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ANTIMICROBIAL ACTIVITY OF *ARTEMISIA VULGARIS* LINN. *(*DAMANAKA)

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ABSTRACT
Extracts of *Artemisia vulgaris* Linn *(*Damanaka) (Asteraceae) were screened for their *in vitro* antimicrobial activity agar diffusion method in comparison with standard antibiotics, Gentamycin, Ampicilline, Tetracycline, Ciprofloxin and Ofloxacin. The antimicrobial activity of aqueous, alcoholic, petroleum ether and Benzene extract of leaves of the plant were studied using *Escherichia coli* and *Staphylococcus aureus*, as test organisms. All the extracts were effective against all the two micro organisms. The result reveals that the plant extracts have maximum inhibitory activity against Gram negative and Gram positive organism when compared to standard antibiotics. The petroleum ether and benzene extracts of plant have shown significant activity against *Escherichia coli* and *Staphylococcus aureus*. Similarly the aqueous and alcohol extract of plant has shown good inhibitory activity of Artemisia vulgaris indicating that the plant can fight these organisms effectively.
KEYWORDS: Antibacterial activity, *Artemisia vulgaris* inhibition zones, infection diseases

INTRODUCTION

As the Damanaka (*Artemisia vulgaris* Linn.) (Family, Asteraceae) leaves have been used to treat a wide variety of skin ailments, foul ulcers, wounds, stomachic, antispasmodic. The expressed juice is applied to the head of young children for the prevention of convulsion[6]. The medicinal value of this plant has been highlighted in ancient ayurvedic text "Dravya guna. "The worm infestations, vishaghna, krimighna kandughana, kushatanasaka, sukravardhaka[1-5] etc., activities of various extracts *of Artimisia vulgaries* have been reported. This created an interest to test the possible antimicrobial activity of different parts of this plant. Hence, the present study was designed and carried out.

The leaves of *Artemisia vulgaris* were collected from K.L.E.U Shree B.M.K. Ayurved Mahavidyalaya,Belgaum.

The present work was carried out with the objectives of comparing antimicrobial activity of various extracts and standard antibiotic drugs, plant against some pathogenic bacterial.

The *in vitro* antibacterial studies of the aqueous, alcohol, Petroleum ether, and Benzene extracts of the leaves were carried out by disc agar diffusion method.[11-13]. The extracts were found to be effective against Gram negative (*Escherichia coli*) pathogens when compared to Gram Positive (*Staphylococcus aureuss*) pathogen. The phytoconstituents, present in the extracts may be responsible for the antimicrobial activity. The mechanism is yet to be identified.

MATERIALS AND METHODS

Collection of plant material and extraction

The leaves of *Artemisia vulgaris* were collected from KLEU Shri. B.M.K.Ayurved Mahavidyalaya, Shahapur, Belgaum. The following studies were carried out. The leaves were collected, dried and coarsely powdered. The powder was subjected to extraction using Soxhlet apparatus with alcohol 95%, petroleum ether, benzene and water separately. Four extracts were concentrated into paste consistency. From each extract, test compound of 50 mg was taken, dissolved in 2 ml of Dimethyl sulphoxide (DMSO) and stored in airtight containers.

Micro organisms

The following strains of bacteria were used in the study.

1. *Escherichia coli* (Gram negative)
2. *Staphylococcus aureus* (Gram positive)

Antibacterial activity

The above mentioned bacterial isolates were grown in nutrient agar at 37° C and reactivated for further use in nutrient broth. The different extracts of Artemisia vulgaris and standard drugs were tested for antimicrobial activity against the test organisms using the agar diffusion method (Van. C.J. Kurata H. *et.al*. 1994)[8-13].

Mueller Hinton agar media was prepared and the plates were swabbed for 24 hrs cultures of respective bacteria grown in nutrient broth overnight. Sterile discs of 8 mm diameter were impregnated with 0.5 ml of each extract and Dimethyl sulphoxide separately. Dimethyl sulphoxide was used as negative control and discs of standard drugs as positive control. The plates were then incubated at 37 C for 24hrs.

