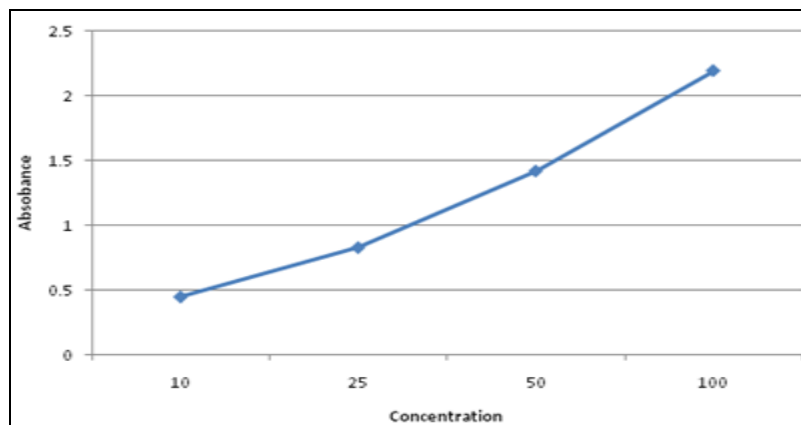


FIG. 3: GRAPHICAL PRESENTATION OF ANTIOXIDANT ACTIVITY

CONCLUSION: Preliminary study concludes that water extract of *Dendrothoe falcata* showed satisfactory antimicrobial activity against gram-positive strains *Staphylococcus aureus*, *Bacillus subtilis* and gram-negative strains *Escherichia coli*; while methanolic extract of *Dendrothoe falcata* shows satisfactory antioxidant activity.

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CONFLICT OF INTEREST: Nil

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