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RESEARCH ARTICLE

STUDIES ON THE ANTIBACTERIAL AND ANTIFUNGAL ACTIVITIES OF THE ETHANOLIC EXTRACTS OF *LUFFA CYLINDRICA* (Linn) FRUIT

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ABSTRACT

To investigate the antibacterial and antifungal activities of Ethanolic extract of Luffa cylindrica (Linn). The extract was prepared from fresh fruit of Luffa cylindrica by hot continuous percolation method in Soxhlet apparatus. Ethanolic extract of Luffa cylindrica (Linn) were tested for antibacterial and antifungal efficacy against Gram positive & Gram negative bacteria and Aspergillus fumigates, Aspergillus niger and Candida albicans organism. The Ethanolic extract was found to be the most effective and showed antibacterial and antifungal activity against the entire organism tested. The Zone of Inhibition (mm) at various concentrations of Ethanolic extract of Luffa cylindrica was found to the range 50 mg/ml to 150mg/ml on tested all the test organisms. This study scientifically supports the usage of whole plant as a remedy for various superficial bacterial and fungal infections in traditional medicine.

KEYWORDS : *Luffa cylindrica, antibacterial activity, antifungal activity, hot continuous percolation, Ethanolic extract.*

INTRODUCTION

The search for compounds with antimicrobial activity has gained increasing importance in recent times, due to growing worldwide concern about the alarming increase in the rate of infection by antibiotic-resistance microorganisms. [1]However, there has also been a rising interest in the research for natural products from plants for the discovery of new antimicrobial and antioxidant agents in the last three decades and in recent times.[2], [3], [4], and [5]More so, many of these plants have been known to synthesize active secondary metabolites such as phenolic compound found in essential oils with established potent insecticidal[6] and antimicrobial activities, which indeed has formed the basis for their applications in some pharmaceuticals, alternative medicines and natural therapies.[7], [8], [5] Santo et al, [9] remarked that the World Health Organization has indeed recognized medicinal plants as the best source for obtaining a variety of synthetic drugs. No doubt, some studies have identified and isolated

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the main active ingredients in the plants responsible for this antimicrobial activity [10], [11]. However, the study on medicinal plants will allow for the demonstration of their physiological activity and also catalyze many pharmacological studies that will lead to the development of more toxicity and high sensitivity especially towards the emerging microbial agents. [12]

Luffa cylindrica (linn). Commonly called sponge gourds. Plant belongs to the curcubitaceae family .The fruits, which also have a network of fibres surrounding a large number of flat blackish seeds. It is reported to have origented from India [13]. *Luffa cylindrica* has been reported to posses both medicinal and nutritional properties. Its seeds have been used in the treatment of asthma, sinusitis and fever [14]. It also reported that abortifacient proteins [15] such as luffaculin which posses ribosome-inhibiting properties on the replication of HIV infected lymphocyte and phagocyte cells explain its potential as a therapeutic agent for AIDS [16]. It has been reported that juice extracted from the stem has been used in the treatment of respiratory disorders and the seed has emetic action [17]. As part of our objective investigation of this on the antibacterial and antifungal activities of the ethanolic extracts of *Luffa cylindrica* fruit.

MATERIAL AND METHODS

Plant materials

The fruit of *Luffa cylindrica (linn)*, were collected from kilikulam Tirunelveli District, Tamilnadu, India. Taxanomic identification was made from Botanical Survey of Medical Plants Unit Siddha, Government of India. Palayamkottai. The fruits were dried under shade, segregated, pulverized by a mechanical grinder and passed through a 40 mesh sieve.

Preparation of Extracts

The above powdered materials (500g) were successively extracted with Ethanol for 6 hrs by hot continuous percolation method in Saxhlet apparatus [18]. The fractions were than distilled separately under reduced pressure of yield solid masses. The solid fractions were re-dissolved in Dimethyl Formamide (DMF) and their antimicrobial efficiency was noted.

Micro Organisms Used

The following bacterial strains were obtained from National Chemical Laboratory, Pune, India. Fungai strains were obtained from Raja Muthaiah Medical College & Hospital, Annamalai University, Annamalai Nagar. Staphylococcus aureus, Staphylococcus epidedermis, Micrococcus luteus, Bacilllus subtilis, Bacillus Cereus, Pseusomonas aeruginosa, Escherichia coli, Klebsiella pneumonia.and Aspergillus fumigates, Aspergillus niger, Candida albicans were used as microbial and fungal strains for the Study. Standard drugs used for study were Ciprofloxacin for antibacterial and Ketaconazole for antifungal study.

Evaluation of Antibacterial Activity:

Filter paper disc diffusion method

The test solutions of ethanolic extract was prepared by using sterile dimethyl formamide as solvent. Ciprofloxacin (100mcg/ml) was taken as the standards for antibacterial activity.Antimicrobial activity was tested by using the filter paper disc diffusion method [19], employing 24 hours cultures of the above mentioned organisms. The test hours organism were seeded into sterile nutrient agar medium by uniformly mixing one ml of inoculum with 20 ml sterile melted nutrient agar cooled to 48-50^{0}c in a sterile petridish. The medium was allowed to solidify. The ethanolic extracts of test and standard drugs as well as blank were impregnated in whatmann filter paper disc and placed on solidified medium in the petridish and the petridishes were left undisturbed for two hours at room temperature. The petridishes were then incubated at 37^{0}C for 24 hours and the zone of inhibition was measured.