After the incubation period, each plate was observed for zone of inhibition and measured using transparent scale or slide calipers.

RESULT AND DISCUSSION

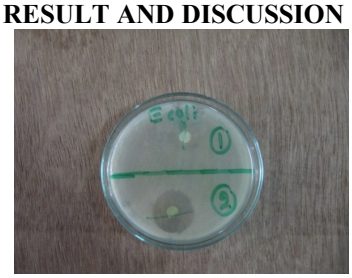

FIG.1

FIG. 2

FIG. 3

Anti Bacterial Screening

Antibacterial Activity of different extracts of *Artemisia vulgaris* against microorganisms

Table 1: Concentration of the drug 0.5/ml

Bacterial Strains	Zone of inhibition in mm				
	DMSO	Aq.E	A.E	P.E	B.E
E. Coli	Nil	15mm	20mm	08mm	08mm
Staphylococcus aureus	Nil	04mm	20mm	Nil	Nil

Aq.E = Aqueous extract
A.E = Alcohol extract
P.E = Petroleum ether extract
B.E =Benzene extract.

Table 2: Antibacterial effects of standard antibiotics were tested on pathogens

	Zone of inhibition in mm				
Bacterial Strains	**Gentamycine**	**Tetracycline**	**Ampicilline**	**Ciprofloxine**	**Ofloxacin**
E. Coli	32mm	35mm	35mm	40mm	42mm
Staphylococcus aureus	32mm	20mm	18mm	40mm	24mm

The results of antimicrobial activities are given in Tables 1 and 2. From Table 1 and Fig. 1, it is very clear that all the extracts have shown antimicrobial activity against all tested organisms. The aqueous and alcohol extracts of plant has shown significant activity, against *Escherichia coli* (18 mm, 20mm) and *Staphylococcus aureus* (10mm, 20mm). The antimicrobial activities of different extracts against test organisms are given below.

Escherichia coli

*A*queous and alcohol extracts showed maximum zone of inhibition 20 mm followed by aqueous extract 18 mm, while petroleum ether and benzene extracts showed less zone of inhibition (8 mm, 8 mm).

Staphylococcus aureus

*A*lcohol extracts showed maximum zone of inhibition (20 mm). While aqueous extract showed (04 mm) same as standard antibiotic (Tetracycline 20 mm). Petroleum ether and benzene extracts zone of inhibition is not seen.

Susceptibility

Susceptibility test of organisms in traditional antibiotics was done using standard antibiotics such as Gentamycin, Tetracycline, Ampicilline, ciprofloxin and ofloxacin. The zone of inhibition of the standard antibiotics against the test organisms was measured and the results are given in table 2 (Fig. 2.).

Escherichia coli

Standard antibiotic ofloxacin showed maximum zone of inhibition (42 mm) followed by ciprofloxin (40 mm) , Tetracycline(35 mm), Ampicilline (35 mm) and Gentamycin (32 mm).

Staphylococcus aureus

Standard antibiotic ciprofloxin showed maximum zone of inhibition (40 mm) followed by gentamycin (32 mm) ofloxacin (24 mm) Tetracycline (20 mm) and Ampicilline (18 mm).

CONCLUSION

It can be concluded from the results that *Artemisia vulgaris* plant leaf extracts possess antimicrobial activity against various test organisms used. Some of the extracts (aqueous and alcohol) were more effective than traditional antibiotics to combat the pathogenic microorganisms studied. This possibly means that the compound responsible for the antimicrobial activity is present in each extract at different concentrations. The chance to find antimicrobial activity was more apparent in alcohol and aqueous extracts than in petroleum ether and benzene extracts. The extracts were found to be effective against Gram negative (*Escherichia coli*) pathogens when compared to Gram positive (*Staphylococcus aureus*) Pathogen. The phytoconstituents present in the extracts may be responsible for the antimicrobial activity. The mechanism is yet to be studied.

The *in vitro* study of antimicrobial activity of *Artemisia vulgaris* on various test organisms may help to discover new class of antibiotic substances that could serve as selective agents for infections, chemotherapy and control. This approach has opened up the possibility of the use of this plant in drug development for human consumption for future use.

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