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Comparative antimicrobial activity of *Sophora interrupta* and *Clitoria ternatea*

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ABSTRACT

Aim The aim of present study was to evaluate the comparative antimicrobial potentials of *Sophora interrupta* and *Clitoria ternatea*

Methods The anti bacterial activity of Benzene, Ethyl acetate and Chloroform extracts of *Sophora interrupta* and *Clitoria ternatea* was carried out by Disc diffusion technique. The test organism used for evaluation of antibacterial activity is *Bacillus subtilis* and *Eschericia coli*. These cultures were maintained on nutrient agar by sub culturing them on fresh slants after every four weeks.

Results The antimicrobial study of benzene, ethylacetate and chloroform extracts of *Sophora interrupta* and *Clitoria ternatea* revealed that the benzene extract of *Sophora interrupta* shown the antimicrobial activity against *Eschericia coli* and ethyl acetate extract shown activity against *Bacillus subtilis*, respectively where as chloroform extract shown antimicrobial activity against both *Eschericia coli* and *Bacillus subtilis*. The benzene and ethyl acetate extracts of *Clitoria ternatea* does not shown any antimicrobial activity on both species where as chloroform extract of *Clitoria ternatea* shown antimicrobial activity against *Eschericia coli*.

Conclusion On the basis of the result obtained in this present study we conclude that the benzene, ethylacetate and chloroform extracts of *Sophora interrupta* and *Clitoria ternatea*, had significant *in vitro* antimicrobial activity.

Keywords *Sophora interrupta*, *Clitoria ternatea*, *Bacillus subtilis*, *Eschericia coli*, antimicrobial activity.

INTRODUCTION

Disease and death have always held the attention of human mind. Ancient humans ascribed them to divine wrath and other super natural forces [1]. Later, it was known that microorganisms are the causative agents although the majority of microorganisms play beneficial or benign roles some harm humans and have disrupted society over the millennia. Microbial diseases undoubtedly played a major role in historical events such as the decline of the Roman Empire and the conquest of the new world [2]. Agostino Bassi first showed a microorganism could cause disease when he demonstrated in 1835 that a silk worm disease was due to microbial infections. M.J. Berkeley proved that the great potato blight of Ireland was caused by a water mould an in 1853, Heinrich de Bary showed that smut and rust fungi caused cereal crop disease. Due to this harmful effects of microorganisms there put forth the necessity of anti microbial agents. In general, bacteria have the genetic ability to transmit and acquire resistance to drugs, which are utilized as therapeutic agents [3]. The problem of microbial resistance is growing and the outlook for the use of antimicrobial drugs in the future is still uncertain. Therefore, actions must be taken to

reduce this problem, for example, to control the use of antibiotic, and develop research to better understand the genetic mechanisms of resistance and to continue studies to develop new drugs, either synthetic or natural. The ultimate goal is to offer appropriate and efficient antimicrobial drugs to the patient.

To overcome the draw backs of synthetic antimicrobials, many researchers have focused their attention on antimicrobials of plant origin. As they have enormous therapeutic potential. They are effective in the treatment of infectious diseases while simultaneously mitigating many of the side effects that are often associated with the synthetic antimicrobials. Many commercially proven drugs used in modern medicine were initially used in crude form in traditional or folk healing practices or for other purposes that suggested potentially useful biological activity [4]. Plant based antimicrobials represent a vast untapped source [5]. The use of plant extract for medicinal treatment has become popular when people realized that the effective life span of antibiotic is limited and over prescription and misuse of traditional antibiotics are causing microbial resistance. At present, nearly 30% or more of the modern pharmacological drugs are derived directly or

indirectly from plants and their extracts dominate in homeopathy or Ayurvedic medicines.

Hence the recent advance and restrictions on the use of animal antibiotic growth promotes stimulated interest in bioactive secondary metabolites of plant sources as alternative performance enhancers. By considering the vast potentiality of plants as sources for anti microbial drugs, with reference to anti bacterial agents, a systematic investigation was undertaken to screen flora for anti bacterial activity from two species *Sophora interrupta* and *Clitoria ternatea*.

