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RESEARCH ARTICLE

PHYTOCHEMICAL EVALUATION AND ANTIMICROBIAL ACTIVITY OF MERREMIA DISSECTA (JACQ.) HALLIER F. LEAF

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ABSTRACT

The present research based on the phytochemical analysis and antimicrobial activities of *Merremia dissecta* (Jacq.). It is a member of family Convolvulaceae. The shade dried leaves powder was extracted with different solvent such as petroleum ether, benzene, chloroform, acetone and ethanol. The phytochemical evaluation revealed that the leaves contain alkaloid, glycoside, saponins, carbohydrates, tannin and flavonoids.

These plant extract of *Merremia dissecta* were examined using agar disk diffusion method against Gram positive and Gram negative bacteria. Antimicrobial activity tested against one Gram positive (*Bacillus subtilis*) and four Gram negative (*Salmonella typhi*, *Proteus vulgaris*, *Enterobacter aerogenes* and *Proteus mirabilis*) pathogenic bacteria. *B. subtilis* showed highest (17.0 mm) zone of inhibition with ethanol extract of leaf.

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INTRODUCTION

Merremia dissecta (Morning glory) is belongs into family Convolvulaceae. *Merremia dissecta* grows as a perennial herbaceous vine covered with sparse pubescence. The leaves are alternately arranges with 10 cm in length. The leaf blade is palmate; margins are sinuate to dentate with an acuminate apex. The actinomorphic flowers are solitary or occasionally in cymes; peduncles as long as the petioles; bracts deciduous. Calyx has 5 sepals which are not fused. Corolla tubular-campanulate has 5 fused petals that are white with a red centre. There are 5 stamens fused to the throat of the corolla tube. The ovary is superior with 2 locules and numerous seeds. The fruit is a subglobose, glabrous capsule at maturity. Subtending the fruit are the sepals that become dry and woody.

Dates back in many centuries, traditionally many herbal extracts are used to cure a variety of diseases (Singh *et al*., 2010). The most important of these bioactive constituents of plants are alkaloids, tannins, flavonoids and phenolic compounds (Hill, 1995). *Merremia dissecta* is used in condiments, medicines and as ornamentals (Austin, 2007). Beside *Merremia dissecta* several members of Convolvulaceae are reported to be cyanogenic (Nahrstedt *et al*., 1990). It will grow in sunny or partially shady locations (Huxley *et al*., 1992). Leaves essence extracted from *Merremia dissecta* leaves was used for food flavor. The leaves used as tea for relieving cold flu (Shahin *et al*., 2014).

MATERIAL AND METHODS

Collection of plant materials

Fresh leaves of *Merremia dissecta* were collected from different localities of Chikhli tehsil of Dist Buldhana. The identification of plant species were confirmed using standard literature. The leaves were washed with tap water to remove any dust and then shade dried. The dried leaves material was grind into fine powder with the help of grinder mixture. The leaves powder was stored in the air tight container for further use.

Extraction of Plant Drugs

The powdered plant material was subjected to extraction in a Soxhlet apparatus. The powdered plant material was successively extracted with petroleum ether, chloroform, benzene, acetone and ethanol as a solvent.

Phytochemical Evaluation

(Evans, 2005; Khandelwal, 2006; Kokate, 1986)

In preliminary phytochemical evaluation, leaves powder extract of *Merremia dissecta* was subjected to various qualitative chemical tests to determine the presence of various phytoconstituents. The qualitative test for alkaloids, glycosides, tannins, phytosterols, proteins, flavonoids, saponins and carbohydrates were taken.

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Target organisms

Bacterial cultures of *Salmonella typhi, Proteus vulgaris, Bacillus subtilis, Enterobacter aerogenes and Proteus mirabilis* were obtained from Department of Botany and Microbiology, Government Institute of Science, Aurangabad.

Antibacterial Screening

Antibacterial activity was tested by nutrient agar disk diffusion method (Bauer, 1966). Bacterial inoculums were prepared by inoculating a loopful of target bacteria (24 h old culture) in 5 ml nutrient broth and incubated at 27±2^{o}C for 5-8 h until the moderate turbidity was developed. Testing of antibacterial activity was done in vitro in 9 cm petri plates with 20 ml nutrient agar media was allowed to solidify. Surface of the nutrient agar was inoculated with bacterial culture using sterile cotton swab in three directions. The surface was allowed to dry for 10 min. Sterile filter paper discs (6mm in diameter) 50µl of each extracts; air dried to eliminate residual solvent and were placed on the surface of the inoculated plates using sterilized forceps. The discs impregnated with the mother solvents of each extracts served as the control and were placed on the same plate. All the plates were incubated at 37^{o}C for 24 h. Each experiment was carried out in triplicate and the mean diameter of the inhibition zones was recorded the inhibition zones was recorded.

RESULT AND DISCUSSION

The phytochemical evaluation of extracts revealed the presence of alkaloid, glycoside, phytosterols, saponins, flavonoids, tannin and carbohydrates. The result was showed in table no. 1. The most important bioactive chemical constituents like alkaloids, tannin, flavonoids and saponins were present in a leaf extracts. The phytoconstituents like alkaloids, glycosides, flavonoids and saponins are bioactive principles of plants. These bioactive principles are actually the defensive mechanism of the plants against different pathogens (Hafiza, 2000).These phyto-constituents were active chemicals against different microbes and fungi, so drug having higher ethnomedicinal value.

