

**Antimicrobial activity of floral extracts on selected human pathogens**

**Sunilbabu Koppula\* and K Ammani**

Department of Microbiology, Acharya Nagarjuna University,

Received for publication: May 5th 2013; Revised: May 15<sup>th</sup> 2013; Accepted: May 22<sup>nd</sup> 2013

**Abstract:** : Antimicrobial potential in the flower crude extracts of five plants viz. *Michelia champaca* L., *Hibiscus rosa-sinensis* L., *Catharanthus roseus* (L.) G.Don, *Mimusops elengi* L. and *Azadirachta indica* having some medicinal properties was traced in the present study. The flowers extract of all the plants inhibited the growth of pathogenic microbes. Crude extract using methanol as solvent showed a maximum inhibition of zone formation for the species *Klebsillae pneumonia* (45 mm) and *Escherichia coli* (40 mm) at a concentration of 40µg/mL. The crude extract of *Hibiscus rosa-sinensis* L., showed maximum inhibition zone for *Staphalococcus aureus* (23 mm) and *Escherichia coli* (20 mm) at a concentration of 40µg/mL next to *Michelia champaca* L. In the present study it was observed that flowers extracts of the five plants had broad spectrum of antifungal activity.

**Keywords:** Medicinal plants, Flower extracts, Antimicrobial activity.

**Introduction**

India is a land of rich biodiversity. The total number of lower and higher plants in India is about 45000 species (Jain, 1992). The plants are potential source of medicines since ancient times. According to World Health Organization, 80% of the populations in the World depend on traditional medical practitioners for their medicinal needs. Many formulations of plants and their products are said in the form of hymns in the Veda (Kausik and Dhiman, 1997). Numerous surveys on antimicrobial medicinal plants had been made in United States and in many countries throughout the world. Such studies had demonstrated the wide occurrences of active compounds in higher plants (Huges, Pates and Mads 1995). Yet a scientific study of flowers and determines their anti-microbial material is comparatively new. As the plants represent an extraordinary reservoir for exploration of new drugs in controlling of diseases, the present study has been planned to find out the antimicrobial potential in the extracts of the flowers viz. *Michelia champaca* L., *Hibiscus rosa-sinensis* L., *Catharanthus roseus* (L.) G.Don, *Mimusops elengi* L. and *Azadirachta indica*.

**Materials and Methods**

Five plants were chosen. They are *Michelia champaca* L., *Hibiscus rosa-sinensis* L., *Catharanthus roseus* (L.) G.Don, *Mimusops elengi* L. and *Azadirachta indica*.

***Michelia champaca* L.**

**Family:** Magnoliaceae

**Genus:** Michelia

**Species:** *Michelia champaca*

**Habitat:** Tree

**Flowers:** The flowers are used in Southeast Asia for several purposes. They are floated in bowls of water to scent the room, as a fragrant decoration for bridal beds, and for garlands and hair ointments. The flower is the main scent present in the commercial

"joy" perfume, and is sometimes commonly called the "joy perfume tree".

***Hibiscus rosa-sinensis* L.**

**Family:** Malvaceae

**Genus:** Hibiscus

**Species:** *Hibiscus rosa-sinensis*

**Habit:** Shrub

**Flower:** The flowers are large, generally red in the original varieties, and firm, but generally lack any scent. Hibiscus flower preparations are used for hair care. The flowers themselves are edible and are used in salads in the Pacific Islands. The flowers are used to shine shoes in parts of India, as well as for the worship of Devi. In Indonesia, these flowers are called "kembang sepatu", which literally means "flower of shoes".

***Catharanthus roseus* (L.) G.Don**

**Family:** Apocynaceae

**Genus:** Catharanthus

**Species:** *Catharanthus roseus*

**Habit:** Sub shrub

**Flower:** The flowers are white to dark pink with a darker red centre, with a basal tube 2.5-3 cm long and a corolla 2–5 cm diameter with five petal-like lobes. In traditional Chinese medicine, extracts from it have been used to treat numerous diseases, including diabetes, malaria, and Hodgkin's disease. The substances vinblastine and vincristine extracted from the plant are used in the treatment of leukemia. Used in cancer chemotherapy.

***Mimusops elengi* L**

**Family:** Sapotaceae

**Genus:** Mimusops

**Species:** *Mimusops elengi*

**Habit:** Tree

**Flower:** Flowers are cream, hairy and scented. Extract of flowers used against heart diseases, leucorrhoea, menorrhagia and act as antiduretic in

\*Corresponding Author:

Dr. Sunilbabu Koppula,  
Department of Microbiology,  
Acharya Nagarjuna University,  
Gunture, India

polyuria and antitoxin. The snuff made from the dried and powdered flowers used in a disease called Ahwa in which strong fever, headache and pain in the neck, shoulders and other parts of the body occurs.

