International Journal of Research in Engineering and Bioscience ISSN: 2321-743X
Special Issue: National conference on "**Drug discovery, Threatened medicinal plants and strategies for sustainable use**" EDITED BY, S. DOMINIC RAJKUMAR & J. K. LAL
St. Andrew's college, Gorakhpur, U.P., India

IJREB

ISSN 2321-743X
International Journal of Research in
Engineering and Bioscience
Volume 1 (Special Issue 1)
Journal home page: www.ijreb.org

ANTIMICROBIAL ACTIVITY AND PRELIMINARY PHYTOCHEMICAL ANALYSIS OF *SESAMUM LACINATUM.* (Klein) ex willd

Sahaya Sathish .S, R. Palani, P. Vijayakanth, T. Thamizharasi and A. Vimala

Department of Botany, St. Joseph's College (Autonomous), Tiruchirappalli – 620 002, Tamil Nadu, India

ABSTRACT

In this study different solvents like ethanol, methanol, chloroform and aqueous fraction of selected angiosperms plant *Sesamum lacinatum.* (Kelin) ex willd, belongs to the family Pedalliaceae. The disc diffusion methods for different pathogenic bacterias like *Pseudomonas aeruginosa, Salmonella typhi, Vibrio cholerae, Bacillus subtilis* and fungi species *Penicillium notatum, Aspergillus niger, Rhizopus nigricants* were studied with different solvent extracts. The ethanol and acetone stem extracts were studied for preliminary phytochemical analysis. *Bacillus subtilis* showed higher inhibition in stem extract and showed resistance in the leaf extract. Pathogenic fungi *Penicillium notatum* stem extract chloroform highly inhibition, aqueous extract did not show any activity. Chloroform and aqueous leaf extracts activity highly resistant. Preliminary phytochemical analysis was preformed which enabled identify the presence of different secondary metabolites and bioactive compounds.

Keywords: Antimicrobial activity, phytochemical analysis, *Sesamum laciniatum.*

INTRODUCTION

In the present scenario of every green of multiple drug resistance to human pathogenic organism, search for now, safe and effective therapeutically agent from another source including plants are urgently needed. Antimicrobial activity agents from plants are plentiful in many countries, especially in India, where thousands of tribal communities still use medicinal plants today to curse sickness. (Perumalsamy R and lgnacimuthu, S., 2000). In a recent year number of studies has been reported dealing with the antimicrobial screening of extracts of medicinal plants, previously with unknown. Pharmacological activities have been extensively investigated as a source of medicinal agents **(**Krishnaraju *et al.*, 2005).. Later, it was tested the bactericidal activity of anacardic acid and totarol on methicillin resistant strains of S. aureus (MRSA) and the synergistic effect of these compounds associated with methicillin (Muroi *et al.*, 1996). The synthetic antibiotics have the following limitation firstly; these are costly and are out of range from the patient belonging to developing countries. Secondly, with the passage of time microorganism develop resistance against antibiotics. Therefore, after some time these antibiotics are not effective against the microbes (Walsh and Alder. 2005) Phytochemical and antimicrobial activity estimated used in disc diffusion methods briefly investigated.

MATERIALS AND METHODS

Collection of Plants

The plant *Sesamum laciniatum* (Kelin) ex willd oil herbs. In Tamil it is called as ellu, kattu ellu and nallennai. The plants were collected from their natural habitats nearby T.kulathur, Thuraiyoor, Tiruchirappalli district, Tamilnadu. The sample was washed thoroughly in running tap water to remove soil particles and adhered debris and finally washed with sterile distilled water. The leaves and stem were shade dried, ground into fine powder and stored in air tight polythene bags until use.

Microorganism used

Four bacterial species were treated. The bacteria used in this study collected from P.G.P Arts and Science College Namakkal District. The bacteria species Gram positive bacteria: *Bacillus subtitles.* Gram negative bacterias: *Pseudomonas aeruginosa, Salmonella typhi, Vibrio cholerae.* Fungi speciously were collected from Govt. Medical College, Tiruchirappalli, Tamil Nadu. The fungi

include *Penicillium notatum, Aspergillus Niger* and *Rhizopus nigricants.*

Preparation of Extracts

10g of the dried leaf and stem powdered materials were soaked with 150 ml of 80% methanol, ethanol, and chloroform and aqueous for 72 hrs, after that each extract was filtered by whatmann no. 1 paper and the filtrate was concentrated at room temperature in order to reduce the volume and kept in glass bottles in the refrigerator.

Evolution of antimicrobial activity

The stock culture was maintained at 4^0c on the slopes of nutrient agar, and potato dextrose agar. Active culture for experiments were prepared by transferring a loopful of cells from the stock culture to test tubes nutrient broth (NB) for bacteria and potato dextrose broth (POB) for fungi that were that were incubated without agitation for 24h at 37^0 c and 25^0 c respectively.

