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Antimicrobial and Antifungal activity of leaves of *Euphorbia Thymifolia* – A traditional medicinal plant

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Abstract

The aim of the present study antimicrobial activity of leaf extract of *Euphorbia thymifolia* were tested against the human pathogenic bacterial and fungi such as *Escherichia coli, Staphylococcus aureus, Bacillus pumilis, Bacillus subtilis, Klebsiella pncumoniae,, Pseudomonas aeruginosa,* and *Aspergillus niger, Candida albicans, Fusarium monoliforme* and *Phanerochaete chrysosporium* by disc diffusion method. The results of the present study observed that among the three solvents, the ethanol extract showed broad spectrum of antimicrobial activity against *Escherichia coli, Klebsiella pneumoniae,* and *Aspergillus niger*. The chloroform extract was exhibited significant antimicrobial activity against *Candida albicans* and *Pseudomonas aeruginosa*. The petroleum ether extract was showed moderate antimicrobial activity against *Fusarium monoliforme* and *Bacillus subtilis.*

Key words: *Euphorbia thymifolia,* Antibacterial activity, Antifungal activity.

Introduction

Euphorbia thymifolia is traditionally used as a haemostatic, sedative, stimulant, blood purifier, astringent in diarrhea, anthelminthic and dysentery. It also in cases of chronic cough; as an antiviral in bronchial asthma and paronychia (Gabriella and Ameenah, 2013; Warrier *et al.,* 1995). Root is given in gonorrhea and amenorrhea. The oil is used as a spray to keep off flies and mosquitoes. It is applied with ammonium chloride to cure of dandruff (Warrier *et al.,* 1995; Prasad and Bisht, 2011).The fresh plant is used in ophthalmia and other eye troubles, sores, ardor, atrophy, dysentery and breast pain (Khare, 1991). *Caraka* prescribes *dugdhika* is an ingredient of vegetable soup for diarrhea, painful bleeding piles. According to *Bhavaprakasa*, *dugdhika* is expectorant and cures aggravated cough, skin disease and parasitic infections. It promotes conception, possesses aphrodisiac and age-sustaining properties (Prasad and Bisht, 2011; Sikdar and Dutta, 2008). The plant is used as an anti-pyretic, menstrual disorders, chronic cold, skin diseases, urinary tract infections such as measles, leprosy and other skin eruptions. The crushed plant is rubbed on the head as an irritating rubefacient to promote hair growth in cases of alopecia. The latex is also useful in acne vulgaris and as a tonic in menorrhagia (Warrier *et al.,* 1995; Prasad and Bisht, 2011).

Materials and Methods

The fresh leaves of *Euphorbia thymifolia* collected from Sivanthipatti village of Tirunelveli, Tamilnadu in June 2016. This plant leaves were air- dried and powdered. 20gms of powdered materials of *E. thymifolia* were rolled in a filtered paper and kept in soxhlet apparatus with 200 ml of solvent (Petroleum ether, chloroform and ethanol) for the extract preparation at 12 to 24 hour process. For antibacterial activity studies was carried by Whatman No. 1 filter paper (5 mm diameter) disc diffusion method. The selected pathogenic diluted bacteria (0.5 ml) like *Escherichia coli, Staphylococcus aureus, Bacillus pumilis, Bacillus subtilis, Klebsiella pncumoniae, Pseudomonas aeruginosa* and some fungi like *Candida albicans. Fusarium monoliforme* and *Phanerochaete chrysosporium* species culture was spread on sterile Muller Hinton Agar plates. The dried discs were placed on the sealed plates and gently pressed down to assure contact with the medium. Gentamycin 5 mg/ml was used as positive control and respective solvents which were used to dissolve the crude extracts served as negative control. The plates were incubated at room temperature for 24 hrs. After the incubation period the diameter of the inhibition zone around the discs were measured and recorded. Three replicates for each concentration were maintained.

Results and Discussion

The dried leaf extract of *Euphorbia thymifolia* shown to possess both antibacterial and antifungal activity. The ethanol extract showed a broad spectrum of antimicrobial and antifungal activity against *Escherichia coli* (12.2), *Klebsiella pneumonia* (12.8), and *Aspergillus niger* (12.0). The chloroform extract exhibited significant antimicrobial activity

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against *Candida albicans* (12.0) and *Staphylococcus aureus*(12.0) . The petroleum ether extract showed moderate antimicrobial activity against *Fusarium monoliforme* (11.8) and *Bacillus subtilis* (11.6). Standard (Gentamycin) was produced inhibitory zone active against all the chosen bacteria and fungi (Table-1). A ccording to Badmanaban and Patel (2010) obtained the significant activity against bacterial and fungal strains showed more in ethanol extracts against when compared to that of chloroform leaf extract. Antibacterial and antifungal activity of medicinal plants are being increasingly stated from different parts of the world and the plant extracts showing maximum sites other than those used with antibiotics will be active against drug-resistant microbial pathogens (Ranjani *et al*., 2012). The bacterial strains may be due to the intrinsic tolerance of the bacterial and the nature and combinations of phytocompounds present in the medicinal plant extracts (Suree and Pana, 2005).

Table 1: Antimicrobial and antifungal activity of leaves of *Euphorbia thymifolia*

Microorganisms	**Inhibition Zone in diameter(mm)**			
	Petroleum ether	Chloroform	Ethanol	Gentamycin
Escherichia coli	10.9	11.0	**12.2**	15.0
Staphylococcus aureus	10.8	12.0	11.0	14.3
Bacillus subtilis	11.6	11.1	11.2	16.4
Bacillus pumilis	10.0	11.4	10.9	17.0
Pseudommonas aeruginosa	10.2	11.0	11.0	15.2
Klebsiella pneumonia	10.1	10.5	**12.8**	16.3
Candida albicans	10.8	12.0	11.0	14.8
Aspergillus niger	10.1	10.4	**12.0**	16.7
Fusarium monoliforme	11.8	11.4	11.4	17.1
Phanerochaete chrysosporium	10.1	10.6	11.0	14.5

Values are inhibition zone (mm), and an average of triplicate

Conclusion

The present results concludes that *Euphorbia thymifolia* contains varied pharmacological spectrum. The plant shows many phytochemical constituents which are responsible for the varied pharmacological property. The evaluation needs to be carried out on *E. thymifolia* in order to use their practical clinical applications, which can be used for the welfare of the mankind.

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