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# Effect of Plant Extracts on Seed Borne Mycoflora in *Zea mays* L.

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## Abstract

Aqueous extract of leaves of *Azadirachta indica Juss., Datura metal* L., *Parthenium hysterophorous* L., *Vitex negundo* L., were evaluated for the control of fungi on seeds of maize (*Zea mays* L.). The seeds were soaked in 25%, 50%, 75% and 100% for 48 hours. All the plant extract had significant inhibitory growth effect on the fungal pathogen. Extract of *Azadirachta indica Juss*., *Datura metal* L., *Parthenium hysterophorous* L. and *Vitex negundo* L was recorded inhibitory to all recorded fungi at 75% and 100% concentration. Azadirachta indica Juss., Datura metal L and Vitex negundo was more effective than *Parthenium hysterophorous* plant extract and compared to control of the pathogen.

**Keywords:** Leaf extract datura metal • *Parthenium hysterophorous* • *Vitex negundo* • *Azadirachta indica* • Seeds Zea mays.

## Introduction

Seed borne mycoflora in any crop is major issue for agricultural sector from recent years. The soil also contaminated with seed borne mycoflora which results in increase in agricultural practices, reduction in crop yield and effect on the quality parameters of the seed. In india, various agricultural crops are cultivated in different states and in unbalanced environmental climatic conditions. *Zea mays* (L.) is major forage crop in india cultivated in different states in large scale with high productivity. The life cycle of maize is 95 to 120 days. At the time of harvesting, if unbalanced synchronous maturity the chances of infection were more. The seed mis-handling at harvesting stage are also responsible for contamination with seed mycoflora. Traditionally, farmers stored seeds in unsafe condition with many dormant, contaminated, infectious, seed borne mycoflora. Seed mycoflora activated when the seeds sown in field and shown their efficacy, symptoms. The seedlings get affected and damaged with weakened, unhealthy, diseased. The affected seedlings and effect of seed borne mycoflora not identified by farmers.

Loss and reduction in crop yield in every year; studies on seed borne fungi and their control using plant extract plays important role same as the chemical fungicides do. Many workers reported data on antifungal activity of different plant extract earlier [1,2]. On the other hand, the chemical fungicide adversely affects the useful micro-organism present on the plant body and in environment. This has been recently proved that they are hazardous to plants, animals and also human beings. The fungicides, pesticides sprayed vegetables are being consumed by infinity of people every day and they get bio accumulated in human body and forms several disorders after reaching certain accumulation level. Different types of integrated management system followed to control seed borne mycoflora [3]. In recent years the presence of anti-fungal properties in plant extracts have been recognized and tested Tables 1 and 2.

In this paper effect of different concentrations of plant extract on seed mycoflora were tested and found significant results of plant extracts on seed mycoflora of *Zea mays*.

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## Materials and Methods

### Seed collection, plant extract collection, instruments and equipments

Seeds of *Zea mays* were collected randomly from farmer seed lot of stored grains of Shevgaon taluka nearby village Dahigaon, Pimprishahali, Shahartakli, Khamgaon, Ranjani Bhavi Nimgaon. Fresh and healthy leaves of Vitex negundo, Parthenium hysterophorous, Azadirachta indica, Datura metal. Laminar air flow cabinet, Autoclave, Incubator, compound / stereo binocular microscope, dissecting microscope, electronic top pan balance. Petri-plates, Conical flask, Buckner funnel, measuring cylinder, Beaker, slides, Cover slips, Forceps, Blotting paper, Mortar and pestle. Various methods and procedures have been adopted by many workers in different parts of world for detecting the seed borne fungal pathogens such as; Examination of dry seeds, Washing test, Fungus coating, Seed soak method, necrotic lesion, Embryo count method, Incubation methods such as; Blotter and Agar method, Seedling symptom test. The selected method was blotter technique [4]. The identification of fungi was done [5].