Zone of Inhibition (mm) determination

The Ethanolic extract exhibited maximum antibacterial activity when compared with standard were further tested

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Table 1: Antibacterial activity of ethanolic extracts of *Luffa Cylindrica (Linn)* against Gram Positive organism

Test Micro organisms	Zone of Inhibition (mm)				
	Ethanol extract (50mg/ml)	**Ethanol extract (100mg/ml)**	**Ethanol extract (150mg/ml)**	**Ciprofloxacin standard (100mcg/ml)**	**Blank DMF**
Staphylococcus aureus	40	47.5	47.5	60	0
Staphylococcus epidedermis	27.5	37.5	47.5	55	0
Micrococcus luteus	57.5	62.5	75	82.5	0
Bacillus cereus	37.5	57.5	62.5	85	0
Bacillus subtilis	52.5	70	75	87.5	0

Table 2: Antibacterial activity of ethanolic extracts of *Luffa Cylindrica (Linn)* against Gram negative organism

Test Micro organisms	Zone of Inhibition (mm)				
	Ethanol extract (50mg/ml)	**Ethanol extract (100mg/ml)**	**Ethanol extract (150mg/ml)**	**Ciprofloxacin standard (100mcg/ml)**	**Blank DMF**
Escherichia coli	40	52.5	62.5	82.5	0
Pseudomonas aeruginosa	35	55	67.56	92.5	0
Klebsilla Pneumoniae	35	55	80	87.5	0

Table 3: Antifungal activity of ethanolic extracts of *Luffa Cylindrica (Linn)*

Test Micro organisms	Zone of Inhibition (mm)			
	Ethanol extract (50mg/ml)	**Ethanol extract (100mg/ml)**	**Ethanol extract (150mg/ml)**	**Ketaconazole standard (100mcg/ml)**
Aspergillus fumigates	45	70	82.5	97.5
Aspergillus niger	55	90	92.5	107.5
Candida albicans	50	77.5	70	137.5

against all the organisms for evaluation of its antibacterial efficiency at different concentration (50 mg/ml, 100 mg/ml, 150 mg/ml) by using the filter paper disc diffusion method. The zone of inhibition was calculated by measuring the minimum dimension of the zone of no bacterial growth around the filter paper disc.

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Evaluation of Antifungal Activity

Filter paper disc diffusion method

Sterile yeast nitrogen base (HI Media) with 2% agar was inoculated by a rotating swab (Soaked in standard inoculam suspension) over the surface of the media. Ethanolic extract impregnated discs were placed on the agar and incubated at 37^0C for 18 hrs. The solvent (DMF) was used as control. The clear zone of inhibition was measured.

Zone of Inhibition (mm) determination

The ethanolic extract exhibited maximum antifungal activity. The anti fungal efficiency tested at different concentrations (50mg/ml, 100mg/ml and 150mg/ml) by using the filter paper disc diffusion method. The zone of inhibition was calculated by measuring the minimum dimension of the zone of no fungal growth around the filter paper disc.

RESULT AND DISCUSSION

The antibacterial activity of the ethanolic extract of fruit of *Luffa cylindrica* (L). Was studied against gram positive & gram negative bacteria organism at various concentrations of ethanolic extract was compared with that of the standard drugs Ciprofloxacin (100mcg/ml). The zone of inhibition obtained with different concentration of the Ethanolic extract and the standard drug for the antibacterial activity are shown in table1 & 2. The result shows that the

ethanolic extract of fruit of *Luffa cylindrica* at 150mg concentration exhibited a significant antibacterial activity. The antifungal activity at various concentrations of ethanolic extract of fruit of *Luffa cylindrica* (L). Was studied against Aspergillus fumigates, Aspargillus niger and Candida albicans fungai strain the Zone of inhibition was compared with that of the standard drugs Ketaconazole(100mcg/ml). The antifungal activities of different concentration of the Ethanolic extract of fruit of *Luffa cylindrica* are shown in table 3. The result shows that the antifungal activity of the *Luffa cylindrica* 150mg/ml concentration exhibited a significant activity when compared to that of standard drug. The active principle of *Luffa cylidrica* are responsible for antimicrobial activity. Hence it can be concluded that the Ethanolic extract of *Luffa cylidrica* possess a significant antimicrobial activities. This also stands as a scientific support for the usage of this plant for treating Fever and in traditional medicine.

CONCLUSION

The results of the above study clearly demonstrated that the ethanolic extract of *Luffa cylindrica* exhibit antibacterial and anti fungal activity which might be helpful in preventing the progress of various diseases and can be used in alternative system of medicine.

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