

Inhibitory effect of medicinal plant extracts on spore germination of *Curvularia lunata*

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ABSTRACT

Dematiaceous moulds are pathogenic micro-organism and act as etiological agent of mycoses with different degree of severity on human and animals. These moulds also can cause spoilage of food, crops and storage of food products. The information regarding antimicrobial efficacy of the plant extracts on these moulds is scanty. The antifungal activity of an aqueous extract of the leaf e.g. *Allium sativum*, *Acacia arabica*, *Achyranthus aspera*, *Alternanthera sessilis*, *Ocimum sanctum*, *Punica granatum*, fruits of *Terminalia bellirica*, *Terminalia chebula*, Triphla, *Emblica officinalis*, stem gel of *Aloe barbadensis* and petals of *Rosa indica* was tested against *C.lunata*. The extracts showed a broad fungitoxic spectrum as tested by inhibition of spore germination. Exposure of the spores of *C. lunata* to the extract of *Allium sativum* for 6-8 hrs. inhibited the spore germination by 91.40% similarly the extract of *Rosa indica* inhibited the spore germination by 43.14%. The aim of the present investigation have to assess the antifungal activities of the plant extracts on the spore germination of *Curvularia lunata*.

Key words: Plant extracts, Dematiaceous moulds, *Allium sativum*, *Rosa indica*.

Plants are rich in a wide variety of secondary plant metabolites such as tannins, terpenoids, alkaloids and flavonoids. Medicinal plants represent a rich source of antimicrobial agents.

Medicinal plants have been used on traditional treatment of numerous human diseases for thousands of years in many parts of the world. Several higher plants and their

constituents have shown success in plant disease control and proved to be chemical fungicides^{4,10,12}. The extracts of plants also exhibited marked effect on fungal spore germination^{4,9}.

The plant extracts exhibit marked effect on germination of fungal spores. The inhibitory effect of leaf extracts of *Allium sativum*, *Acacia arabica*, *Achyranthus aspera*,

Alternanthera sessilis, *Ocimum sanctum*, *Punica granatum* fruits of *Terminalia bellirica*, *Terminalia chebula*, Triphala, *Emblica officinalis*, stem gel of *Aloe barbadensis* and petals of *Rosa indica* on spore germination of *Curvularia lunata* has been used during present study. The plant extracts exhibited variable efficacy against test fungus. Maximum inhibition of spore germination of test fungus by extract *Allium sativum* (91.49%) showed maximum antifungal activity. Minimum inhibitory effect of *Rosa indica* was 56.86%. It showed less antifungal activity against *Curvularia lunata*. The aim of the present investigation was to assess the antifungal activities of the plant extracts on the spore germination of *Curvularia lunata*.

The extract of various plant parts are recommended to control the disease^{3,11}. In the present study an attempt has been made to observe the effect of different plant extracts as fungitoxics on *Curvularia lunata*. These findings provide a platform for the researchers to develop more efficient new herbal formulations.

Fresh healthy leaves of *Acacia arabica*, *Achyranthus aspera*, *Alternanthera sessilis* Linn., *Ocimum sanctum* Linn., *Punica granatum*, stem gel of *Aloe barbadensis* Mill. and fruits of *Terminalia bellirica*, *Terminalia chebula*, Triphala, *Emblica officinalis* Gaertn. and petals of *Rosa indica* were taken. Leaves and fruits were washed with running water and wiped with blotting paper. The effect of plant extracts on fungal spore germination was studied by taking a drop of plant extract on slide to which a loopfull of spores were placed. All slides were kept on moist blotting paper to Petriplates to maintain humidity. After 6 hrs. the percentage of spore germination was observed and inhibitory effect was recorded.

