INTRODUCTION

Being sub-tropical country, India has vast natural resources including a large variety of medicinal herbs with a high potential ability in Ayurvedic, Unani, Siddha traditional medicines. Different medicinal plants were in use as early as 5000 to 4000 BC in China and in 1600 BC by Syrians, Babylonians, Hebrews, Ethiopians and Egyptians (Mirgissa, 1998, Dery et al., 1999). India is one of the 12 mega biodiversity center having over 45,000 plant species. More than 35,000 plant species are known to have different medicinal properties across the world (Lewington, 1993). About 1500 plants with medicinal uses are mentioned in ancient texts of which 800 have been used in traditional medicines (Kamboj, 2000). Traditional medicine was the only option available for healthcare prior to the introduction of modern medicines for prevention, diagnosis and treatment of social, mental and physical illness (Dawit, 1986).

Herbal medicine is still the mainstay of about 75-80% of the world population, mainly in the developing countries, for primary health care (Kamboj, 2000). The traditional knowledge on medicinal plants is the main basis for biocultural and ecosystem conservation as well as further pharmacological, phytochemical, toxicological and ecological studies (Khan et al., 2010). The pharmaceutical sector is using 280 medicinal plant species, out of which 175 are from the Indian Himalayan Region (Dhar et al., 2002). Pharmaceutical companies have screened more than 25,000 plants for anticancer drugs (Saxe, 1987). For example, most legumes, fruits (such as apples, grapes, pears, plums, raspberries and strawberries), vegetables (such as broccoli, cabbage and onion) are rich in polyphenol antioxidants (Breton, 2008). It has been reported that polyphenolic compounds have coronary heart disease prevention ability and anticarcinogenic properties (Satora et al., 2008).

MATERIALS AND METHODS

Collection of Plants Leaves
Fresh leaves of Acacia arabica, Callistemon lanceolatus, Lantana camara, Mentha piperita, Murraya koenigii and Parthenium hysterophorus free from disease were collected from the Ch. Charan Singh University Campus, Meerut. The leaves were washed thoroughly 2-3 times with running tap water and finally with sterile double distilled water to remove possible dust or surface contaminants. The washed leaves were dried at room temperature for 6-8 days under shade.

Preparation of Crude Aqueous Extract of Leaves
5 gm powder of dried leaves of each of the test plant was dispersed in 100 ml of sterilized double distilled water separately and shaken for 24 h at a constant speed of 200 rpm on a rotator shaker at 25 ºC temperature. The resultant suspension was filtered through muslin cloth followed by sterilization through membrane filter (pore size 0.22 µm). Final volume of resultant filtrate was made to 100 ml with sterilized distilled water.

Isolation of Microfungi from Soil
1 kg of soil was collected aseptically from apparently pollution free 10 sites of the park in Pandav Nagar ‘B’ block, Meerut. The upper layer of the soil was removed with the help of a trowel to remove extraneous litter/organic matter. The samples were analyzed for soil mycobiota using dilution plate method (Waksman, 1927). Potato Dextrose Agar (PDA) medium was used for the isolation of fungi from composite soil sample using 1:100 and 1:1000 dilutions. Identification of fungal species was made based on standard taxonomic characters using documented scientific literature. More than 40 species were found of which Aspergillus niger, Aspergillus fumigatus, Cladosporium herbarum and Penicillium spinulosum were the dominant species.

Antifungal Activity of Crude Extract
Antifungal activity was tested on PDA using 25 and 50% final concentrations of crude extract. The strength of PDA was adjusted so as to obtain same amount of nutrients in control and test plates. 5-day old cultures of Aspergillus niger, Aspergillus fumigatus, Cladosporium herbarum and Penicillium spinulosum were used by disc (6 mm diam.) transfer technique. Petri plates were incubated at 25 ºC temperature and radial growth of test species was recorded as colony diameter (mm) in 5-7 day old cultures. The percentage inhibition was calculated using the following formula:

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\text{% Growth Inhibition} = \left( \frac{\text{Linear growth in control} - \text{Linear growth in crude extract}}{\text{Linear growth in control}} \right) \times 100
\]

