

***In-vitro* antibacterial activity of *Anisomeles indica* (L) O. Ktze Lamiaceae plant from Melghat, (M.S.) India**

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ABSTRACT

Medicinal plants are the wealthy source of antibacterial agents and curatives. The selected plant, *Anisomeles indica* (L) O. Ktze is an aromatic under-shrub, belongs to family Lamiaceae. This plant is generally found at higher elevations throughout Indian subcontinent. The plant is used as folk medicine by the tribals and villagers inhabiting in Satpuda ranges, predominantly in the treatment of intestinal disorder and intermittent fever. This paper deals with investigation on *in vitro* antibacterial activity of crude leaf extracts of *A. indica* plant against selected pathogenic bacterial strains. All the tested bacteria were found to be highly susceptible to the crude extracts of *A. indica*. The most effective activity was observed in methanolic extract with maximum zone of inhibition ranging from 13 mm and 10 mm against *B. subtilis* and *S. typh* respectively. The aqueous extract shows comparatively less inhibition ranging from 10 mm and 9 mm in *B. subtilis*.

KEY WORDS: Antibacterial activity, *Anisomeles indica*, Lamiaceae family, Melghat

INTRODUCTION

In recent years drug resistant to human pathogenic bacteria has been commonly and widely reported in literature (Mulligen *et al.*, 1993; Devis 1994, Robin *et al.*, 1998). Because of the side effect and resistant that pathogenic microorganisms build against antibiotics, many scientist have recently paid attention to extracts and biologically active compounds isolated from plant species used in herbal medicines (Essawi and Srour, 2000).

The antimicrobial compounds from plants may inhibit bacterial growth by different mechanisms than those presently used. Antimicrobial properties of medicinal plants are being increasingly reported from different parts of the world (Saxena, 1997). It has been reported that higher plant have shown to be a potential source for the new antimicrobials agents (Mitscheret *al.*, 1987). Antimicrobials may have significant clinical value in treatment of resistant microbial strains (Eloff, 1988). The antimicrobial activity of plant extracts had given us the basis of many applications in pharmaceuticals, alternative medicine and also in natural therapies.

Wild plants can be selected for biological screening based on ethnomedicinal uses, because

many infectious disease are known to have been treated with herbal remedies throughout the history of mankind. Even today, plant materials continue to play a major role in primary health care as therapeutic remedies in many developing countries (Zakaria, 1991, Sokemanet *al.*, 1999, Hossein *et al.*, 2007; Laura *et al.*, 2009; Pierangeli *et al.*, 2009; Koche *et al.*, 2010 and 2011)

Lamiaceae members are well known for their medicinal properties. *Anisomeles indica* (L) O. Kuntz., was selected for the study strictly on the basis of its ethnobotanical uses confirmed from the traditional healers of study area. The present paper deals with its *in vitro* antibacterial activity against some pathogenic strains of bacteria.

MATERIALS AND METHODS

The plants were collected during the month of December 2012, from Chikhaldara forest, Melghat region of Amravati district (MS). The collected plant was identified taxonomically by local taxonomist and using floras (Naik, 1998 and Singh and Karthikeyan, 2001) and voucher specimen are kept in the herbarium of Botany Department, ShriShivaji College Akola (MS) India. Fresh plant material was washed under running tap water, air dried in shade for about seven days

and then homogenized to make fine powder. This powder was packed in air tight polythene bags until further use.

Preparation of Crude Extracts

10g of air dried plant powder of each plant was mixed with distilled water and methanol and heated slowly for 2 hrs up to boiling. The boiled decoction was then filtered through 8 layered muslin clothe and centrifuged at 5000g for 10 min and collected the supernatant. The above procedure was repeated twice. After 6 hours, the supernatant collected at an interval of every 2 hrs, was pooled together and concentrated to make the final volume (Parekh *et al.*, 2005). Then the extract was filter sterilized and stored at 4°C for further use.

Screening for antibacterial activity

The antibacterial assay performed by agar disc diffusion method (Bauer *et al.*, 1966). All the microbiological media used in this experiment were obtained from (Hi-media Laboratories, Mumbai). Overnight cultures were prepared by inoculating approximately in 2ml nutrient broth with 2-3 colonies of each organism taken from nutrient agar. Broths were incubated overnight at 35°C with shaking. Inocula were prepared by diluting overnight bacterial cultures approximately 10 cells per ml in sterile saline. The suspension of tested bacterial strains (0.1ml of 10 cells per ml) was spread on Muller-Hinton agar plates (Samy and Ignacimuthu, 2000). Filter paper discs (6 mm in diameter) were impregnated in 20 µl of the plant extract and dried aseptically. The disc are placed on the bacterial lawn of agar plates and incubated at 37°C for 24 hrs. The diameter of the inhibition zones were measured using a scale in millimeters.

RESULTS AND DISCUSSION

Plant derived antimicrobial agents has great perspectives in medicine and pharmaceutical industries. In the present investigation, methanolic and aqueous extracts of *A. indica* were tested for its antibacterial activity against few pathogenic bacterial strains like *Bacillus subtilis*, *Staphylococcus aureus*, *E. coli*, *Klebsiella pneumonia* and *S. typhi*. The results are presented in Table-1.

All the tested bacteria were found to be highly susceptible to the crude extracts of *A. indica*. However, our study revealed a remarkable antibacterial activity. The most effective activity was observed in methanolic extract with maximum zone of inhibition ranging from 13 mm and 10 mm against *B. subtilis* and *S. typhi* respectively. The aqueous extract shows comparatively less inhibition ranging from 10 mm and 9 mm in *B. subtilis*. Though both the extracts were found effective, the highest zone of inhibition and the effectiveness is the major consideration in the case of antibacterial activity. When, the activity of crude extracts was compared with positive control, it was found to be significant and this confirms that the selected plant has antibacterial potential.

There are several reports indicating the antimicrobial potential of various medicinal plants (Shirsat, 2008, Mahesh and Satish, 2008; Selvamohan *et al.*, 2012). However, the antibacterial activity against pathogenic bacterial strain was reported by very few workers (Koche *et al.*, 2012). The result indicate that the leaves of *A. indica* has a potential broad spectrum antibacterial activity and these extracts either individually or in combination can be used as formulation to treat the infectious diseases caused by the test organism.

Table 1: Inhibitory effect of crude leaf extracts of *Anisomeles indica* against various pathogen

Microorganism	Zone of inhibition (mm)		
	Methanolic extract	Aqueous extract	Streptomycine
<i>Bacillus subtilis</i>	13	10	17
<i>Staphylococcus aureus</i>	9	8	15
<i>E. coli</i>	8	6	19
<i>Klebsiella pneumoniae</i>	8	8	16
<i>Salmonella typhi</i>	10	9	15

Values are mean inhibition zone (mm) of thriplicate analysis

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