Antimicrobial screening

The Antimicrobial screening of the organic solvent extracts of leaves and stem of *Sesamum laciniatum* (Kelin) ex willd, was investigated through disc diffusion methods (Maruzella & Henry, 1958).

Phytochemical screening

Chemical test was carried out on the acetone and ethanol extracts for qualitative determination of phytochemical constituent as described by (Brindha., *et al.*, 1981).

RESULTS AND DISCUSSION

The methanol stem extract in *Bacillus Subtilis* (1.1cm) exhibited higher inhibition than the other bacterial species tested. In chloroform stem extract *Pseudomonas aeruginosa* and *Bacillus subtilis* showed higher inhibition but no activity against *Salmonella typhi* (Table: 1). *Indigofera linnaei*. L (Fabaceae) compare the methanolic leaf extract showed more activity against *P.aeruginosa* and minimum activity in *Klebsiella pneumoniae*, (Sahaya Sathish., *et al* 2012).In the methanolic leaf extract showed no antimicrobial activity against *Salmonella typhi* and *Bacillus subtilis* and *Vibrio cholerae*. The chloroform leaf extract showed antimicrobial activity against *Vibrio* sps. (1.0cm). It is evident from the (Table 1). Both gram positive and gram negative bacterial strains were found to be sensitive to the leaf extracts of all the solvents except chloroform at higher concentration (75% & 100 %). (Senthil kumar and Sahaya Satish., 2002). Ethanol and aqueous leaf extract did not any show

antibacterial activity against *Vibrio cholerae* (Table: 2). In determining the antifungal effect methanol stem extract against three fungal species *P. notatum* (1.8cm) exhibited higher inhibition then *A. niger* (1.1cm) and *R. nigricants* (0.3cm), ethanol extract against *P. notatum* (0.7cm), showed higher inhibition then *Aspergillus niger* (1.0cm), in chloroform stem extract *P. notatum* (1.8cm) exhibition then the remaining fungal species such *R. nigricants* (1.6cm) and *A. niger* (1.2cm), aqueous stem extracts did not show any activity against all three *fungal sps* (Table:3. The leaf extract *P. notatum* (2.2cm) exhibited higher inhibition towards the methanolic leaf extract then *R. nigricants* (1.0cm), there is no activity against, *A. niger*, ethanolic leaf extract three fungal species *A. niger* (1.8cm), exhibition then *P. notatum* (0.8cm) and *R. nigricants* (1.2cm), chlorophyll and aqueous leaf extract no showed antifungal activity against all the fungal sps, such as *P. notatum, A. niger, R. nigricants* (Table: 4).

Table 1. Effect *of Sesamum laciniatum*. (Kelin) ex willd. Stem extract on different pathogenic bacteria by disc diffusion method

Test Bacteria	Zone of Inhibition (cm) #				
	Ethanol	Methanol	Chlorophyll	Aqueous	Control*
Bacillus subtilis	0.9±05.	1.1±0.3	0.8±0.4	0.7±0.4	2.1
Pseudomonas aeruginosa	1.0±0.7	0.8±0.5	0.8±0.4	0.8±0.5	2.1
Salmonella typhii	0.9±0.5	0.9±0.5	_	_	1.5
Vibrio cholorae	0.8±0.4	0.8±0.2	1.0±0.6	0.7±0.1	1.9

Mean of triplicates, * Chloramphenicol, ± Standard deviation

Table 2. Effect of *Sesamum laciniatum*. (Kelin) ex willd. Leaf extract on different pathogenic bacteria Disc diffusion method

Test Bacteria	Zone of Inhibition (cm) #				
	Ethanol	Methanol	Chlorophyll	Aqueous	Control*
Bacillus subtilis	-	-	-	-	2.1
Pseudomonas eruginosa	-	1.2±0.1	-	-	2.1
Salmonella typhii	-	-	-	_	1.5
Vibrio cholorae	-	1.0±0.5	-	-	1.9

Mean of triplicates, * Chloramphenicol, ± Standard deviation

Table 3. Effect of *Sesamum laciniatum*. (Kelin) ex willd. Stem Extract on different pathogenic fungi Disc diffusion method

Test fungi	Zone of Inhibition in (cm) #				
	Ethanol	Methanol	Chlorophyll	Aqueous	Control*
Penicillium notatum	1.7±0.3	1.1±0.3	1.4±0.9	-	3.5
Aspergillus niger	1.0±0.5	1.1±0.6	1.2±0.6	-	3.0
Rhizopus nigricants	0.9±0.5	1.3±0.7	1.6±0.7	-	2.1

Mean of triplicates, * Chloramphenicol, ± Standard deviation

Table 4. Effect of *Sesamum laciniatum*. Kelin ex willd. Leaf extract on different pathogenic fungi Disc diffusion method

Test fungi	Zone of Inhibition in (cm) #				
	Ethanol	Methanol	Chlorophyll	Aqueous	Control*
Penicillium notatum	1.8±0.4	2.2±1.2	-	-	2.9
Aspergillus niger	1.8±0.5	-	-	-	2.4
Rhizopus nigricants	1.2±0.8	1.0±1.4	-	-	2.3

Mean of triplicates, * Chloramphenicol, ± Standard deviation.

