



SHORT COMMUNICATION

Efficacy of Plant Extracts against the Seed Borne Fungi of *Zea mays* L

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Various fungi are responsible for causing seed and plant disease. Such diseases are referred as seed borne disease, which have damaging effect on seed quality and yield. Seeds of maize stored traditionally by farmers are with many dormant seed borne mycoflora that gets activated when the seeds are sown and shows their efficacy, symptoms when the seeds get adapted to the moisture present in the soil. Due to these the seedlings gets affected and shows unhealthy, diseased symptoms. Chemical fungicides show instant positive result on seed borne fungi and its related diseases but on the other hand they adversely affect the environment and useful microorganisms present in the soil. Excessive spraying not only affects the environment but also develop resistance among the target pathogen. This has been recently proved that they are hazardous to plants, animals and also to human beings. Thus various plants extracts can be employed to overcome the damage of environment and to control the fungal diseases

KEYWORDS: Efficacy, extract, seed borne fungi, *Zea mays*

INTRODUCTION

As a matter of fact there is hardly any crop cultivated where at least one seed borne disease is not known. Owing to this background it becomes all the more imperative to analyze the seed for association of Fungal Flora. India is agriculture base country and Maize is a forage crop cultivated in many hectares of land. Some of the fungi are responsible for causing seed and plant disease. Such diseases are referred as seed borne disease, which have damaging effect on seed quality and yield. Seeds of maize stored traditionally by farmers are with many dormant seed borne mycoflora that gets activated when the seeds are sown and shows their efficacy, symptoms when the seeds get adapted to the moisture present in the soil. Due to these the seedlings gets affected and shows unhealthy, diseased symptoms. Thus the effect of seed borne mycoflora is not visualized by farmers.

The effect of seed borne fungi is noticed after harvesting as yield obtained is less. Thus to get more yield, to fulfill the need of over increasing population and to save farmers from huge economic, the studies on seed borne fungi and their control using plant extracts becomes important same as the chemical fungicides do. Undoubtedly they show instant positive result on seed borne fungi and its related diseases but on the other hand the chemical fungicides adversely affect the useful microorganisms present in the soil and environment. Excessive spraying not only affects the environment but also develop resistance among the target pathogen. This has been recently proved that they are hazardous to plants, animals and also to human beings.

Thus various plants extracts can be employed to overcome the damage of environment and to control the fungal diseases [1-3].

MATERIALS AND METHODS

Seeds of *Zea mays* were collected randomly from the farmers of Loni village. The seeds using purity board and dissecting microscope were examined for the seed borne fungal symptoms such as pigmentation, shrunken necrosis, seed discoloration, fungal coating etc. and were picked for further investigations.

Fifty grams of healthy fresh leaves of *Azadirachta indica*. Juss., *Datura metel* L., *Parthenium hysterophorous* L. and *Vitex negundo* were cut into small pieces and minced with the help of grinder by adding 50 ml sterilized distilled water. These phyto-extracts were filtered through double-layered muslin cloth in 150 ml conical flasks and plugged with non-absorbent cotton. These filtered extracts were autoclaved at 1.2 kg cm⁻² pressure for 20

minutes. Autoclaved extract was individually added into previously sterilized distilled water @ 25 percent (i.e. 25 **sprouting per cent**

Sprouting is an inherent ability of plant to unfold the buds and produce the shoot proliferation. It is an important ml extract +75 ml DW), 50 percent (i.e. 50 ml extract +50 ml DW), 75 percent (i.e. 75 ml extract +25 ml DW) and 100 percent (i.e. 100 ml extract + 00 ml DW) and mixed thoroughly [4]. 10-15 maize seeds with seed borne fungal symptoms were dipped in each concentration of all the test plants for a period of three hours. Seeds soaked in distilled water served as control.

Treated seeds were then transferred aseptically to sterilized Petri-plates each containing 10-15 seeds placed on sterilized moist blotter paper. The seeds were placed at safe distance from each other to avoid mycelia/hyphal contact of two different seed borne fungi. The plates were then incubated at $20 \pm 2^{\circ}$ C for seven days. The blotter paper was moistened aseptically at an interval of 1 day with sterile distilled [5].