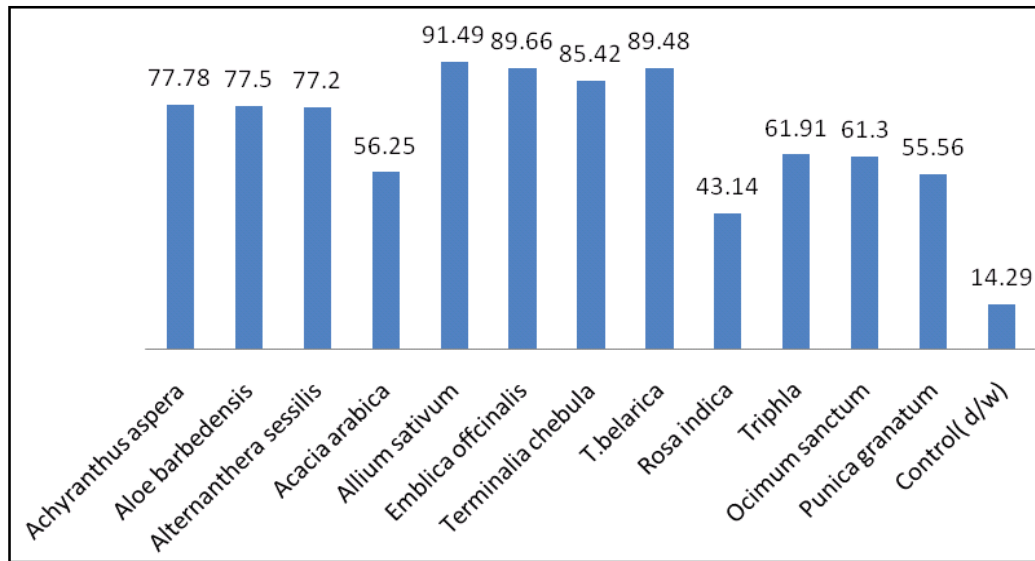
A fine aqueous paste of plant parts were made separately, filtered, autoclaved and stored. To avoid contamination and prospective chemical alterations, the extract was generally used within 3-4 days.

Medicinal plants represent rich sources of antimicrobial agents^{6,8}. All the plant extracts have more or less inhibitory tendency. Various plant extracts have been evaluated for their antifungal property against different pathogens^{7,14}. Spore germination of *C. lunata* were more effected by *Allium sativum* extract, percentage of spore germination were found to be maximum in the presence of *Rosa indica*. The effect of plant extract on spore germination of *C. lunata* are according to (Table-1) 85.71%, germination in D/W (controlled).

Minimum spore germination was observed in *Allium sativum* (8.51%). It shows maximum inhibition percentage (91.49%). In the presence of *Emblica officinalis* (89.66%), *Terminalia bellirica* (89.48%), *T. chebula* (85.42%), *Achyranthus aspera* (77.78%), *Aloe barbadensis* (77.50%), *Alternanthera sessilis* (77.20%), *Triphala* (61.91%), *Ocimum sanctum* (61.30%), *Acacia arabica* (56.25%), *Punica granatum* (55.56%) extracts inhibitory effect was observed on spores of test fungi. Maximum percentage spore germination was observed in *Rosa indica* (56.86%) It showed minimum inhibition percentage (43.14%) of spore. The extract of plant *Allium sativum* showed maximum antifungal activity, whereas other extracts exhibited more or less antifungal activity against *C. lunata*. Therefore the study suggests that aqueous extract of screened plants would be helpful in treating diseases caused by *C. lunata*. It is therefore, encouraging to identify and characterize the active principle. Moreover,

Table-1. percentage of inhibition of spore germination of *Curvularia lunata* against medicinal plant extracts

S.No.	Medicinal plant	Percentage of spore germination	Percentage of inhibition
1.	<i>Achyranthus aspera</i> Linn.	22.22	77.78
2.	<i>Aloe barbadensis</i> Mill.	22.50	77.50
3.	<i>Alternanthera sessilis</i>	22.80	77.20
4.	<i>Acacia arabica</i> var. <i>indica</i> Willd. (Benth)	43.75	56.25
5.	<i>Allium sativum</i> Linn.	8.50	91.49
6.	<i>Emblica officinalis</i> Gaertn.	10.34	89.66
7.	<i>Terminalia chebula</i> Retz.	14.58	85.42
8.	<i>T. belirica</i> Roxb.	10.52	89.48
9.	<i>Rosa damscena</i> Mill.	56.86	43.14
10.	Triphla	38.09	61.91
11.	<i>Ocimum sanctum</i> Linn.	38.70	61.30
12.	<i>Punica granatum</i> Linn.	44.44	55.56
13.	Control (d/w)	85.71	14.29



Graph 1. Percentage of inhibition of spore germination of *Curvularia lunata* against medicinal plant extracts.

because of the water soluble nature of toxic principle, it is ideal for developing into herbal pesticides. The inhibitory effect of the plant extract might be attributed to the presence of some antifungal toxicants. It was revealed that the antifungal activity of extract was enhanced by increase in concentration of extract. It also supports the earlier investigation² that the tannins isolated from the medicinal plant possess remarkable toxic activity against bacteria and fungi and may assume pharmacological importance. Extensive bioprocess parameter studies should be undertaken for sterilized aqueous extract of *Allium sativum* as a strong antifungal agent against *C.lunata*. On the basis of above experiment it may be concluded that many plants contain some fungitoxic compounds which inhibit the mycelial growth of fungi, further more studies are needed to isolate, purify and identify, the active ingredient in promising plant extracts for commercial use in case of disease caused by fungal pathogens.

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