MATERIALS AND METHODS

Collection, Authentication and treatment of plant material

Sophora interrupta

The roots of plant *Sophora interrupta* belonging to the family Fabaceae were collected from surroundings of Tirumala hill, Tirupathi Andhra Pradesh, India in the month of July. The plant material was authenticated by K. Audisehanna, Lecturer in Botany, D.K.W Govt Degree College.

Clitoria ternatea

The roots of plant *Clitoria ternatea* belonging to the family Fabaceae were collected from surroundings of Nellore, Andhra Pradesh, India in the month of July. The plant material was authenticated by K. Audisehanna, Lecturer in Botany, D.K. Govt Degree College, Nellore Dist, A.P, India.

Extraction

The roots of *Sophora interrupta* and *Clitoria ternatea* were collected and shade dried for 5 days. The successive solvent extraction is carried out by Sox let apparatus.

Successive solvent extraction

Extract about 50gms of the air-dried powder plant material successfully with the following solvents in a Sox let extractor, using solvents like Benzene, Ethyl acetate and Chloroform. Each time before extracting with the next solvent, dry the powdered material in air-oven below 50^oc. Finally, macerate the marc with chloroform water for 24 hours to obtain the aqueous extract. Concentrate each extract by distilling off the solvent and then evaporating to dryness on the water-bath. Weigh the extract obtained with each solvent and calculate its percentage in terms of the air-dried weight of the plant material. Also note the consistency of the extract.

Preliminary phytochemical screening

Preliminary phytochemical screening was carried out by using standard procedure. The Benzene, Ethyl acetate, Chloroform extracts tested for the presence of phytoconstituents viz. Flavonoids, Alkaloids, Glycosides, Saponins and Carbohydrates.

Evaluation of anti-bacterial activity

The anti bacterial activity of Benzene, Ethyl acetate, Chloroform extracts of *Sophora interrupta* and *Clitoria ternatea* was carried out by Disc diffusion technique. The test organism used for evaluation of anti-bacterial activity is *Bacillus subtilis* and *Eschericia coli*. These cultures were maintained on nutrient agar by sub culturing them on fresh slants after every four weeks. Temperature for incubation was at 30^oc for 24 hours. The Benzene, Ethyl acetate, Chloroform extracts of *Sophora interrupta* and *Clitoria ternatea* of different concentrations of about 250, 500, 1000, 2000µg/ml was made dissolved in DMSO (Dimethyl sulphoxide). For the present study Ciprofloxacin was taken as standard drug and Control as DMSO. These solutions were sterilized using filtrate sterilization technique (membrane filter # 0.45µ), these dilutions were used to test the anti bacterial activity of two different strains viz., *Bacillus subtilis* and *E.coli*. The minimum inhibitory concentration was determined for the concerned micro organisms.

RESULTS

Preliminary phytochemical screening

Preliminary phytochemical analysis on both the extracts of *S.interrupta* and *C.ternatea* revealed the presence of flavonoids, alkaloids, glycosides, saponins, Proteins, Steroids and carbohydrates. (Table 1 & 2)

Anti-bacterial activity

The antimicrobial study of benzene, ethyl acetate and chloroform extracts of *S.interrupta* and *C.ternatea* revealed that the benzene extract of *S.interrupta* shown the antimicrobial activity against *E.coli* and ethyl acetate extract shown activity against *B.subtilis* respectively where as chloroform extract shown antimicrobial activity against both *E.coli* and *B.subtilis*. The benzene and ethyl acetate extracts of *C. ternatea* does not shown any antimicrobial activity on both species where as chloroform extract of *C.ternatea* shown antimicrobial activity against *E.coli*. (Table 3, 4, 5 & 6)

DISCUSSION

Recently, much attention has been directed toward plant extracts and biologically active compounds isolated from popular plant species. The use of medicinal plants plays a vital role in covering the basic health needs in developing countries and these plants may offer a new source of antibacterial, antifungal and antiviral agents with significant activity against infective microorganisms [6,7].