Incubated seeds were examined after 7 days under stereo binocular microscope. Identification of fungi was done with help of pictorial guide [6].

RESULTS AND DISCUSSIONS

A total 11 species belonging to 11 genera's were isolated. The plant extracts of *Azadirachta indica* showed stimulation of *Aspergillus niger* at 25% & 50% concentration while the extract stimulated the growth of *Rhizopus* spp., *Curvularia* spp., *Alternaria alternata*, *Bipolaris* spp. at 25% concentration.

Datura extract was found to be inhibiting *Aspergillus niger* at 25% & 75% conc., *Aspergillus flavus* was stimulated at 25% & 50%. *Rhizopus* spp. was inhibited at 25% conc., *Mucor* spp. at 50% conc. and *Phoma* spp. at 25% conc..

Parthenium extract proved to be stimulatory for *Aspergillus niger* at 25% & 50% conc. respectively and *Aspergillus flavus* was inhibited at 25% & 75% conc. *Rhizopus* spp. was totally inhibited in all the concentrations. *Curvularia* spp. was inhibited at 25%, 50% & 75% conc., *Mucor* spp and *Cladosporium herbarum* were stimulatory at 25% conc., *Fusarium oxysporum* was inhibited at 50% and 75% concentrations, *Alternaria alternata* was inhibited at 75% and 100%, conc. while *Phoma* spp., *Bipolaris* spp., *Helminthosporium* were stimulated at all the concentrations.

The *Vitex negundo* extract was stimulatory to *Aspergillus niger* at all the concentrations while *Aspergillus flavus*, *Rhizopus* spp., *Curvularia* spp., *Bipolaris* spp. were stimulated at 25% concentration. While at all the other concentrations the seed borne myco flora were totally inhibited.

CONCLUSIONS

It can be concluded from the above investigations that, extracts of *Azadirachta indica* L. inhibited all the recorded fungi at 75% and 100%, *Datura metel* L. restrained all the fungi at 100 % concentration. *Parthenium* showed stimulatory effect on *Fusarium oxysporum*, *Alternaria alternata*, *Phoma* spp., *Bipolaris* spp., *Helminthosporium* at all concentrations & *Vitex negundo* extracts inhibited all recorded fungi at 75% and 100% concentrations except *Aspergillus niger* was stimulated at all concentrations.

The plant extracts having antifungal properties to all the recorded fungi are more cheaply available and eco friendly so this plant extracts showing inhibitory action on seed borne mycoflora may be used as alternative to chemical fungicides.

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Table 1 Effect of different plant extract on the seed borne fungal pathogens

S. N.	Name of Fungal Species	Control Aqueous	Plant Extracts														
			<i>Azadirachta indica</i>				<i>Datura metel</i>				<i>Parthenium hysterophorus</i>				<i>Vitex negundo</i>		
			25%	50%	75%	100%	25%	50%	75%	100%	25%	50%	75%	100%	25%	50%	75%
	<i>Aspergillus niger</i>	+	+	+	+	-	+	-	+	-	+	+	-	-	+	+	+
	<i>Aspergillus flavus</i>	+	+	-	-	-	+	+	-	-	+	-	+	-	+	-	-
	<i>Rhizopus</i> sps.	+	+	-	-	-	-	-	-	-	+	-	-	-	-	-	-
	<i>Curvularia</i> sps.	+	+	+	-	-	+	-	-	-	-	-	-	-	+	+	-
	<i>Mucor</i> sps.	+	+	+	-	-	-	-	-	-	+	+	+	-	+	-	-
	<i>Cladosporium herbarum</i>	+	+	-	-	-	-	+	-	-	+	-	-	-	-	-	-
	<i>Fusarium oxysporum</i>	+	-	-	-	-	-	-	-	-	+	-	-	-	-	-	-
	<i>Alternaria alternate</i>	+	-	-	-	-	-	-	-	-	+	-	-	+	-	-	-
	<i>Phoma</i> sps.	+	+	+	-	-	-	-	-	-	+	+	-	-	-	-	-
	<i>Bipolaris</i> sps.	+	-	-	-	-	+	-	-	-	-	+	+	+	-	-	-
	<i>Helminthosporium</i> sps.	+	+	+	-	-	-	-	-	-	+	+	+	+	+	-	-