chloroform and ethanol extract of *Merremia dissecta* leaf extract. The result was showed in table no. 2. *S. typhi* gave 8.1 mm, 7.3 mm, 8.1 mm, 8.3 mm and 10.2 mm zone of inhibition in petroleum ether, benzene, chloroform, acetone and ethanol respectively. In petroleum ether, benzene, chloroform, acetone and ethanol showed zone of inhibition 10.3, 9.2, 10.3 mm, 12.1 mm, 13.4 mm against *P. vulgaris*. *B. subtilis* showed zone of inhibition, 11.2 mm in petroleum ether, 13.4 mm in benzene, 14.3 mm in chloroform, 16.3 mm in acetone and 17.3 mm in ethanol extract. Zone of inhibition was 9.2 mm, 8.3 mm, 10.3 mm, 7.1 mm and 12.3 mm in petroleum ether, benzene, chloroform, acetone, ethanol extract respectively against *E. aerogenes*. *P. mirabilis* showed 10.2 mm, 8.2 mm, 11.2 mm, 12.1 mm, 14.3 mm zone of inhibition in petroleum ether, benzene, chloroform, acetone and ethanol respectively.

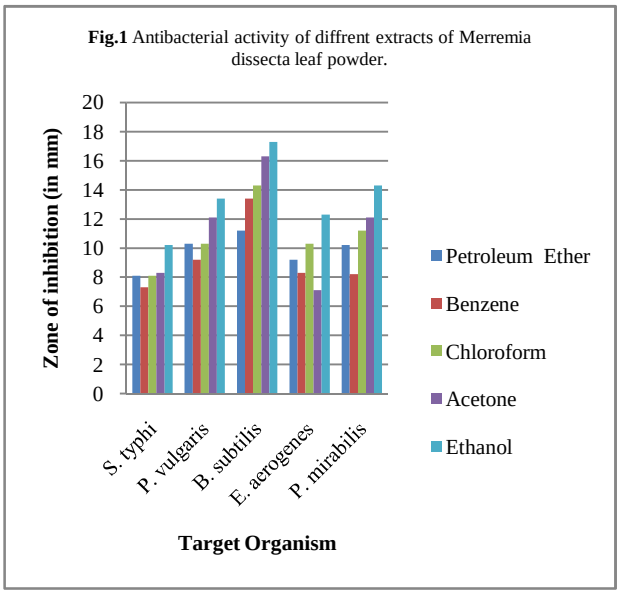

Fig.1 Antibacterial activity of diffrent extracts of Merremia dissecta leaf powder.

Ethanol extract gave highest zone of inhibition (17 mm) on *B. subtilis*. All the five extract gave better result against *B. subtilis*. Ethanol extract showed highest zone of inhibition against all the pathogens. The Gram negative bacteria were

Table no 1 Phytochemical evaluation of *Merremia dissecta* leaf powder

Test	Reagents	Solvents				
		Petroleum Ether	Benzene	Chloroform	Acetone	Ethanol
Alkaloid	Dragandorff's	+++	++-	+++	++-	+++
	Mayer's	+++	+--	+++	++-	+--
	Hager's	+--	+--	++-	+--	+--
	Wagner's	++-	+--	++-	++-	+--
Glycosides	Bornstrager's	++-	++-	++-	++-	+--
Phytosterol	Liebermann, Burchards	+--	+--	+--	+--	++-
Saponin	Foam Test	+++	+--	++-	++-	++-
Tannin	Ferric Chloride	+++	+--	++-	++-	+++
Flavonoids	Lead acetate	+--	+--	+--	++-	++-
Carbohydrates	Fehling's	++-	+--	+++	++-	+++

(--- = Absent, +--= low concentration, ++- = medium concentration, + + + = high concentration).

Table No 2 Antimicrobial activity of *Merremia dissecta* leaf powder extract

Extracts	Zone of inhibition (mm)				
	S. typhi	*P. vulgaris*	*B. subtilis*	*E. aerogenes*	*P. mirabilis*
Petroleum Ether	8 ± 0.1	10 ± 0.3	11 ± 0.2	9 ± 0.2	10 ± 0.2
Benzene	7 ± 0.3	9 ± 0.2	13 ± 0.4	8 ± 0.3	8 ± 0.2
Chloroform	8 ± 0.1	10 ± 0.3	14 ± 0.3	10 ± 0.3	11 ± 0.2
Acetone	8 ± 0.3	12 ± 0.1	16 ± 0.3	7 ± 0.1	12 ± 0.1
Ethanol	10 ± 0.2	13 ± 0.4	17 ± 0.3	12 ± 0.3	14 ± 0.3

All the bacterial pathogens used in antibacterial analysis demonstrated susceptible to the petroleum ether, benzene, more resistant than Gram positive bacteria (Tomas- Barberan *et al.*, 1988). In antimicrobial test, *B. subtilis* is one of Gram

positive bacteria highly susceptible to plant extracts. Unlike Gram positive bacteria, the lipopolysaccharide layer along with protein and phospholipids are the major components in the outer surface of Gram negative bacteria (Burn, 1988). Due to presence of these additional layers explain the resistance of Gram negative bacteria than Gram positive bacteria to the lytic action of most extracts (Panda *et al*., 2009). In the present investigation, we have found that the biologically active constituents were present in the all the extract of *Merremia dissecta* leaves powder. The antibacterial properties of these extracts may be due to the presence of bioactive constituents present in crude plant drugs.

CONCLUSION

The present investigation revealed that *Merremia dissecta* leaf extract has antibacterial activity against one Gram positive and four Gram negative bacterial pathogens. Phytochemical and antibacterial activity of *Merremia dissecta* extract showed that it is mainly due to the presence of phytochemical compounds such like alkaloid, glycoside, tannin, saponin and flavonoids. Thus this plant could be utilized as an alternative source of useful antimicrobial drugs.

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