## Results and Discussion

In this experiment effect on Datura metal, *Vitex negundo*, *Parthenium hysterophorous* and *Azadirachta indica* plant extract with different concentration such as; 0, 25, 50, 75 and 100% on studied seed mycoflora such as; *Aspergillus niger, Trichoderma viridae, Aspergillus flavus, Fusarium oxysporum, Mucor spps., Helminthosporium, Rhizopus spp., Alternaria alternata, Curvularia spps., Bipolaris spps*. Datura metal and Azadirachta indica plant extract were showed 100% inhibitory effect on the studied seed mycoflora of Zea mays in 50 and 100% concentrations followed by *Vitex negundo* except seed mycoflora Aspergillus niger. Similar kind of seed borne mycoflora was studied in guar and Sesamum by [6,7]. Parthenium hysterophorous less effective than Datura metal, *Azadirachta indica* and *Vitex negundo*. Parthenium hysterophorous less effective to inhibit seed mycoflora *Helminthosporium, Alternaria alternata, Curvularia spps. and Bipolaris spps*. The similar results of inhibition of seed mycoflora with different plant extract obtained by [1,8-10].

## Conclusion

All above investigation can be concluded that, extract of Datura metal and *Azadirachta indica* was recorded inhibitory to all the recorded fungi at 75% and 100% than *Parthenium hysterophorous* showed stimulatory effect on *Fusarium oxysporum, Bipolaris spps, Helminthosporium and Vitex negundo* extracts was inhibitory to all recorded fungi at 75% and 100% except Aspergillus niger. These plant extracts having anti-fungal property to all the recorded fungi and available

**Table 1:** Effect of different concentrations of plant extracts on various fungi (*Seed Mycoflora*) of *Zea mays* (L.)

| Sr. | Fungi | Plant Extract | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | *Datura metal* | | | | | *Vitex negundo* | | | | |
| | | Control | 25% | 50% | 75% | 100% | Control | 25% | 50% | 75% | 100% |
| 1 | *Aspergillus niger* | + | + | - | - | - | + | + | + | + | + |
| 2 | *Trichoderma viridae* | + | - | - | - | - | + | - | - | - | - |
| 3 | *Aspergillus flavus* | + | + | + | - | - | + | + | - | - | - |
| 5 | *Fusarium oxysporum* | - | - | - | - | - | - | - | - | - | - |
| 4 | *Mucor spps.* | + | + | + | - | - | + | - | - | - | - |
| 5 | *Helminthosporium* | - | - | - | - | - | + | - | - | - | - |
| 6 | *Rhizopus spp.* | + | + | - | - | - | + | + | + | - | - |
| 7 | *Alternaria alternata* | - | - | - | - | - | + | - | - | - | - |
| 8 | *Curvularia spps.* | - | - | - | - | - | + | + | - | - | - |
| 9 | *Bipolaris spps* | - | - | - | - | - | + | + | - | - | - |
| | | | | | | | | | | | |

**Table 2:** Effect of Different concentrations of plant extracts on various fungi (*Seed Mycoflora*) of *Zea mays* (L.)

| Sr. | Fungi | Plant Extract | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | *Parthenium hysterophorous* | | | | | *Azadirachta indica* | | | | |
| | | Control | 25% | 50% | 75% | 100% | Control | 25% | 50% | 75% | 100% |
| 1 | *Aspergillus niger* | + | + | + | - | - | + | + | + | - | - |
| 2 | *Trichoderma viridae* | - | + | - | - | - | + | - | - | - | - |
| 3 | *Aspergillus flavus* | + | + | - | - | - | + | - | - | - | - |
| 5 | *Fusarium oxysporum* | - | + | - | - | + | - | - | - | - | - |
| 4 | *Mucor spps.* | + | + | - | - | - | + | - | - | - | - |
| 5 | *Helminthosporium* | + | + | + | + | + | + | - | - | - | - |
| 6 | *Rhizopus spp.* | + | - | - | - | - | + | + | - | - | - |
| 7 | *Alternaria alternata* | + | + | + | - | - | + | + | - | - | - |
| 8 | *Curvularia spps.* | + | + | + | + | - | + | + | - | - | - |
| 9 | *Bipolaris spps* | + | + | + | + | + | + | + | - | - | - |

cheaply, eco-friendly so; those plant extract showing inhibitory action on seed borne mycoflora of *Zea mays*., they may be used as alternative to chemical fungicides and reduce the environmental and soil pollution

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