



## Antimicrobial Activity of Whole Plant of *Luffa cylindrica* (Linn) Against Some Common Pathogenic Micro-organisms

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### ABSTRACT

In this present investigation was to evaluate the antimicrobial activity of pet ether and chloroform extract of whole plant of *Luffa cylindrica* (Linn) by in-vitro method in agar plate against ten bacterial and four fungal species. The extract was prepared from the whole plant of *Luffa cylindrica* (Linn) by hot continuous percolation method in Soxhlet apparatus with various solvents (Pet ether & Chloroform). The minimum inhibitory concentration of the various extract range from 266.66µg/ml to 66.66µg/ml on tested bacteria and fungi. The maximum antibacterial activity of chloroform extract of whole plant of *Luffa cylindrica* (Linn) was found at 200.00µg/ml than that of petroleum ether extract. The significant antifungal activity of chloroform extract was found at 266.66µg/ml than that of petroleum ether extract. The antimicrobial activity was showed at concentration dependent. The results of the above study clearly indicated that the chloroform extract of whole plant of *Luffa cylindrica* (Linn) was found significant antibacterial and antifungal activity which might be helpful in preventing the progress of various diseases and can be used in alternative system of medicine.

**Keywords:** Whole plant of *Luffa cylindrica*, antimicrobial activity, hot continuous percolation.

### INTRODUCTION

The use of higher plants and their preparations to treat infectious diseases is an age-old practice and in the past possibly the only method available. However, the systematic study of higher plants for detecting antimicrobial activity is of comparatively recent origin. [1] 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 [2] and antimicrobial activities, which indeed has formed the basis for their applications in some pharmaceuticals, alternative medicines and natural therapies. [3-4]

*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 originated from India. [5] *Luffa cylindrica* has been reported to possess both medicinal and nutritional properties. Its seeds have been used in the treatment of asthma, sinusitis and fever. [6] It also reported that abortifacient proteins [7] such as luffaculin which possess ribosome-inhibiting properties on the replication of HIV infected lymphocyte and phagocyte cells

explain its potential as a therapeutic agent for AIDS. [8] 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. [9] The aim of the present investigation was to evaluate the antimicrobial activity of various extract of whole plant of *Luffa cylindrica* against some common pathogenic micro-organisms.

### MATERIALS AND METHODS

#### Collection

The whole plant of *Luffa cylindrica* (Linn) was collected from Tirunelveli District, Tamil Nadu, and India. The whole plant were identified, confirmed and authenticated by comparing with an Authentic Specimen by a Botanist Dr. P. Jayaraman, Ph.D., Plant Anatomy Research centre (PARC), West Tambaram, Chennai-45. The whole plant were dried under shade, segregated, pulverized by a mechanical grinder and passed through a 40 mesh sieve.

#### Preparation of Extracts

The above powdered materials were successively extracted with Petroleum ether by hot continuous percolation method in Soxhlet apparatus [10] for 24 h. Then the marc was subjected to chloroform for 24 h. The extract were concentrated by using a rotary evaporator and subjected to freeze drying in a lyophilizer till dry powder was obtained.

#### Micro-organisms used

The following microbial strains were obtained from Institute

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**Table 1: Minimum Inhibitory Concentration of various extracts of whole plant of *Luffa cylindrica* (Linn) for antibacterial activity**

Extracts	Conc (µg/ml)	<i>S. auras</i>	<i>Conc. Neg</i>	<i>Enterococci</i>	<i>E. coli</i>	<i>Klebsiella</i>	<i>Pseudomonas</i>	<i>S. typhi</i>	<i>Serratia</i>	<i>Citro bactor A</i>	<i>S. Paratyphi A.</i>
Petroleum ether extract	66.66	+	+	+	+	+	+	+	+	+	+
	133.33	+	+	+	+	+	-	+	+	+	+
	200.00	+	-	-	+	-	-	-	+	-	+
	266.66	-	-	-	-	-	-	-	-	-	-
Chloroform extract	66.66	+	+	+	+	+	+	+	+	+	+
	133.33	+	+	+	+	+	-	-	-	-	-
	200.00	-	-	-	-	-	-	-	-	-	-
	266.66	-	-	-	-	-	-	-	-	-	-

