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ANTIMICROBIAL ACTIVITY OF ETHANOL EXTRACT OF TURNERA APHRODISIACA WARD (FAMILY TURNERACEAE)

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ABSTRACT

Turnera aphrodisiaca Ward (family Turneraceae) is a well known medicinal plant. The volatile oil of T.aphrodisiaca has antibacterial activity. The ethanol extract of the plant were tested for their in vitro antimicrobial activity by cup plate method. The test organisms were *Staphylococcus aureus, Micrococcus luteus, Bacillus subtilis, Escherichia coli, Pseudomonas aeruginosa and Candida albicans.* The zone of inhibition and Minimum Inhibitory Concentration (MIC) of the ethanol extract was determined and compared with the standard drugs ciprofloxacin and fluconazole. The ethanol extract was found antimicrobial activity.

KEYWORDS: Turnera aphrodisiaca Ward, Antibacterial Activity, inimum inhibitory Concentration.

INTRODUCTION


Turnera aphrodisiaca ward (synonym T. diffusa Wild, Family Turneraceae) is commonly known as ‘Damiana’. The leaves of Turnera aphrodisiaca have been used traditionally as a stimulant, aphrodisiac, tonic, diuretic, nerve tonic, laxative, in kidney, menstrual and pregnancy disorders (Hocking & Thomas 1955).[1] The Biritish Herbal Pharmacopoeia (1983)

lists specific indications for Damiana as anxiety neurosis associated with impotency and includes other indications as depression, nervous dyspepsia, atonic constipation and coital inadequacy. Damiana has achieved some repute in the treatment of sexual impotence where it is used in conjunction with strychinine, phosphorus or some other stimulant (Osol et al., 1947).[2] The leaf infusion of damiana has been used in the diseases related to the gastrointestinal and respiratory system (Caceres 1996)[3], reproductive organs (Saggese 1959)[4] and for the treatment of gonorrhea (Koch 1936).[5] Mother tincture of damiana is an important homoeopathic medicine for the treatment of sexual debility and nervous prostration (Boericke, 1988).[6] T. aphordisiac has been reported to contain cyanogenic glycoside tetraphyllin B (Spencer & Seigler 1981)[7], flavonoid gonzalitosin I & alpha sitosterol (Dominguez and Hinojosa 1976)[8], volatile oil containing alpha pinene, p-cymene and 1,8-cineole & arbutin (Autherhoff & Hackle 1968)[9], Damianin (Steinmetz 1960)[10], tricosan-2-one, hexacosanol (Fryer 1965).[11] Aqueous extract of T. aphordisiac whole plant has been reported to exibit significant hypoglycaeminc activity in alloxan diabetic male mice (Perez et al., 1984).[12]

Preparation of Extracts: The plant material was coarsely powdered and extracted sequentially with ethanol (95%) using Soxhelet apparatus. The Extract was filtered and allowed to evaporate to dryness. Each Extract was transferred into clean and dried airtight vials until ready for use.

Microorganisms: The test organisms were *Staphylococcus aureus, Micrococcus luteus, Bacillus subtilis, Escherichia coli, Pseudomonas aeruginosa and Candida albicans.* The microorganisms were available from IVRI, Bareilly U.P.

Table 1: Antimicrobial activity (Zone of inhibition) of Ethanol Extract of Turnera aphrodisiaca Ward.

Extracts/ Standards	**Etahnol**				**Ciprofloxacin**	**Fluconazole**
Conc.(mg/ml)	10	20	40	50	5	5
Microorganisms	**Zone of inhibition (mm)**					
S. aureus	1	2	3	6	24	NA
B. subtilis	-	2	4	5	30	NA
M. luteus	1	2	5	7	16	NA
P. aeruginosa	3	5	8	10	23	NA
E. coli	2	3	4	5	20	NA
C. albicans	-	-	-	-	NA	14

***S. aureus* = *Staphylococcus aureus*, *B. subtilis* = *Bacillus subtilis*, *M. luteus* = *Micrococcus luteus*, *P. aeruginosa*= *Pseudomonas aeruginosa*, *E. coli* = *Escherichia coli*, *C. albicans* = *Candida albicans*, NA = Not Applicable.**

The organisms were sub cultured onto nutrient agar in order to determine their viability. The identity of each test organism was confirmed using standard cultural, morphological and biochemical techniques. Stock cultures were maintained on nutrient agar slants at 4^0C and then subcultures in nutrient broth at 37^0C prior to each antimicrobial test.

Evaluation of antimicrobial activity

I. Culture media: Nutrient agar (NA) (Himedia) containing bromocresol purple was used for the activation of *Bacillus* glucose agar (Himedia) was used for the activation of the fungi. Nutrient broth was used for MIC determination.

II. Chemicals for antimicrobial assay: Ciprofloxacin and Fluconazole (Central Drug House (P). LTD., New Delhi 110002., India) were used as positive reference standards (RA) for all bacteria and fungi strains respectively. The dimethylsulfoxide (DMSO) (Qualigenis) was used as solvent for the tested samples.

Minimum Inhibitor Concentration

It was determined by Tube dilution method (Turbidity Method)[13,14] 0.1 ml sterilized media was poured in the sterile test tubes. The stock solution of the ethanol extract having concentration of 50µg/ml was used. The extract was serially diluted to give a concentration of 25, 12.5, 6.25, 3.12 and 1.56 µg/ml. In all the test tubes 0.1 ml of suspension of bacteria in saline was added and incubated at 37°C/24 hr (Plates containing bacterial cultures), 25°C/3days (for plates containing *Candida albicans* culture). Post-incubation the plate was observed for turbidity.

Table 2: Minimum inhibitory concentration of ethanol extract of *Turnera aphrodisiac* Ward.

Microorganisms	Ethanol (µg/ml)	Ciprofloxacin (µg/ml)	Fluconazole (µg/ml)
S. aureus	13.5	0.75	-
B. subtilis	13.5	0.625	-
M. luteus	7.25	0.525	-
P. aeruginosa	7.25	0.625	-
E. coli	4.10	0.312	-
C. albicans	11.5	-	0.315

RESULTS AND DISCUSSION

Table 1 shows the results of antimicrobial activity against the tested microorganisms. The ethanol extract showed varying degrees of inhibition against all the bacterial stains. It is found to be more active against Pseudomonas *aeruginosa* as compared in comparison with the other tested bacteria. The Minimum Inhibitory Concentration (MIC) values of the extract against tested micro organism were shown in Table 2. It showed that MIC for *Pseudomonas aeruginosa* is found to be less followed by *Micrococcus luteus* and *Escherichia coli* as compared with other tested microorganisms.

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