Vol : No. XXVII (2) October, Novermber, December - 2007

Comparative antimicrobial activities of *Emblica officinalis* and *Ocimum sanctum*

Received : 04.06.2007
Accepted : 18.07.2007

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Abstract

The aqueous and successive extracts of the fruit pulp of *Emblica officinalis* and fresh leaves and stems of *Ocimum sanctum* were prepared and evaluated for antimicrobial activity. The successive extracts such as petroleum ether,chloroform, ethyl acetate and methanol were prepared by successive solvent extraction method and aqueous extract by maceration process and screened for antimicrobial activity against gram positive bacteria *Staphylococcus aureus,* gram negative bacteria *E.coli* and fungal strains of *Candida* species by using agar cup plate method. The extracts showed different degree of activity against pathogenic microbes. The results obtained were compared with standard drugs Amoxicillin (10µg) and Amphotericin B(10µg). The methanolic extract of *Emblica officinalis* was found to be more effective than the leaf and stem extracts of *Ocimum sanctum* in inhibiting all the microbial strains.

Introduction

Emblica officinalis (Phyllanthus emblica) belonging to the family Euphorbiaceae and *Ocimum santum* (Family Lamiaceae) are called as Amla and Tulsi respectively.These plants are found through out Tamilnadu, South India.Fresh fruits of Amla are globose,depressed,shining yellowish green when ripe. Six vertical furrows are distinct.astringent and sour taste followed by delicately sweet taste. The

fruit contains mainly tannins, gallic acid.ellagic acid,phyllembic acid and emblicol,vitamin C,alkaloids of phyllantidine and phyllantine,pictine and minerals. Useful in the treatment of peptic ulcer, skin diseases, dyspepsia, antacid and as an antioxidant. Tulsi leaves are elliptic, oblong, obtuse or acute, entire or serrate, pubescent on both sides, minutely gland dotted, petioles, slender, hairy with characteristic odour and slightly aromatic taste. It contains mainly volatile oil, eugenol and â-caryophyllene. Used as hypoglycaemic, antistress, analgesic, antipyretic, anti inflammatory, expectorant and antitumour[1,2]. The objective of the present study is to assess the antimicrobial activity of the aqueous and successive extracts of *Emblica officinalis* and *Ocimum sanctum.*

Materials and Methods

The fruits of *Emblica officinalis* and the aerial parts of *Ocimum sanctum* were collected from Coimbatore. Identified and authenticated by Botanist, Botanical survey of India, Coimbatore. The present study was carried out at the Department of Pharmacognosy, PSG College of Pharmacy, Peelamedu, Coimbatore, Tamilnadu. The fruits of Amla and the aerial parts of Tulsi were dried under shade and then powdered. The powdered material was extracted with successive solvent extraction method in a soxhlet apparatus. Extracts such as petroleum ether, chloroform, ethyl acetate and methanol were obtained. Aqueous extract was obtained separately by maceration process. The extracts obtained were concentrated under controlled temperature (25-30°c) and preserved in a desiccators and used for further studies[3].

Phytochemical studies

The extracts of Amla fruit and aerial parts of Tulsi were subjected to qualitative chemical tests for the identification of various plant constituents [4]. The results are tabulated in Table 1 and 2.

Antimicrobial studies

Test Organisms

Cultures were selected from the range of gram-positive and gram-negative bacteria and fungal strains listed in Indian pharmacopoeia. Gram-positive bacteria *Staphylococcus aureus*, gram-negative bacteria *E.coli* and fungal strains of C*andida species* were used for the experiment by using Amoxicillin and Amphotericin B as standards. Muller Hington agar medium were used for bacterial culture and Sabouard's Dextrose medium were used for fungal culture.

Antimicrobial assay

The Antimicrobial assay was carried out by using agar cup plate method. Plant extracts at the concentration of 200µg/ml was prepared by dissolving the extracts in the respective solvents. The standards, Amoxicillin (10µg) and Amphotericin B (10µg) used as standards for gram-positive, gram-negative bacteria and fungi respectively. The required volume of

the medium was poured in to the sterilized petri dishes.After solidification of the medium bacterial and fungal strains were streaked on it. Four wells were made in petri dishes and filled with the test samples of 0.1ml of extract solution. The bacterial culture in Muller Hington agar media was incubated at 37°C for 24 hours and the fungal culture in Sabouard medium. The zone of the inhibition produced by the different crude extracts was measured and compared with standard[5,6]. The results are tabulated in Table 3 and 4.

