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Antibacterial activity of *Jasminum grandiflorum* Linn leaves

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ABSTRACT

Extracts of *Jasminum grandiflorum* Linn (Oleaceae) were screened for their *in vitro* antibacterial activity by agar diffusion method in comparison with standard antibiotic penicillin. The antibacterial activity of petroleum ether, chloroform, acetone, methanol and aqueous extract of leaves of the plant were studied using *Staphylococcus aureus, Bacillus subtilis, Escherichia coli* and *Pseudomonas aeruginosa* as test organism. Out of all extracts tested, petroleum ether, methanol and aqueous extracts were effective against all the four microorganisms. Chloroform extract was only effective against *Bacillus subtilis* and *Pseudomonas aeruginosa*. Acetone extract was most effective against *Pseudomonas aeruginosa* and *Escherichia coli*.

Keywords: *Jasminum grandiflorum* Linn, *Staphylococcus aureus, Bacillus subtilis, Escherichia coli, Pseudomonas aeruginosa, in vitro* antibacterial activity.

INTRODUCTION

Plants are source of many valuable secondary metabolites which serves as plant defense mechanisms against predator such as micro organism, insects and herbivores which have been proved to be a potential antimicrobial compounds [Marjorie, 1999]. There is a tremendous increase in search of antimicrobial plant extracts due to the fact that the resistance offered against antibiotic by the microorganism, in short the effective life span of any antibiotic is limited. One such plant which has number of traditional uses is *Jasminum grandiflorum.*

Jasminum grandiflorum Linn var *officinale* (Oleaceae), which is well known as Chameli,is a plant with fragrant flower, large scrambling sub erect twining evergreen shrub cultivated both in the plains and on the hills especially in Kashmir, Afghanistan, Persia, France, Italy, China, Japan, India, Morocco and Egypt [Wealth of India, 2004; Frank et al., 1999].In the Traditional System of Medicine, the leaves are useful in odontalgia, fixing loose teeth, ulcerative stomatitis, leprosy, skin diseases, ottorrhoea, otalgia, strangury, dysmenorrhoea, ulcers, wounds, ring worm and corns [Kulkarni et al.,2004;Sharma et al.,2005]. The phytoconstituents isolated so far from the leaves are Sambacein I-III [Brinda et al., 1998];200-epifraxamoside, demethyl-200-epifraxamoside, jasminanhydride [Sadhu et al., 2007]; indole oxgyenase[Divakaret al.,1979];kaempferol-3-O-α-L-rhamnopyranosyl(1-3) α-L-rhamnopyranosyl (1-6) β-D-galactopyranosyl, kaempferol-3-O- rutinoside, 7-ketologanin, oleoside-11-methyl ester, 7-glucosyl-11- methyl ester, ligstroside, oleuropein [Zhao et al.,2007]. The plant is reported to possess spasmolytic, anti-inflammatory, antimicrobial, antioxidant, antiulcer, cytoprotective, chemo preventive, wound healing and antiacne activities [Sharma et al, 2005]. Since there is no report on antibacterial activity of leaves of *Jasminum grandiflorum* against these four microorganisms, an attempt was made to evaluate the antibacterial activity of petroleum ether, chloroform, acetone, methanol and aqueous extract of the plant by agar diffusion method using *Staphylococcus aureus, Bacillus subtilis, Escherichia coli* and *Pseudomonas aeruginosa* as test organism.

Materials and methods:

Plant material:

Jasminum grandiflorum Linn was collected and authenticated by Central Council for Research in Ayurveda and Siddha, Bangalore. A voucher specimen (RRI/BNG/SMP/Drug Authentication/ 2008-09/318) has been preserved in our Department for the future reference.

Extraction procedure

Shade dried leaves (470 g) were coarsely powdered and subjected to successive solvent extraction by continuous hot extraction (soxhlet). The extraction was done with different solvents in their increasing order of polarity such as petroleum ether (60-80^{0}C), chloroform, acetone, methanol and water. Each time the marc was air dried and later extracted with other solvents. All the extracts were concentrated by distilling the solvent in a rotary flash evaporator. The yield was found to be 2.36, 1.26, 0.56, 4.67 and 9.26% w/w with reference to the air dried plant. The dried extracts were dissolved in dimethyl sulphoxide (DMSO) and subjected to antibacterial activity.

Preliminary phytochemical screening

The coarse powder of leaves of *Jasminum grandiflorum* (25g) was subjected to successive extraction with different solvents in their increasing order of polarity from petroleum ether (60^0-80^{0}C), chloroform, acetone, methanol and water. The extracts were concentrated and subjected to various chemical tests to detect the presence of different phytoconstituents [Kokate, 1990].

Microorganisms and media:

Gram Positive Bacteria: *Staphylococcus aureus, Bacillus subtilis*

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Table 1: Antibacterial activity of different extract of leaves of *Jasminum grandiflorum* against Gram negative organisms

Concentration used [µg/ml]	Zone of inhibition of extract in mm									
	Escherichia coli					*Pseudomonas aeruginosa*				
	PEE	CE	AE	ME	AQE	PEE	CE	AE	ME	AQE
10	12	-	12	14	14.6	16	16	14.6	14	14
25	12	-	12	15	15.2	16.2	16.2	16	15.2	16
50	12	14	12	16	15.2	18	16.2	17	16	16.2
100	12	14.4	14	17	15.4	18.2	16.4	20	16.2	16.2
250	14	14.6	16	18	17	18.2	16.5	20.2	18	16.2
500	16	15.2	16	18	18	18.2	17.2	22	18.2	18
1000	16.6	16.6	16	18	18.2	18.2	21.4	22	18.6	18
Penicllin [10]	16					16				

PEE-petroleum ether extract; CE-chloroform extract; AE-acetone extract; ME-methanol extract; AQE-aqueous extract.

