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Research Paper

In-Vitro Antileprotic Activity of Ethanolic Extracts of Mimosa Pudica L. and Prosopis Cineraria L. (Druce)

Pharmacy

KEYWORDS : Leprosy, Prosopis cineraria, Mimosa pudica, antileprotic activity, agar-well diffusion method, zone of inhibition

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ABSTRACT

Leprosy is a chronic infectious disease mainly affecting skin and peripheral nerves in patients. The present study investigated activity of ethanolic extracts of roots of Mimosa pudica and bark of Prosopis cineraria against Mycobacterium leprae using agar-well diffusion method. Zone of inhibition was determined by taking Dapsone as the positive control and ethanol as the negative control. M. pudica and P. cineraria were individually found effective against M. leprae. When combined together, they showed an enhanced antileprotic activity.

1. Introduction

Leprosy is a chronic infectious disease caused by gram positive bacillus, *Mycobacterium leprae*. It mainly affects skin and peripheral nerves. It may also affect the mucosa of upper respiratory tract and eyes. If left untreated, leprosy can cause progressive and permanent damage to the skin, nerves, limbs and eyes[1-2]. Multidrug therapy (MDT) is frequently used in the treatment of leprosy. However, increasing drug resistance in leprosy is a serious concern today, and there is a need for the development of newer and more effective anti-infective drugs useful in the leprosy treatment[3-4].

Many medicinal plants possess effective therapeutic activities. Due to increasing resistance in microorganisms towards synthetic antibacterial drugs and side effects of these drugs, medicinal plants are now gaining popularity in the treatment of infectious diseases[5]. Two medicinal plants considered of great importance are *Mimosa pudica* L. and *Prosopis cineraria* L. (Druce). *M. pudica* is commonly called as Chui-mui. It is a creeping annual or perennial herb of Fabaceae - Mimosoideae family. Traditionally it is used in the treatment of many diseases like bilious fevers, piles, jaundice, leprosy, dysentery, inflammation, asthma, leucoderma, menorrhagia, haemorrhoids, wounds, whooping cough and diarrhea. It is found to be cultivated throughout the tropics and subtropics regions of the world. *P. cineraria* also called as Khejri, is a small tree of Fabaceae family. Traditionally it is used in the treatment of asthma, bronchitis, dysentery, leucoderma, leprosy, muscle tremors, snakebite, rheumatism, inflammations, piles and other skin problems[6-7]. It is found in the arid and semi arid, lowland tropical and subtropical regions of the world.

The present study was undertaken to investigate the antileprotic activity of the ethanolic extracts of roots of *Mimosa pudica* and bark of *Prosopis cineraria* against *Mycobacterium leprae* using agar-well diffusion method.

2. Materials and Methods

2.1 Plant material

Collection of whole plant of *Mimosa pudica* L. was done from Gungun Nursery, Chopasani Housing Board, Jodhpur (Raj.). Bark of the *Prosopis cineraria* L. (Druce) was collected from Pal Village, Jodhpur (Raj.). Their taxonomical identification and authentication were done by Dr. Vinod Maina, Joint Director, Botanical Survey of India, Arid Zone Regional Center, Jodhpur (Raj.).

2.2 Test Organism

The test microorganism used in the study was *Mycobacterium leprae*. The bacterial strain was maintained in sterile conditions and was grown on nutrient agar medium. Standard bacterial suspension of 10^8 (CFU)/ml was prepared and used[8].

2.3 Preparation of extracts

Whole plant of *M. pudica* was washed with distilled water. Roots of the plant were separated and air dried at room temperature under shade. Bark of *P. cineraria* was air dried at room temperature under shade. 250 gm each of the dried roots of *M. pudica* and dried bark of *P. cineraria* were extracted individually with ethanol by soxhelation (continuous hot percolation) method. Phytochemical investigation of the *M. pudica* and *P. cineraria* extracts was conducted. These extracts were used to study the *in-vitro* antileprotic activity.

2.4 Agar-well diffusion method

Agar-well diffusion method[9-10] was used to evaluate *in-vitro* antileprotic activity of *M. pudica* and *P. cineraria* extracts. Five sets, each of three sterile nutrient agar plates were prepared for examining the zone of inhibition against the test microorganism *M. leprae*. Five ethanolic extract solutions, each of 500 µg/ml concentration were prepared. Out of these, three solutions were made by dissolving *M. pudica* and *P. cineraria* extracts in ethanol in the ratios 1:2; 1:1; and 2:1 respectively, whereas two solutions were prepared by dissolving *M. pudica* extract and *P. cineraria* extracts individually in ethanol.

The prepared agar plates were inoculated with the test organism. Three wells were made in the medium of each plate using a sterile cork borer. Out of the three wells, one well was filled with 100 µg/ml Dapsone solution (positive control), the second well was filled with one of the ethanolic extract solution (test) and the third well was filled with ethanol (negative control). Therefore, all observations were made in triplicate. All the plates were then incubated at 37°C for 24 hrs. After incubation time period, the plates were examined for the presence of zone of inhibition[11-12]. Diameter (in mm) of the inhibition zone around the well (including the well diameter) was measured.

3. Result and Discussion

In-vitro antileprotic activity of *M. pudica* and *P. cineraria* in terms of diameter of zone of inhibition is shown in table 1. In the study, *P. cineraria* was found to possess more potent antileprotic activity as compared to *M. pudica*. When extracts of both the plants were mixed together, they showed an enhanced synergistic activity. The maximum zone of inhibition was found when *M. pudica* and *P. cineraria* extracts were mixed in 1:1 ratio.

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Table 1: *In-vitro* Antileprotic Activity of Ethanolic Extracts of *Mimosa pudica* and *Prosopis cineraria* against *Mycobacterium leprae*

Ratio of Extracts	*Zone of inhibition in mm (Mean ± S.D)		
	[1]Dapsone (100 µg/ml)	[2] Extract (500 µg/ml)	[3]Ethanol
P. cineraria : *M. pudica* (1:2)	26 ± 0.58	13± 1.15	NA
P. cineraria : *M. pudica* (1:1)	26 ± 1.00	22 ± 0.58	NA
P. cineraria : *M. pudica* (2:1)	26 ± 0.58	17 ± 1.73	NA
P. cineraria	26 ± 1.15	12 ± 2.08	NA
M. pudica	26 ± 1.53	09 ± 1.00	NA

*Mean of triplicate determinations; All values are Mean ± Standard Deviation

1-Positive control; 2-Test sample; 3-Negative control; NA=No Activity

4. Conclusion

In the present study, ethanolic extracts of roots of *Mimosa pudica* and barks of *Prosopis cineraria* showed effective *in-vitro* activity against *Mycobacterium leprae*. When the extracts of these plants were combined together, they showed enhanced antileprotic activity. *M. pudica* and *P. cineraria* plants are therefore potential source of antimicrobial compounds for the treatment of leprosy. Further investigations towards isolation and characterization of active principles of these plants can help in developing effective treatments for leprosy.

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