(+) -- indicates presence of bacterial growth; (-) -- indicates absence of bacterial growth

of Microbiology, Madras Medical College and Chennai-3. *Staphylococcus aureus*, Coagulase Negative *Staphylococcus aureus*, *Escherichia coli*, *Pseudomonas aeruginosa*, *Salmonella typhi*, *Salmonella para typhi A*, *Enterococci*, *Klebsiella*, *Serratia*, *Citrobacter A*, *Klebsiella pneumonia*, *Aspergillus flavus*, *Aspergillus niger*, *Aspergillus fumigates*, *Aspergillus rhyzobus* used to study the antimicrobial activity of various extracts of whole plant of *Luffa cylindrica* (Linn).

**EVALUATION OF ANTIMICROBIAL ACTIVITY**

**Disc diffusion method**

A suspension of the organism was added to sterile nutrient agar medium at 45°C. The mixture was transferred to sterile petridishes and allowed to solidify sterile disc (5 mm) in diameter (made from whatmann filter paper previously sterilized in UV-lamp) was dipped in solution of different concentrations of compounds standards and a blank were placed on the surface of agar plate. Left the plates to stand for 4 h at room temperature as a period of pre-incubation diffusion to minimize the effects of variation in time between the applications of the different solutions. Then the plates were incubated for 37 ± 1°C and observed for antimicrobial activity. The diameter of zone of inhibition was observed and recorded in Table 2.

**Zone of inhibition**

A suitable dilution of a broth culture or a broth suspension of the test bacterium is flooded on the surface of a solid medium (MH agar). The plate is tilted to ensure uniform spreading and the excess broth pipetted off. Inoculations may also be performed by spreading with swabs. After drying the plates 37°C for 30 min antibiotic discs applied with sterile forceps. After overnight incubation, the degree of sensitivity is determined by measuring the zones of inhibition of growth around the discs. [11]

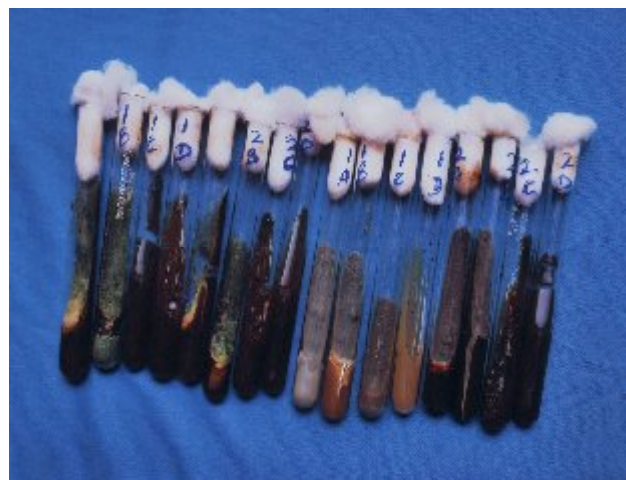
**Minimum Inhibitory Concentration (MIC)**

The plates were prepared using agar and different extracts of various dilutions allowed to solidify and dry. Then plates were then incubated at 37°C for 24 h and the results are recorded. [12]