Phytochemical Analysis

Analysis of ethanolic leaf extract of *Sesamum laciniatum* determined the presence of phytochemicals like steroids, triterpenoids, alkaloids, flavonoids and saponins. Biography of these chemicals that indicate they might be the agents of antimicrobial activity as reported in several of such systems (Parekh J. *et., al* 2005; Vinod *et., al* 2010). Preliminary phytochemical analyses were carried out on the ethanol extract for the qualitative determination, ethanol extracts in *S .laciniatum* is the experimental plant. The Ethanol extract large amount of carbohydrates, secondary metabolites compound by chemical substance like flavonoids, tannins, steroids, phenol. Acetone extract of this plant larger amount of phenol, secondary metabolite compounds present followed by the other chemical substance like glycosides, alkaloids, terpenoids and saponins (Table: 5).

Table 5. Qualitative Test in Plant extract

Chemicals	**Solvents**	
	Acetone	**Ethanol**
Tannins	-	+
Terpenoids	+	-
Steroids	-	+
Phenols	+	+
Glycosides	+	-
Carbohydrates	-	+
Alkaloids	+	-
Flavonoids	-	+
Saponins	+	-

CONCLUSION

The medicinal plant *Sesamum laciniatum*. (Kelin) ex wild, it may be concluded that. The study of antimicrobial activity and preliminary phytochemical studies. And antifungal activity were detected by dice diffusion methods assay by using organic solvents such has ethanol, ethanol, chloroform and aqueous for 4 different bacterial and 3fungal species. While leaf extracts of the plant did not produce any measurable antimicrobial activity. This study has the potency of the crude extract on the tested microorganism which indicates the medicinal value of the plant extract. This plant has certain bioactive principles and medicinal uses. The chemical compounds present this plant form the characteristic nature of its medicinal uses. The plant studies here can be seen as a potential source of useful drugs. The further studies will help to isolate, identify, characteristics and elucidate the structure of the bioactive compounds antimicrobial activities of the disease as claimed by traditional heater are also being investigated.

REFERENCES

Alder JD and Daptomycin, (2005), a new drug class for the treatment of Gram-positive infections. *Drugs Today*, 41:81.

Brindha P, Sasikala B and, Purushothaman KK. (1981), Pharmacological Studies on Merugan kizhangu. *Bulletin of Medico - Ethno - Botanical Research* 3; (1) 84 – 96.

Krishnaraju AV, Rao TVN and Sundararaju D. (2005), Assessment of bioactivity of Indian medicinal plants using Brine shrimp (*Artemiasalina*) lethality assay. *In, J Appl Sci Eng* 2: 125-134.

Muroi, H and Kubo, I. (1996) Antibacterial activity of anacardic acids and totarol,alone and in combination with methicillin, against methicillin-resistant Staphylococcus aureus. *J. Appl. Bacteriol*. 80, 387-394;.

Maruzzella JC, Henry PA (1958): The antimicrobial activity of perfume oils. *Journal of the American Pharmaceutical Association* 28(7): 471.

Perumalsamy, R. and lgnacimuthu S. 2000. Antimicrobial activity of some folkflore medicinal plants used by tribals in Western Ghats *of India Journal of Ethanopharmacology*. 69:63-71.

Parekh J, Jadeja D and Chanda S. (2005), Efficacy of aqueous and methanol extracts of some medicinal plants for potential

antibacterial activity. *Turk J Biol*; 29:203-210.

Sahaya Sathish *et al*., (2012). In vitro antimicrobial activity of *Indigofera linnaei* L. against selected pathogenic bacteria. *In Journal of Basic and Applies Biology*. ISSN: 0973 – 8207. Volume – 5-1281-286, 1995.

Senthil Kumar, S., S. Sahaya Sathish and M. Kamaraj, (2009), Antibacterial activity of *Rauwolfa serpentia. J Microbial World*, 11:244-247.

Walsh FM, and Amyls SGB: (2004), Microbiology and drug resistance mechanisms of fully resistant pathogens. *Curr Opi Micro*, 7:439-444.

Vinod NV, Haridas M and Sadasivan C. (2010), Isolation of 1,4-naphthalenedione, an antibacterial principle from the leaves of *Holoptelea integrifolia* and its activity against β-lactam resistant *Staphylococcus aureus*. *Indian Journal of Biochemistry and Biophysics*; 47:53-55.