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**P Shivakumar Singh**  
Department of Botany,  
Palamuru University,  
Mahabubnagar, Telangana,  
India

**GM Vidyasagar**  
Medicinal Plants and  
Microbiology Research  
Laboratory, Department of Post-  
Graduate Studies and Research  
in Botany, Gulbarga University,  
Gulbarga, Karnataka, India

## ***In vitro* antimycotic activity of ethanolic young leaves extract of *Argemone mexicana* L.**

**P Shivakumar Singh and GM Vidyasagar**

### **Abstract**

Antimycotic Activity (Agar well diffusion technique) of ethanolic leaf extract of *Argemone mexicana* L. (Papaveraceae) was evaluated against mycotic fungi namely *Trichophyton rubrum*, *Microsporum gypseum*, dimorphic fungi such as *Candida albicans*, and saprophytic fungi like *Aspergillus flavus*, *Aspergillus niger* and pathogenic bacteria like, *Staphylococcus aureus*, *E. coli*, *Bacillus subtilis*. Maximum antimycotic activity was observed against *M gypseum* (13 mm) followed by *T. rubrum* (11 mm), *C. albicans* (9 mm), *A. flavus* (8.4 mm), *A. niger* (8 mm). Among bacteria tested, *B. subtilis* showed maximum inhibition of 8.2 mm followed by *E. coli* (8 mm) and *S. aureus* (7.5 mm). The MIC was determined against all the test fungal and bacterial strains. The sensitivity of the test organisms varied with the species and strains. The study provides basis for the isolation and purification of anti-dermatophytic compounds from the leaves of *Argemone mexicana* L.

**Keywords:** Antimycotic activity, minimum inhibitory concentration, *Argemone mexicana* L.

### **1. Introduction**

Ever since the birth of mankind there has been a relationship between life, disease and plants. The men of early ages must have used therapeutical agents from those things which were easily available to them. Plants were among those things which have used as remedies since time immemorial. Infectious diseases, particularly skin and mucosal infections are common in most of the tribal inhabitants due to lack of sanitation, potable water and awareness of hygienic food habits (Jordaan, 2008, Desta B 1993). It has been estimated that skin diseases account for 34% of all occupational diseases (Spiewak, 2000) [5]. *Argemone mexicana* L (Papaveraceae) is an herb with branches, which has naturalized widely in many tropical and subtropical regions although it's a native of tropical American (Siddiqui *et al.*, 2002) [4]. It is an herb with bright yellow flowers and yellow juice. *A. mexicana's* concoction from its ethnological survey in Hyderabad Karnataka region Karnataka is used in treatment of bacterial infection. It is widely believed that the latex from this plant cures cataract, reddening and itching in the eyes. Traditional healers in Mali use *A. mexicana* to treat Malaria (Wilcox *et al.*, 2007) [6]. Ayurveda reported that the plant is purgative, diuretic and destroys worms. It cures skin-diseases, leprosy and inflammation bilious fevers. Roots are equally used to cure anthelmintic. Juice is used to cure opacity of cornea and ophthalmia. Seeds are purgative and sedative. In Mexico the seed is used as an antidote to snake poisoning and the fresh yellow milky seed extract contains protein-dissolving substances, effective in the treatment of warts, coldsores, cutaneous infections, skin diseases, itches and also dropsy and jaundice (Chopra *et al.*, 1986) [1]. But there are no previous reports from the study area, against mycotics. Therefore the present research work undertaken.

### **2. Materials and Methods**

#### **2.1 Collection of plant material**

Young leaves of *A. mexicana* were collected from rural areas of around the University campus of Gulbarga, Karnataka, India, in May, 2010 and was authenticated in the Department of Botany, Gulbarga University, Gulbarga, Karnataka, India. The plant material washed with clean water and air-dried.

#### **2.2 Preparation of plant extract**

Coarse powder from the shade dried leaf part of (50 g) was extracted to exhaustion successively with ethanol extract using a soxhlet apparatus.

**Correspondence**  
**GM Vidyasagar**  
Department of Post-Graduate  
Studies and Research in Botany,  
Gulbarga University, Gulbarga,  
Karnataka, India

The extract thus obtained was dried under reduced pressure at room temperature not exceeding 40 °C and were used for the assays.

### 2.3 Microbial cultures and growth conditions Microbial strain

The microorganisms were authenticated, collected from MRMC Gulbarga, Karnataka, India and maintained on Potato Dextrose Agar media and Nutrient agar media. The fungi and bacteria used were selected because they have been implicated with skin, oral and intestinal tract, urinary tract of man. Two dermatophytic fungi namely *Trichophyton rubrum*, *Microsporum gypseum*, dimorphic fungi such as *Candida albicans*, and saprophytic fungi like *Aspergillus flavus*, *Aspergillus niger* and pathogenic bacteria like, *Staphylococcus aureus*, *E. coli*, *Bacillus subtilis*.



Fig 1: *Argemone mexicana* plant.