Table 2: Antibacterial activity of different extract of leaves of *Jasminum grandiflorum* against Gram positive organisms

Concentration used [µg/ml]	Zone of inhibition of extract in mm									
	Staphylococcus aureus					*Bacillus subtilis*				
	PEE	CE	AE	ME	AQE	PEE	CE	AE	ME	AQE
10	12	-	-	12	-	13	15	13	14.4	16
25	14	14	-	14	-	14	16.4	14	15	17
50	14.2	14	-	16	-	15	16	14.2	16	18
100	16	14	-	18	-	15	16.2	14.4	17	18
250	18	14	-	20	16	16	16.6	16	18	18
500	-	14.6	-	22	18	17	17.2	18	18.6	18
1000	-	16	-	22	22	19	18	18.2	19	20
Penicillin [10]	18.6					16				

PEE-petroleum ether extract; CE-chloroform extract; AE-acetone extract; ME-methanol extract; AQE-aqueous extract.

Gram Negative Bacteria: *Escherichia coli*, *Pseudomonas aeruginosa* Bacteria's were obtained from the Department of Microbiology, The Oxford College of Science, Bangalore. The bacterial stock cultures were maintained on Muller Hinton agar and stored at 4^0C.

Antibacterial activity:

The extracts obtained above were screened for their antibacterial activity in comparing with standard antibiotic Penicillin (10 µg/ml) *in-vitro* by disc diffusion method [Greenwood et al.,2002] using *Staphylococcus aureus*, *Bacillus subtilis*, *Escherichia coli* and *Pseudomonas aeruginosa* as test organism. Each extract were individually loaded on the 3 mm sterile disc at the concentration of 10, 25, 50, 100, 250, 500 and 1000 µg/ml and subjected to antibacterial activity. The results were recorded by measuring the zone of growth inhibition surrounding the disc. The experiments were done in triplicate.

Results and Discussion:

The results of antibacterial activity are given in the Table 1 and 2. From the tables, it is clear that all the extract at various concentrations have shown antibacterial activity equivalent to that of standard against all the tested organism. Petroleum ether, methanol and aqueous extracts have shown better activity than the standard against all the four microorganisms. Chloroform extract was only effective against *Bacillus subtilis* and *Pseudomonas aeruginosa*. Acetone extract was most effective against *Pseudomonas aeruginosa* and *Escherichia coli*.

It is concluded that the plant extract possess antibacterial activity against test organism used. The zone of inhibition varied among suggesting that the varying degree of efficacy and different phytoconstituents of herb on the target organism. Preliminary phytochemical screening of different extracts showed the presence of alkaloids, tannins, saponin, flavonoids, steroids and glycosides. The antibacterial activity of the plants may be be due to the presence of various active principles in the leaves. Further studies are needed to isolate and characterize the bioactive principles to develop new antibacterial drugs.

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References

1. Anonymous. The Wealth of India: A Dictionary of Indian Raw Materials and Industrial Products, Publication & Information Directorate, CSIR,New Delhi, 2004,284-88.
2. Kulkarni PH, Ansari S. The Ayurvedic Plants: Indian Medical Science Series No. 132. Sri Satguru Publication, New Delhi, 2004,191.
3. Sharma PC, Yelne MB, Dennis TJ. Database on Medicinal Plants Used in Ayurveda. CCRAS, New Delhi, 2005, 332-345.
4. Brinda S, Ulla WS, George V, Pushpangadan P, Rajasekharan S, Angiotensin converting enzyme inhibitors from *Jasminum azoricum* and *Jasminum grandiflorum*, Planta Med,64,1998,246-250.
5. Sadhu SK, Khan MS, Ohtsuki T, Ishibashi M, Secoiridoids component from *Jasminum grandiflorum*, Phytochem,68,2007, 1718-21.
6. Divakar NG, Subramanian V,Sugumaran M,Vaidyanathan CS, Indole oxygenase from the leaves of *Jasminum grandiflorum*, Plant Science Letter,15,1979,177-180.
7. Zhao GQ, Xia JJ, Dong JX, Glycosides from leaves of *Jasminum grandiflorum* var *officinale*, Acta Pharmaceutica Sinica, 42, 2007, 1066-9.
8. Kokate KR, Practical Pharmacognosy, Vallabha Prakashan, New Delhi, 1990, 110-117.
9. Greenwood, Slack CB, Peutherer TT, Medical Microbiology, a guide to microbial infections, pathogenesis, immunity, laboratory diagnosis and control, Churchill Livingston, 2002, 225-285.
10. Frank SD, Amelio Sr, A Phyto cosmetic desk reference: Botanicals, CRC Press Boca Raton London, Newyork, Washington DC, 1999, 138.
11. Marjorie MC, Plant product as antimicrobial agents, Clinical Microbiology Review, 12, 1999, 564-582.

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