### ***Azadirachta indica***

**Family:** Meliaceae

**Genus:** *Azadirachta*

**Species:** *Azadirachta indica*

**Habit:** Tree

**Flower:** The (white and fragrant) flowers are arranged axillary, normally in more-or-less drooping panicles which are up to 25 cm (10 in.) long. All parts of the tree (seeds, leaves, flowers and bark) are used for preparing many different medical preparations.

### **Collection and Extraction:**

The plant material was collected in and around area of Acharya Nagarjuna University. It was transferred immediately to the laboratory. The prepared plant material was extracted by crude method.

### **Crude method:**

Pre-weighed plant material was taken is sterilized mortar and pestle. It was crushed well with methanol solvent. Then different concentrations were prepared and used against pathogenic bacteria and fungi.

## **Results and Discussions**

### **Antimicrobial assay:**

For determination of Antimicrobial activity of five flower plant extracts, different bacterial and fungal stains were used by agar ditch method. The pathogenic cultures were swabbed separately on each pre-incubated Nutrient Agar (NA) and Sabourands Dextrose Agar (SDA) plants with help of sterile cotton swabs (I Joseph and A J A Ranjit singh, 2008). Ditches were prepared in agar plates with the help of surface sterilized borer. After boring the flower extracts were added separately to the ditches (40 µL).

The commercial available Gentamycin (Ranbaxy laboratory limited New Delhi) was used for comparison study. The antibiotic Gentamycin and Fungicidal agent Myconazole was prepared (40 µg/mL) concentration and was impregnated into ditches in agar medium. The plants were incubated at 37° C. Controls were maintained. After 24 h diameter of clear zone produced around the ditches was measured to the nearest mm with the help of the micro scales.

## **Results and Discussion**

### ***Michelia champaca* L.**

The crude extract of the plant *Michelia champaca* L flowers showed maximum inhibition for *Corynebacterium diphtheriae* (45mm), *K. pneumonia* (45 mm) followed by *S. aureus* (40 mm) at concentration of 40 µg/mL. (Table.1). Elizabeth and Jaya Lakshmi (2006) reported the extract of *Michelia champaca* L. was bacteriostatic against the bacterial pathogens.

**Table.1:** Antimicrobial activity of the methanol extracts of the flower of the plant *Michelia champaca* L.

Antimicrobial agent	Inhibition zone in diameter (mm)				
Extract concentration	<i>E. coli</i>	<i>C. diphtheriae</i>	<i>S. aureus</i>	<i>S. typhirium</i>	<i>K. pneumonia</i>
Flower extract 40 µg/ mL	40	45	40	40	45
Gentamycin 40 µg/mL	20	35	30	50	30
Fungal Strains	<i>A. niger</i>		<i>Fusarium sp</i>		<i>Candida albicans</i>
Flower extract 40 µg/mL	16		16		14
Myconazole 40 µg/mL	20		25		20

### ***Hibiscus rosa-sinensis* L**

The crude extract of the plant *Hibiscus rosa-sinensis* showed maximum inhibition for the species *S. aureus* (23 mm) and *E. coli* (20 mm) at the concentration of 40 µg/mL. (Table 2). M. P. Darokar et al., (1998) found the antibacterial effects of flowers of *Hibiscus rosa-sinensis* L against selected bacterial pathogens.

**Table.2:** Antimicrobial activity of the methanol extracts of the flower of the plant *Hibiscus rosa-sinensis* L

Antimicrobial agent	Inhibition zone in diameter (mm)				
Extract concentration	<i>E. coli</i>	<i>C. diphtheriae</i>	<i>S. aureus</i>	<i>S. typhirium</i>	<i>K.pneumonia</i>
Flower extract 40 µg/ mL	20	16	23	15	15
Gentamycin 40 µg/mL	20	35	30	50	30
Fungal Strains	<i>A. niger</i>		<i>Fusarium sp</i>		<i>Candida albicans</i>
Flower extract 40 µg/mL	14		12		15
Myconazole 40 µg/mL	20		25		20

### ***Catharanthus roseus* (L.) G. Don:**

The crude extract of the plant *Catharanthus roseus* showed maximum inhibition for the species *S. aureus* (18 mm) and *E. coli* (14 mm) at the concentration of 40 µg/mL. (Table 3). S. Sathiya et al found the similar antibacterial activity against bacterial pathogens (2008).

**Table.3:** Antimicrobial activity of the methanol extracts of the flower of the plant *Catharanthus roseus* (L.)

Antimicrobial agent	Inhibition zone in diameter (mm)				
	<i>E. coli</i>	<i>C. diphtheriae</i>	<i>S. aureus</i>	<i>S. typhirium</i>	<i>K.pneumonia</i>
Extract concentration					
Flower extract 40 µg/ mL	14	10	18	10	12
Gentamycin 40 µg/mL	20	35	30	50	30
Fungal Strains	<i>A niger</i>		<i>Fusarium sp</i>		<i>Candida albicans</i>
Flower extract 40 µg/mL	12		10		13
Myconazole 40 µg/mL	20		25		20

***Mimusops elengi* L.**

The flowers extract of the plant *Mimusops elengi* inhibited the growth of pathogenic microbes. The methanolic crude extracts of the plant showed a broad spectrum of antibacterial potential. The maximum zone formation was observed for *E. coli* (17 mm) and *S. aureus* (14 mm) at the concentration of 40µg/mL. (Table.4). Abbas ali *et al* (2008) reported the antimicrobial activity of *Mimusops elengi*.