### 3. Results and Discussion

The antimycotic activity of ethanolic leaf extract of *A. mexicana* (Figure 1) at different concentrations was determined by agar well diffusion method (Plate 1-3). A total of 9 microorganisms that consisted of five fungi and four bacteria were tested. Standard antibiotics (Ketoconazole) were used as positive control while DMF as negative control. Maximum antimycotic activity was observed against *M. gypseum* (13 mm) followed by *T. rubrum* (11 mm), *C. albicans* (9 mm), *A. flavus* (8.4 mm), *A. niger* (8 mm). Among bacteria tested, *B. subtilis* showed maximum inhibition of (8.2 mm) followed by *E. coli* (8 mm) and *S. aureus* (7.5 mm). The MIC was determined against all the test fungal and bacterial strains. The sensitivity of the test organisms varied with the species and strains. As shown in Tables 1 & 2 the results obtained from the agar well diffusion method and the measurement of the MIC (Figure 2) values revealed that *T. rubrum*, *M. gypseum*, *C. albicans* were the most sensitive with the lowest MIC values of 0.62 mg/ml in the presence of methanol leaf extract while *B. subtilis* was showed least sensitive. The methanol extracts of *A. mexicana* leaf materials was found to possess better wound-healing property over other extracts (G. K. Dash and P. N. Murthy (2011)) [3]. *Candida* species are known to be involved in several diseases such as intertrigo and Diaper rashes and chronic mucocutaneous candidiasis all of which are skin disease. This observation is perfectly in line with the assertion of Coffey (1993) [2] who stated that *A. mexicana* can be used for the treatment of cutaneous affections, skin diseases and itches. Observed inhibition of the bacterial by *A. mexicana* could be of significant importance in the pharmaceutical industry, especially for treatment of diseases caused by some of the bacteria and fungi tested in this study. *A. mexicana* derived compounds could play an important role in the development of drugs to control several diseases caused by various bacterial, particularly the pathogenic *P. aeruginosa* (Siddiqui et al., 2002) [4].

Table 1: Antimycotic activity of *Argemone mexicana* L. ethanol young leaf extract.

Fungal strains	Different conc of crude and inhibition zone in mm							Control (DMF)	Standurd (Ketokonazole)
	40mg/ml	20mg/ml	10mg/ml	5mg/ml	2.5mg/ml	1.25mg/ml	0.62mg/ml		
<i>T. rubrum</i>	11.0	07.6	07.0	06.6	06.1	05.8	05.2	05.0	20.0
<i>M. gypseam</i>	13.0	09.5	08.2	07.8	06.5	05.5	05.1	05.0	28.0
<i>C. albicans</i>	12.2	09.6	08.4	07.2	06.5	06.0	05.2	04.1	20.0
<i>A. niger</i>	11.2	09.7	08.4	07.0	06.8	06.0	---	04.5	16.0
<i>A. flavus</i>	10.5	08.1	07.4	06.3	05.9	05.4	---	05.1	29.0

Tr - *Trichophyton rubrum*, Tt - *Trichophyton tonsurans*, Tm- *Trichophyton mentagrophytes*, Mg- *Microsporum gypseum*, Ca - *Candida albicans*, K-Ketoconazole.

Table 2: Antibacterial activity of *Argemone mexicana* L. ethanolic young leaf extract. (Well diffusion technique).

Bacterial strains	Different conc of crude and inhibition zone in mm							Control (DMF)	Standurd (Streptomycene sulphate)
	40mg/ml	20mg/ml	10mg/ml	5mg/ml	2.5mg/ml	1.25mg/ml	0.62mg/ml		
<i>E. coli</i>	08.0	07.6	06.1	05.7	05.3	04.9	---	04.0	20.1
<i>B. subtilis</i>	08.2	07.4	06.8	05.3	04.5	---	---	04.1	18.0
<i>S. marcescens</i>	06.5	06.1	05.4	05.0	04.6	---	---	05.0	18.4
<i>S. aureus</i>	07.5	06.9	06.4	05.8	05.1	04.7	---	04.5	19.0

Sa- *Staphylococcus aureus*, P a- *Pseudomonas aeruginosa*, Bs- *Bacillus subtilis*, Ec- *Escherichia coli*, S-Streptomycin Sulphate.

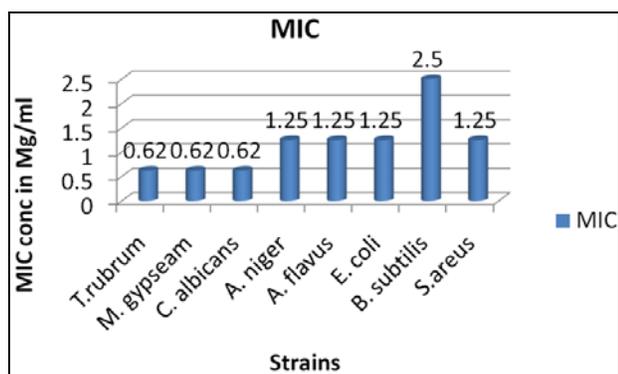


Fig 2: Minimum Inhibitory Concentrations against mycotics.

#### 4. Conclusion

In conclusion, the *A. mexicana* young leaves extract tested in this study had potential antimycotic activity against the reference extracts possess compounds with good antibacterial properties that can be used as antimicrobial agents in the search of new drugs.

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