Environment Conservation Journal 6 (2) 59-61 , 2005
(ISSN 0972-3099)

Antibacterial activity of *Mimusops elengi* (Bakul)

Prabhat, Navneet and Sri Krishna*

Department of Botany and Microbiology Gurukul Kangri University Haridwar
*Department of Chemistry , Gurukul Kangri University Haridwar

Abstract

Mimusops elengi (Linn.) extracts were evaluated for antibacterial activity against human pathogenic bacterial strain of Gram positive and Gram negative bacteria. The methanolic extract showed the maximum activity against *Streptococcus mutans, Staphylococcus aureus and Bacillus subtilis* (16 mm) and petroleum ether extract showed the minimum activity against *Streptococcus mutans* (9 mm) by well diffusion method. The use of *M. elengi* extracts as a potential antibacterial agent and the treatment of dental caries has been suggested.

Key words: *Antibacterial activity, M. elengi, Dental caries, CFU(Colony forming Unit)*

Introduction

The medicinal plants have been evaluated for possible antimicrobial activity and to get remedy from a variety of ailments due to microorganisms. *Mimusops elengi* is a large glabrous ever green tree. It belongs to family Sapotaceae (Kirtikar and Basu, 1984). It is widely distributed throughout the greater parts of India. The bark and fruit enjoy a considerable reputation in Indian medicine as an astringent and tonic and are used in the treatment of diarrhoea and dysentry (Niranjan *et al*., 1995).Several chemical substances from the plant such as saponins ,steroids, terpenoids and alkaloids have been reported (Misra and Mitra, 1967)and isolated (Satyanarayana *et al.* ,1997). The leaf extract of plant showed antibacterial activity against *B. anthracis, B. mycoides, B. subtilis, Salmonella typhi and Staphylococcus aureus* (Kapoor *et al*., 1969).

However, there is no report of antimicrobial activity of *Mimusops elengi* against dental caries bacteria. Therefore, the antibacterial activity of *M. elengi* against dental caries bacteria and other pathogens have been studied.

Materials and Methods

The material was collected from the plants present in the campus of Gurukul Kangri University, Hardwar, Uttaranchal. They were shade dried at room temperature and then powdered by using blender. The 100 gm. of powdered plant material was loaded in soxhlet assembly and extracted by sucessively in four different solvents i.e. petroleum ether , acetone, methanol and water. The polarity of the solvents would leach out compounds soluble in the particular solvent.

A total of 11 bacterial cultures were used in the screening. Muller Hinton Agar media (Himedia No. M-173) was used to carry out antimicrobial studies. Inoculam of each organism was prepared by inoculating a loopful growth from freshly prepared culture in to respective broth media. The inoculam was further diluted in sterile normal saline solution to provide 10^5 CFU/ml.

0.1 ml of approximately diluted broth culture of test bacteria was evenly mixed in Muller Hinton Agar. Wells of 8 mm diameter were punched into agar with sterilized cork borer and each

well was filled with 45 µl (100 mg/ml) of plant extracts solvent for blank and antibacterial drug (ampicillin 100 µ g/ml) for positive control. The plates were incubated for 24 hrs. at 37°C.

The antibacterial activity was evaluated by measuring the inhibition zone diameter (Ahmad *et al*., 1998).

Results and Discussion

The antibacterial activity of extracts of *Mimusops elengi* against various test organisms at the concentration of 100 mg/ml were determined as presented in Table 1. The plant extracts were effective against both Gram +ve and Gram -ve bacteria. The extracts were found to be less effective as compared to ampicillin . The methanolic extract is effective as compared to other extracts because the antibacterial compounds (triterpenoid, saponin, glycosides) (Sen *et al*., 1995; Sahu *et al*., 2001) leached in more quantity . In general the extracts were highly inhibitory to, *K. pneumoniae, S. mutans* and *S. aureus* but the methanolic extracts shows maximum zone of inhibition 16 mm against *K. pneumoniae, S. mutans* and *S. aureus*.

A variety of constituents have been isolated from *Mimusops elengi* they are saponin, pentacyclic triterpenes, mimusopgenone, steroidal glycosides. These organic compounds shows the antibacterial activity against *S. aureus* (Kapoor *et al*. ,1969; Scalbert, 1991).

It is expected that the nature and presence of more than one active plant constituents may be responsible for enhanced antimicrobial activity in the crude extracts. The results encourage that the screening of medicinal plants hopefully will provide valuable substances to be exploited in the disease management of not only human and animals but also of plants as bacteriocides.

References

Ahmad, I.,Mehmood, Z,and Mohammad, F. 1998 Screening of some Indian medicinal plants for their antimicriobial properties, ***Journal of Ethanopharmacology.*** 62, 183-188.

Kapoor,L.D.,Singh, A., Kapoor,S.L.and Srivastava,S.N., 1969 Survey of Indian medicinal plants for saponins, alkaloids and flavonoids. ***Lloydia.*** 32, 297-302.

Kirtikar, K.R. ,Basu, B.D. 1984 *Indian medicinal plants* 2nd edition , Indian press, Allahabad.

Mishra, G. and Mitra, C.R. 1967 Constituents of fruits and seeds of *M.elengi*. ***Phytochemistry***. 6:1309-1315.

Niranjan,P.S., Kaike, K. Jia. Z. and Nikaido, T. 1995 Novel Triterpenoid saponins from *Mimusops elengi.* ***Tetrahediiron***. 51 : 13435-13446 .

Sahu,N.P. ,Mandal,N.B.,Banerjee, S.and Siddique,K.A.I. 2001 Chemistry and Biology of triterpenes and saponins from seeds of *M. elengi*. ***Journal of Herbs, Spices and medicinal plants*** 8: 23-29**.**

Satyanarayana, T.,Rao, D.P.C. and Singh, B.S. 1997 Antibacterial activity of six medicinal plant extracts. ***Indian Drugs***. 14: 209-214.

Scalbert, A. 1991 Antimicrobial properties of tannins. ***Phytochemistry***. 30: 3875-3883.

Sen, S. Sahu, N.P.and Mahato, S.B.C. 1995 Pentacyclic triterpenoids from *M. elengi.* ***Phytochemistry*** 38 : 205-207.

Table 1: Antomicrobial activity of *M. elengi* extracts in different solvent

Inhibition zone (mm)					
Pathogens	Extracts				Antibiotic
	Pet. ether**	Acetone**	Methanol**	Water**	Ampicillin 100mg/ml
Staphylococcus aureus	14	15	16	15	24
S. epidermidis	10	13	15	14	23
Streptococcus mutans	9	12	16	14	25
S.sanguis	10	11	13	12	23
S. salivarius	10	13	15	14	25
Bacillus subtilis	13	14	15	13	22
B. megnetherium	10	11	13	12	24
Lactobacillus acidophillus	12	13	15	14	20
Escherichia coli	10	11	13	12	23
Klebsiella pneumoniae	14	14	16	15	22
Micrococcus luteus	10	11	13	12	21

* tested by well diffusion method
** Solvents did not show any zone of inhibition