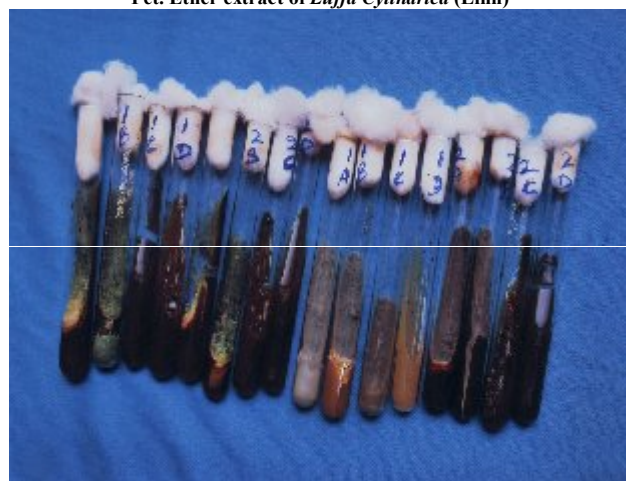
**RESULT AND DISCUSSION**

In present investigation was to evaluate the antimicrobial activity of petroleum ether and chloroform extract of whole plant of *Luffa cylindrica* (Linn) by in-vitro method in agar plate against ten bacterial and four fungal species. The minimum inhibitory concentration of the various extract range from 266.66µg/ml to 66.66µg/ml on tested bacteria and fungi. Table 1 & 2 was depicted the minimum inhibitory concentration and zone of inhibition of various extracts of whole plant of *Luffa cylindrica* (Linn) against the 10 bacterial species. The maximum antibacterial activity of chloroform extract of whole plant of *Luffa cylindrica* (Linn)

was found at 200.00µg/ml than that of petroleum ether extract.



Pet. Ether extract of *Luffa Cylindrica* (Linn)



Chloroform extract of *Luffa Cylindrica* (Linn)

**Fig 1: Antifungal activity of different extracts of *Luffa Cylindrica* (Linn)**

**Table 2: Zone of Inhibition of various extracts of *Luffa cylyndrica* (Linn) for anti-bacterial activity**

S. No	Name of the organisms	Pet ether extract	Chloroform extract	Amikacin (std)
1.	<i>Staphylococcus aureus</i>	15	26	30
2.	<i>Coagulase Negative Staphylococcus aureus</i>	16	20	29
3.	<i>Enterococci</i>	13	17	28
4.	<i>E. coli</i>	20	25	26
5.	<i>Klebsiella</i>	6	19	30
6.	<i>Pseudomonas</i>	20	25	27
7.	<i>Salmonella typhi</i>	18	25	26
8.	<i>Serratia</i>	15	24	27
9.	<i>Citrobacter A</i>	14	24	28
10.	<i>Salmonell paratyphi A</i>	12	18	30

**Table 3: Minimum Inhibitory Concentration of various extracts of whole plant of *Luffa cylindrica* (Linn) for antifungal activity**

Extracts	Conc µg/ml	<i>Aspergillus</i> <i>Flavus</i>	<i>Aspergillus</i> <i>fumigates</i>	<i>Aspergillus</i> <i>niger</i>	<i>Aspergillus</i> <i>rhyzobus</i>
Petroleum	66.66	+	+	+	+
ether	133.33	+	+	+	+
extract	200.00	+	+	+	+
	266.66	-	-	-	-
Chloroform	66.66	+	+	+	+
extract	133.33	+	+	+	+
	200.00	+	+	+	+
	266.66	-	-	-	-

(+) -- indicates presence of fungus growth; (-) -- indicates absence of fungus growth

Table 3 and Fig. 1 was illustrated the antifungal activity of various extracts of whole plant of *Luffa cylindrica* (Linn). The significant antifungal activity of Chloroform extract was found at 266.66µg/ml than that of petroleum ether extract. The antimicrobial activity was showed at concentration dependent. From the analysis of antibacterial & antifungal study, we can confirm the use of these plants as remedies for disease caused by this organism.

The results of the above study clearly indicated that the chloroform extract of whole plant of *Luffa cylindrica* (Linn) was found significant antibacterial and antifungal activity than petroleum ether extract. This also stands as a scientific support for the usage of this plant for treating wounds and as an antiseptic in traditional medicine.

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