

ANTIBACTERIAL ACTIVITY AND PHYTOCHEMICAL ANALYSIS OF SYZYGIUM CUMINI SEED

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ABSTRACT

Syzygium cumini seeds were collected from Javadhu Hills. These were extracted using various solvents based on polarity, which include ethanol, chloroform, petroleum ether, and aqueous. The solvents were subjected to preliminary phytochemical screening. Antibacterial activity had been tested by Syzygium cumini against Bacillus subtilis and Staphylococcus aureus. The results indicate that the zone of inhibition increased when increasing concentrations of the extracts. Among the four extracts of Syzygium cumini seed the chloroform extract exhibited the maximum antibacterial activity against two bacterial strains. This investigation shows the presence of alkaloids, carbohydrates, glycosides, saponins, proteins, flavonoids, and terpenoids.

Keywords: Phytochemical, *Syzygium cumini*, Antimicrobial, Gentamycin.

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I. INTRODUCTION

In traditional medicinal system of India, different parts of the plant were used as medicine. Huge number of herbal products including various metals and minerals has been reported for the care of *Diabetes mellitus* in ancient literature⁽¹⁾. The *Syzygium cumini* is a largest tree. Grown widely in the indegangetic plains and also in the Cauvery Delta of Tamil Nadu⁽²⁾. The Java palm belongs to the family Myrtaceae and botanically identified as *Syzygium cumini*. The Syzygium cumini seeds of have hypoglycemic, anti-inflammatory, antipyretic, hypolipidemic, and antioxidant⁽³⁾. Anti-diabetic or hypoglycemic drugs are orally given in cases of diabetes type 2. Oral administration of alcoholic seed extract has a hypoglycemic effect which also reduces glycosuria⁽³⁾. In the present research we have studied the effect of chloroform extracts of *Syzygium cumini* seed powder antibacterial activity *in vitro*.

II. MATERIAL AND METHODS

The seeds of *Syzygium cumini* (java plum) were collected from Javadhu Hills, Tiruvannamalai, Tamil Nadu, India. The seeds were sun-dried for three weeks to remove the moisture content. Then it is broken into small pieces and ground into a coarse powder. *Syzygium cumini* seed powder (100g) were extracted with ethanol, chloroform, petroleum ether, and aqueous solution separately and preserved in airtight container for further studies. The bacterial cultures were procured from Avigen Biotech Private Limited in Chennai, Tamil Nadu, India, and subcultured.

III. QUALITATIVE PHYTOCHEMICAL SCREENING

The presence of phytochemical screening was done by standard methods are as follows. The Alkaloids were determined by Wanger's tests, Carbohydrate by Fehling's tests, Glycosides by Borntrager's tests, Saponins by Foam test, Protein and amino acid by Whatman test, Amino acid by ninhydrin test, Phenolic by ferric chloride tests, Flavonoid by dilute ammonia test, Terpenoids by H₂SO₄ test, Steroids by acetic anhydride test.

IV. ANTIBACTERIAL SUSCEPTIBILITY TEST:

The well diffusion method on Muller Hinton Agar (MHA) medium was used to screen the antibacterial activity⁽¹⁰⁾. The Nutrient Agar plates were prepared by pouring media into sterile petri plates and bacterial culture inoculated by spread plate technique. Wells of 6mm diameter was bored and extracts were applied to volume of 80 µl, Gentamycin used as positive control for gram (+) and gram (-) bacteria respectively. The plates were incubated at 37°C for 24 hours. The diameter of inhibition zones were measured the results are tabulated.