Results and Discussion

The results obtained are tabulated in Table 1 to 4. Preliminary phyto-chemical analysis of the aqueous and successive extracts of *Emblica officinalis* showed the presence of alkaloids and tannins in ethyl acetate,methanol and aqueous extracts. *Ocimum sanctum* showed the presence of volatile oil in ethyl acetate , methanol and aqueous extracts (Table 1 and 2) .

In comparing various extracts of *Emblica officinalis* and *Ocimum sanctum* for anti microbial activity with the standards significant antibacterial activity was found in methanol extract of *Emblica officinalis* (Table 3 and 4). Ethyl acetate, and aqueous extracts of *Emblica officinalis* also showed antibacterial activity. The maximum zone of inhibition was produced by the methanol extract of *Emblica officinalis* against *E.coli* and *Staphylococcus aureus*. In *Ocimum sanctum* antibacterial activity was produced by ethyl acetate,methanol and aqueous extracts against *E.coli* and *Staphylococcus aureus* Antifungal activity was not produced by the extracts.

Conclusion

The antibacterial activity of methanol extract of *Emblica officinalis* was found to be most significant when compared to all other extracts. Antifungal activity was not produced by the aqueous and successive extracts of *Emblica officinalis* and *Ocimum sanctum.*

Acknowledgement

The authors are thankful to the Management and Principal, A. K. Chandrasekharan, PSG College of Pharmacy, Peelamedu, Coimbatore, Tamilnadu. for providing all the facilities to carry out the above mentioned research work.

Table 1
Phytochemical analysis of various extracts of *Emblica officinalis*

S.No	Phyto constituents	Extracts				
		Pet ether	Chloro-form	Ethyl-acetate	Methanol	Aqueous
1.	Alkaloids	-	-	+	+	+
2.	Carbohydrates	-	-	-	-	-
3.	Phytosterols	-	-	-	-	-
4.	Fixed oil	-	-	-	-	-
5.	Saponins	-	-	-	-	-
6.	Tannins	-	-	+	+	+
7.	Proteins	-	-	-	-	-
8.	Glycosides	-	-	-	-	-
9.	Volatile oil	-	-	-	-	-

+ positive
- negative

Table 2
Phytochemical analysis of various extracts of *Ocimum sanctum*

S.No.	Phyto constituents	Extracts				
		Pet ether	Chloro-form	Ethyl acetate	Methanol	Aqueous
1.	Alkaloids	-	-	-	-	-
2.	Carbohydrates	-	-	-	-	-
3.	Proteins	-	-	-	-	-
4.	Fixed oil	-	-	-	-	-
5.	Volatile oil	-	-	+	+	+
6.	Saponins	-	-	-	-	-
7.	Tannins	-	-	-	-	-
8.	Glycosides	-	-	-	-	-
9.	Gums	-	-	-	-	-

+ positive
- negative

Table 3
Anti microbial screening of *Emblica officinalis*

Standards: Amoxycillin-23 mm (-ve) Amoxycillin-28 mm (+ve)
Amphotericin B-21 mm (-) no antimicrobial activity

S. No	Micro organism	Extracts (Zone of Inhibition in mm)				
		Pet ether	Chloro-form	Ethyl-acetate	Methanol	Aqueous
1.	*E.coli* (gram –ve)	-	-	10mm	19mm	9 mm
2.	*S.aureus* (gram +ve)	-	-	7mm	16mm	-
3.	*Candida sp.*	-	-	-	-	-

Table 4
Antimicrobial screening of *Ocimum sanctum*

S.No	Micro organism	Extracts (Zone of inhibition in mm)				
		Pet-ether	Chloro-form	Ethyl - acetate	Methanol	Aqueous
1.	*E.coli*(gram –ve)	-	-	6mm	8 mm	5 mm
2.	*S.aureu* (gram +ve)	-	-	5mm	7mm	-
3.	*Candida sp.*	-	-	-	-	-

Standards: Amoxycillin-23 mm (-ve) Amoxycillin-28 mm (+ve)
Amphotericin B-21 mm (-) no antimicrobial activity

References

1. Shrivastava.A.K., Medicinal Plants, APH publishing corporation , New Delhi, 243 (2006).

2. Trivedi.P.C., Herbal Medicine, Traditonal practices,1st edition, Aavishkar publishers,115 (2006).

3. Kokate.C.K.,Practical Pharmacognosy, Published by Vallabh prakashan, fourth edition, 107-113 (1999).

4. Raaman.N., Phytochemical techniques, NewIndia publishing agency, NewDelhi , 5-15 (2006).

5. Purohit, Harley Klein., Pharmaceutical microbiology, Agrobios, India,473 (2003).

6. Purohit.S.S., Microbiology Funda mentals and application, sixth edition, Published by Student edition,643-650 (2003).