RESULTS AND DISCUSSION

Results obtained in the present study relieved that the aqueous leaves extract of all the four medicinal plants and two weeds posses potential antifungal activity against Aspergillus niger, Aspergillus fumigatus, Cladosporium herbarum and Penicillium spinulosum. Acacia arabica leaf extract concentration showed a substantial increase in inhibition of A. fumigatus (50% to 55.35%) and P. spinulosum (53.84% to 58.97%) while it showed a steep reduction from 29.16% to 27.08% in case of A. niger. The Cladosporium herbarum showed an increase in stimulation as the concentration increased from 25% to 50%. The leaf extract showed maximum inhibition of P. spinulosum (53.84%)
followed by A. fumigatus (50%) and A. niger (29.16%) at 25% concentration. This pattern was also followed by higher concentration (50%) of the used extract. In case of Cladosporium herbarum the leaf extract showed a similar pattern of increase in stimulation of the test fungus (from 20% to 25%). The leaf extract of Callistemon lanceolatus showed a substantial increase in inhibition of A. fumigatus (56.36% to 74.54%), Cladosporium herbarum (37.00% to 58.62%) and P. spinulosum (45.00% to 60.00%). The A. niger showed a decrease in stimulation as concentration increased from 25% to 50%. The leaf extract showed maximum inhibition of A. fumigatus (74.54%) followed by P. spinulosum (60%) and Cladosporium herbarum (58.62%) at 50% concentration. This pattern was also followed by lower concentration (25%) of the used extract. In case of A. niger the leaf extract showed a pattern of decrease in stimulation of the test fungus (from 56.25% to 37.50%) as the concentration increase from 25% and 50%. The leaf extract of Lantana camara showed a pattern to inhibit all the test fungi up to a remarkable extent except Cladosporium species; where the extract stimulate the growth of the fungus. The extract concentration showed a substantial increase in inhibition of A. fumigatus (40% to 62.22%), A. niger (44.44% to 55.55%) and P. spinulosum (30.43% to 52.17%). The Cladosporium herbarum showed a decrease in stimulation as concentration increased from 25% to 50%. The leaf extract showed maximum inhibition of A. fumigatus (62.22%) followed by A. niger (55.55%) and P. spinulosum (52.17%) at 50% concentration. This pattern was different for lower concentration (25%) as maximum inhibition was showed by A. niger (44.44%) followed by A. fumigatus (40%) and P. spinulosum (30.43%). In case of Cladosporium herbarum the leaf extract showed a pattern of decrease of stimulation of the test fungus as the concentration increase (26.66% to 13.33%). The leaf extract of Mentha piperita showed a pattern to inhibit all the test fungi. The extract concentration showed a substantial increase in inhibition of A. fumigatus (38.46% to 48.71%) and P. spinulosum (28.20% to 43.58%) while it showed a steep reduction from 27.02% to 5.40% in case of A. niger. The Cladosporium herbarum showed a same percentage of inhibition as the concentration increase from 25% to 50%. The leaf extract showed maximum inhibition of A. fumigatus (48.71%) and P. spinulosum (43.58%) at 50% concentration. This pattern was also followed by lower concentration (25%) of the used extract. In case of Cladosporium herbarum in both the concentrations showed the same percentage of inhibition i.e. 20%. In case of A. niger the leaf extract showed a pattern of decrease of inhibition of the test fungus (from 27.02% to 5.40%). The leaf extract of Murraya koenigii showed a pattern to inhibit all the test fungus up to a remarkable extent. The extract concentration showed a substantial decrease in inhibition of P. spinulosum (78.26% to 56.52%), A. fumigatus (52.5% to 50%) and A. niger (51.85% to 42.59%) while it showed a steep reduction in case of Cladosporium herbarum. The leaf extract showed maximum inhibition of P. spinulosum (78.26%) followed by A. fumigatus (52.5%) and A. niger (51.85%) at 25% concentration. This pattern was also followed by higher concentration (50%) of the used extract. In case of Cladosporium herbarum the leaf extract showed a pattern of increase of inhibition of the test fungus (from 15.38% to 23.07%). The leaf extract of Parthenium hysterophorus showed a substantial increase in inhibition of P. spinulosum (37.5% to 67.5%), A. niger (50% to 66.6%) and A. fumigatus (38.33% to 55%) while it showed both the stimulation (in 25% concentration) and inhibition (in 50% concentration) in case of Cladosporium herbarum. The leaf extract showed maximum inhibition of P. spinulosum (67.5%) followed by A. niger (66.6%), A. fumigatus (55%) and minimum inhibition was showed by Cladosporium herbarum (10%) at 50% concentration. In case of 25% concentration maximum inhibition was showed by A. niger (50%) followed by A. fumigatus (38.33%), P. spinulosum (37.5%) and minimum inhibition in case of Cladosporium herbarum (10%).

![Graph A](image1.png)

![Graph B](image2.png)

Fig. Growth of test fungi in the presence of leaves extract of the *Acacia arabica* (A) zone of activity (B) percentage activity.
Fig. Growth of test fungi in the presence of leaves extract of the *Callistemon lanceolatus* (A) zone of activity (B) percentage activity

Fig. Growth of test fungi in the presence of leaves extract of the *Lantana camara* (A) zone of activity (B) percentage activity
Fig. Growth of test fungi in the presence of leaves extract of the *Mentha piperita* (A) zone of activity (B) percentage activity

Fig. Growth of test fungi in the presence of leaves extract of the *Murray koenigii* (A) zone of activity (B) percentage activity
Fig. Growth of test fungi in the presence of leaves extract of the *Parthenium hysterophorus* (A) zone of activity (B) percentage activity

REFERENCES