**Table.4:** Antimicrobial activity of the methanol extracts of the flower of the plant *Mimusops elengi* L.

Antimicrobial agent	Inhibition zone in diameter (mm)				
	<i>E. coli</i>	<i>C. diphtheriae</i>	<i>S. aureus</i>	<i>S. typhirium</i>	<i>K.pneumonia</i>
Extract concentration					
Flower extract 40 µg/ mL	14	10	18	10	12
Gentamycin 40 µg/mL	20	35	30	50	30
Fungal Strains	<i>A. niger</i>		<i>Fusarium sp</i>		<i>Candida albicans</i>
Flower extract 40 µg/mL	12		10		13
Myconazole 40 µg/mL	20		25		20

***Azadirachta indica*:**

The crude extract of the plant *Azadirachta indica* flowers showed maximum inhibition for species *S. aureus* (20 mm) and *E. coli* (20 mm) at the concentration of 40 µg/mL. (Table 5). Chantana Aromdee and Nongluksna Sriubolmas (2006) found the antibacterial activity of essential oil from flowers of *Azadirachta indica*.

**Table.4:** Antimicrobial activity of the methanol extracts of the flower of the plant *Azadirachta indica*.

Antimicrobial agent	Inhibition zone in diameter (mm)				
	<i>E. coli</i>	<i>C. diphtheriae</i>	<i>S. aureus</i>	<i>S. typhirium</i>	<i>K.pneumonia</i>
Extract concentration					
Flower extract 40 µg/ mL	20	8	20	14	16
Gentamycin 40 µg/mL	20	35	30	50	30
Fungal Strains	<i>A niger</i>		<i>Fusarium sp</i>		<i>Candida albicans</i>
Flower extract 40 µg/mL	12		13		12
Myconazole 40 µg/mL	20		25		20

**References**

1. Abbas Ali M, Abdul Mozid M, Sarmina Yeasmin Mst, Astaq Mohal Khan and Abu sayeed M. An evaluation of antimicrobial activities of *Mimusops elengi* Linn. Research Journal of Agriculture and Biological Sciences. 2008, 4(6): 871-874.
2. Chantana Aromdee and Nongluksna Sriubolmas. Essential oil of the flowers of *Azadirachta indica* (Meliaceae). Songklanakarin J. Sci. Technol., 2006, 28(1) : 115-119.
3. Darokar M. P, Mathur. A, Dwivedi. S, Bhalla. R, Khanuja. S. P. S and Sushil Kumar. (Central Institute of Medicinal and Aromatic plants). Detection of Antibacterial activity in the floral petals of some higher plants. Current Science 1998, Vol 75, No 3.
4. Elizabeth, K. M. Antimicrobial activity of *Allium sativum* on some pathogenic bacteria. Indian Journal of Microbiology, 2001, 4: 321-323.
5. Elizabeth, K.M. and Jaya Lakshmi, Y.A.S. (Department of Microbiology, College of Science, Gandhi Institute of Technology and Management, Visakhapatnam 530045, India) Antimicrobial activity of *Michelia champaca*. Asian Journal of Chemistry v. 2006, 18(1): p. 196-200.
6. Frier, M. Inhibition destruction of microbial cell. William B. Hude (ed.,) Academic press, London, 1971, pp 107-120.
7. Hughes, J. E. Survey of antibodies in the wild green plants of southern California. Antibiotics a chemotherapy, 1952, 2: 487-491.
8. Jain, K. K, Studies on Natural products Ph.D., Thesis. Dr. Hari Singh Gour University sager. 1992.
9. Joseph. I and Ranjit Singh, A. J. A., Antimicrobial activity of selected medicinal plants, *Craetva magna* (Linn.), *Pongamia glabra* (Linn.) and *Areca catechu* (Linn.). Ethnobotanical leaflets, 2008, 12: 995-1002.
10. Kausik, P. and Dhiman, A. K. Some Vedic medicine plants, Advan plant sci. 1997, 9(II) Spp., 1-12.
11. Pates, A. L and Madsen, G. C. Occurrence of antimicrobial substances in chlorophyllose plants growing in Florida II. Botany Gaz., 1955, 116: 250-261.
12. Sathiya. S, Karthikeyan. B, Cheruth Abdul Jaleel, M.M. Azooz and Muhammad Iqbal Antibiogram of *Catharanthus roseus* Extracts. Global Journal of Molecular Sciences 2008, 3 (1): 01-07.

Source of support: Nil

Conflict of interest: None Declared