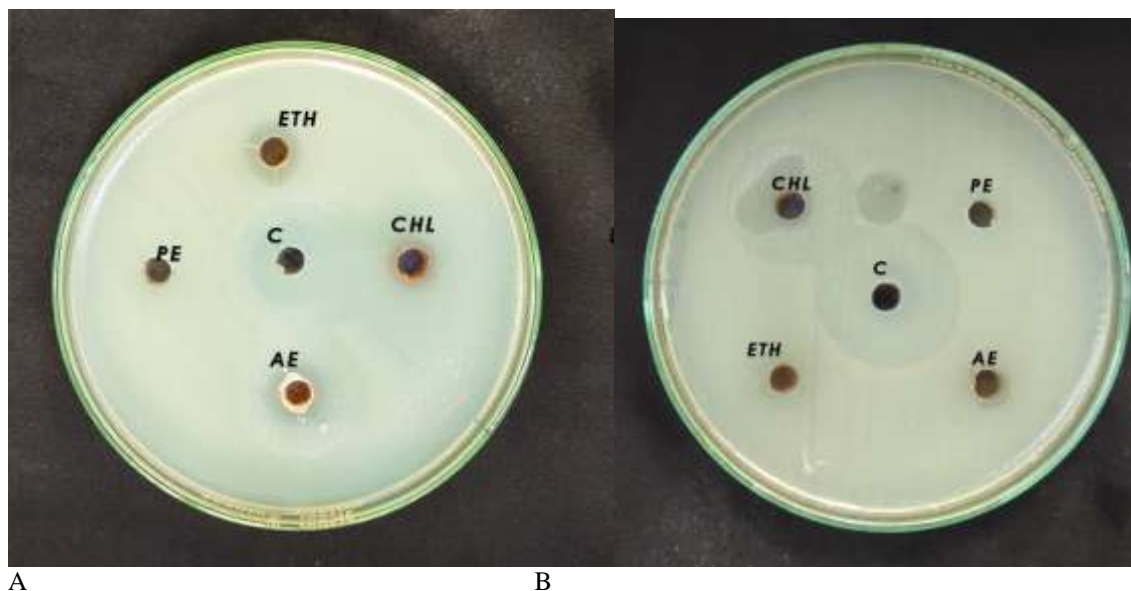


Fig. 1: Antibacterial activity of chloroform extract of *Syzygium cumini* seed powder

A. *Bacillus subtilis*.

B. *Staphylococcus aureus*.

Table 1: Anti-bacterial activity of *syzygium cumini* seed powder

Test organisms	Zone of inhibition in mm				
	Ethanol	Chloroform	P. ether	Aqueous	Control
<i>Bacillus subtilis</i>	Nil	25	11	30	30
<i>Staphylococcus aureus</i>	Nil	26	–	–	27

Table 2: Phytochemical content of *Syzygium cumini* seed powder

S. No	Name of the Compounds	Name of the solvent
		Chloroform
1	Alkaloids	+
2	Carbohydrates	++
3	Glycosides	++
4	Saponins	++
5	Protein and amino acid	+
6	Amino acid	–
7	Phenolic	–
8	Flavonoid	+
9	Terpenoids	+++
10	Steroids	–

+ mild, ++ moderate, +++ strong and – absence

V. RESULTS AND DISCUSSION:

From the well diffusion method, it was observed that the *Syzygium cumini* seed extract exhibited higher antimicrobial activity against all the tested bacteria (Table 1). The highest zone of inhibition against *Staphylococcus aureus* and *Bacillus subtilis* formed in chloroform extract. The aqueous extract showed more inhibition zones against *Bacillus subtilis*. So it has found that chloroform extract have more potent antibacterial activity. The phytochemical analysis of *Syzygium cumini* seed extract (Table 2) using chloroform solvent showed the presence of alkaloids, carbohydrates, flavonoids, terpenoids, glycosides, saponins, steroids, and proteins. These secondary metabolites are reported to have many biological and therapeutic properties.

VI. CONCLUSION

The usage of plants to cure diseases have been widely applied by the herbal practitioners. In this study we concluded that chloroform extracts of *Syzygium cumini* showed potential antimicrobial activity. It can be considered as valuable information for to prepare medicinal natural products to treat Diabetes.

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