This implied that the gram-positive bacteria were more susceptible to the extract than the gram-negative bacteria. Possibly because of the presence of outer membrane that serves as an effective barrier in gram-negative species [8,9].

Table 1: Preliminary phytochemical screening for *Sophora interrupta*

SI. No	Test	Extracts		
		Benzene	Ethyl acetate	Chloroform
1	Carbohydrates	–	–	–
2	Amino acid	–	–	–
3	Protein	+	+	–
4	Alkaloids	+	+	+
5	Tannins	–	–	–
6	Steroids	+	–	–
7	Flavonoids	+	+	+
8	Saponins	–	+	–
9	Glycosides	–	+	–

Table 2: Preliminary phytochemical screening for *Clitoria ternatea*

SI. No	Test	Extracts		
		Benzene	Ethyl acetate	Chloroform
1	Carbohydrates	-	-	-
2	Amino acid	-	-	-
3	Protein	+	-	-
4	Alkaloids	+	+	+
5	Tannins	-	-	-
6	Steroids	+	-	-
7	Flavonoids	+	+	+
8	Saponins	-	-	+
9	Glycosides	-	+	-

Table 3: Zone of inhibition of different extracts on *Bacillus subtilis*

SI. No	Strain	Extract	Zone of inhibition (mm)					
			Concentration (µg/ml)					
			Standard	Control	250	500	1000	2000
1.	<i>B.subtilis</i>	Benzene extract of <i>S.interrupta</i>	18	0	0	0	0	0
		Benzene extract of <i>C.ternatea</i>	18	0	0	0	0	0
		Ethyl acetate extract of <i>S.interrupta</i>	18	0	0	1	3	10
		Ethyl acetate extract of <i>C.ternatea</i>	18	0	0	0	0	0
		Chloroform extract of <i>S.interrupta</i>	18	0	0	1	2	11
		Chloroform extract of <i>C.ternatea</i>	18	0	0	0	0	0

Table 4: Zone of inhibition of different extracts on *E.coli*

SI. No	Strain	Extract	Zone of inhibition (mm)					
			Concentration (µg/ml)					
			Standard	Control	250	500	1000	2000
1.	<i>E.coli</i>	Benzene extract of <i>S. interrupta</i>	16	0	0	0	2	8
		Benzene extract of <i>C. ternatea</i>	16	0	0	0	0	0
		Ethyl acetate extract of <i>S. interrupta</i>	16	0	0	0	0	0
		Ethyl acetate extract of <i>C. ternatea</i>	16	0	0	0	0	0
		Chloroform extract of <i>S. interrupta</i>	16	0	0	3	4	13
		Chloroform extract of <i>C. ternatea</i>	16	0	0	2	4	11

Table 5: Antimicrobial activity of different extracts of *Sophora interrupta*

Extract	Bacillus Subtilis	E. coli
Benzene	-ve	+ve
Ethyl acetate	+ve	-ve
Chloroform	+ve	+ve

+ve = Positive; -ve = Negative

Table 6: Antimicrobial activity of different extracts of *Clitoria ternatea*

Extract	Bacillus Subtilis	E. coli
Benzene	-ve	-ve
Ethyl acetate	-ve	-ve
Chloroform	-ve	+ve

+ve=Positive; -ve = Negative

The present study justifies the claimed uses of *S.interrupta* and *C.ternatea* in the traditional system of medicine to treat various infectious diseases caused by the microbes. This study also encourages cultivation of the highly valuable plant in large-scale to increase the economic status of cultivars in the country.

The obtained results may provide a support to use of the plant in traditional medicine. Based on this, further chemical and pharmacological investigations to isolate and identify minor chemical constituents in *S.interrupta* and *C.ternatea* and to screen other potential bioactivities may be recommended.

CONCLUSION

On the basis of the result obtained in this present study we conclude that the benzene, ethyl acetate and chloroform extracts of *S.interrupta* and *C.ternatea*, had significant *in vitro* antimicrobial activity.

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Conflict of Interest

We declare that we have no conflict of interest

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