

Screening of some medicinal plants for Antifungal Activity

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ABSTRACT

In India pesticides are used for crop protection as extensively as to the extent using nearly 85,000 tonnes annually. Several fungicides like Thiram, Carbendazim, and Nabem are used for plant protection.

In this study an attempt was made to evaluate anti fungal assay of crude extract of some medicinal plants, which are very common in our area. The extract tested; possess various degree of anti fungal activity. Medicinal plants exhibit anti fungal activity since they contain innumerable biological active (compound) chemical constituents.

Plants selected for anti fungal assay are commonly present. These plants include *Lantana indica*, *Ailanthus excelsa*, *Annona squamosa*. The collected plants were identified with the help of flora of Madras Presidency. From the collected plants *Lantana indica*, *Ailanthus excelsa* were used for the evaluation of anti fungal properties. The plants were shade dried and then powdered and crude extract, alcoholic extract were prepared.

Send Mycoflora of Groundnut, Jawar and Tur were isolated by blotter paper method. The fungi associated with seed are *Aspergillus*, *Fusarium*, *Rizopus*, *Pencillium*, *Alternaria*, *Cladosporium*, *Curvularia*, *Cephalosporium* etc. The seeds are treated with these plant extracts for 5, 10 & 15 min., the seeds treated the *Lantana indica* inhibit the growth of many dominant fungi like *Fusarium*, *Alternaria*, *Cladosporium*, *Curvularia* etc. From this study it is noted that the plant extracts are used as antifungal agents and these plants extracts are not hazardous as like Pesticides.

INTRODUCTION

The increased use of pesticides in the field of Agriculture had become major source of environmental pollution affecting the ecosystems.

Consumption of organo mercurial fungicides which are primarily used for seed treatment is gradually increasing. A wide variety of fungicides used for seed treatment are being produced in India, These include organo mercurial, Sulphur, Thiram, Mancozeb, Carbendazim etc. These fungicides applied to crop (seed) are long lived and residues persists in soil causing pollution. To solve this problem seed treatment by plant extract is a cheap. Though numerous reports have appeared on antifungal activity of plants and their secondary metabolites. Scientific evaluation of the antifungal activity of plants still remains an area of intensive investigation; hence a preliminary screening of three locally available plants was undertaken for their antifungal acitivity.

The results are average of three independent experiments.

The plant selected for antifungal activity are very commonly present in our area

1. *Lantana indica* Roxb. (Verbenaceae)
2. *Ailanthus excelsa*. Roxb. (Simarubaceae)
3. *Annona Squamosa*. Linn. (Annonaceae)

Plant extract for the control of seed borne diseases is a method devoid of any health hazard problem. Hill bunt of wheat (*Tilletia foetida*) was effectively controlled by seed treatment with plant extracts of *Datura Stramonium*. *Thuja* sp. and *Eucalyptus* sp. Singh et al. (1979)

Dixit et al. (1983) have listed a number of oils isolated from plants like *Cedrus deodara* and *Aegle marmelos* which exhibit fungicidal properties against seed borne Pathogens.

Crude extractrs of *Amaranthus spinosus*, *Nerium indicum* and *Solanum nigrum* reduce Uredospore germination of *Puccinia helianthi* (Wadhvani et al. 1986)

MATERIALS AND METHODS

1. Preparation of Plant Extracts :

Preliminary screening of three locally available plants was undertaken for their antifungal activity.

Plants selected are

1. *Lantana indica* Roxb. (Verbenaceae)
2. *Ailanthus excelsa*. Roxb. (Simarubaceae)

3. *Annona Squamosa*. Linn. (Annonaceae)

For the preparation of crude extract, the leaves of the plant were dried into hot air oven and plant leaves were crushed into fine powder. 50 gm. of the dry plant material homogenized and made into a paste with sterile distilled water.

For the preparation of acetone extract 50 gm of dry plant material was ground to fine powder and mixed with 25 ml of acetone. The suspension was allowed to sediment over night at room temperature.

These extracts was used for testing antifungal activity.

2. Seed selection and study of Mycoflora

Seeds of Groundnut, Jawar and Tur are collected from different localities of Udgir are and also from some Farmers. The surface Mycoflora of seeds was studied by using Agar plate and Blotter paper method. The agar media used is Potato Dextrose Agar (PDA) .

The number of seeds per plate are 10. The plates were incubated at 28 ± 2^0 C for 5 - 8 days and observation of Fungal colonies identified up to genera.

Seed Treatment

To determine the effect of different plant extract in controlling seed brone Fungi seed samples were dressed separately with three plant extracts by soaking seeds in it for 5,10 and 15 min and incubated in PDA and boltter paper for 4 - 6 days. Untreated and Acetone treated seeds used as control and didn't showed any activity.

Table No.1
Mycoflora of Ground nut, Jawar and Tur on untreated seeds

| Sr.No. | Seed | Mycoflora isolated (Name of Fungus) |
|--------|--|---|
| 1. | Groundnut (<i>Arachis hypogaea</i>) | <i>Aspergillus niger</i> , <i>A. flavus</i> , <i>Rhuzopus</i> , <i>Penicillium</i> , <i>Alternaria</i> , <i>Rhizoctonia</i> , <i>Curvularia</i> , <i>Fusarium</i> |
| 2. | Jawar (<i>Sorghum Vulgare</i>) | <i>Aspergillus niger</i> , <i>A. flavus</i> , <i>Curvularia</i> , <i>Drechslera</i> , <i>Fusarium</i> |
| 3. | Tur (<i>Cajanus Cajan</i>) | <i>Aspergillus</i> , <i>Fusarium</i> , <i>Penicillium</i> , <i>Cladosporium</i> , <i>Cephalosporium</i> , <i>Rhizoctonia</i> |

Table No.2

Mycoflora on Treated Seeds

| Sr. No. | Plant (leaves Extract) | Time in min | Groundnut | Jawar | Tur |
|---------|--------------------------|-------------|---|---|---|
| 1. | <i>Lantana indica</i> | 5 | <i>Aspergillus, Curvularia, Drechslera, Fusarium</i> | <i>Aspergillus Cladosporium Fusarium Cephalosporium</i> | <i>Aspergillus Fusarium Alternaria</i> |
| | | 10 | <i>Aspergillus</i> | <i>Aspergillus Cladosporium</i> | -- |
| | | 15 | -- | | -- |
| 2. | <i>Ailanthus excelsa</i> | 5 | <i>Aspergillus, Penicillium, Rhizopus, Fusarium</i> | <i>Fusarium Alternaria Aspergillus</i> | <i>Aspergillus Fusarium Pencillium Rhizopus</i> |
| | | 10 | <i>Aspergillus, Rhizopus</i> | <i>Aspergillus Alternaria</i> | <i>Fusarium Rhizopus</i> |
| | | 15 | <i>Aspergillus</i> | <i>Aspergillus</i> | <i>Fusarium</i> |
| 3. | <i>Annona Squamosa</i> | 5 | <i>Aspergillus, Penicillium, Drechslera, Fusarium</i> | <i>Aspergillus Cladosporium Alternaria</i> | <i>Aspergillus Fusarium Rhizopus</i> |
| | | 10 | <i>Aspergillus Drechslera, Fusarium</i> | <i>Aspergillus Alternaria</i> | <i>Aspergillus Fusarium</i> |
| | | 15 | <i>Aspergillus Fusarium</i> | <i>Aspergillus Alternaria</i> | <i>Aspergillus</i> |

Table No.3

Percentage infection of seed and seed germination

| Sr. No. | Seed Type | Untreated | Treated |
|---------|---|-----------|-----------|
| 1. | Groundnut % Germination % Infection | 80 50 | 90 10 |
| 2. | Jawar % Germination % Infection | 100 60 | 100 15 |
| 3. | Tur % Germination % Infection | 80 30 | 80 5 |

RESULT

The Mycoflora of untreated seed of from Groundnut, Jawar and Tur were *Aspergillus*, *Penicillium*, *Alternaria*, *Drechslera*, *Fusarium*, *Rhizoctonia*, *Rhizopus*, *Curvularia*, *Cladosporium* etc. The seed germination percentage ranged from 80 to 100% and there is no effect of plant extract on germination percentage of seeds. The result on plant extract treatment showed that in case of *Lantana indica* considerably reduced the Mycoflora. It is also clear from the result that the treatment with the plant extract does not exerts any effect on germination of seed. Mycoflora of Groundnut, Jawar and Tur seeds was completely checked with the treatment of *Lantana indica* crude extract for 15 min. The other two plant extracts from *Ailanthus excelsa* and *Annona Squamosa* also reduced the Mycoflora.

DISCUSSION

From the data obtained it may be concluded that Mycoflora associated with seeds can effectively controlled by using plant extracts. The plants used in treatment are very common and have no adverse effect on seed germination.

Lantana indica, *Ailanthus excelsa* shows the antifungal activity so the extracts of these plants can be applied (as a seed treatment) to treat seeds before sowing. Seed treatment with plant extract has not adverse effect on seed as well as not create any problem of pollution. Fungicides are expensive dangerous and not degraded in soil as compared with these plant extract. The plant extract were more active than acetone extract. The fact that the crude extract is more active than the acetone extract implies that the antifungal action may be due to the synergistic action of the different chemical constituents. Further studies on the plants which showed potent antifungal activity are in progress.

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