IJCRT.ORG ISSN : 2320-2882

INTERNATIONAL JOURNAL OF CREATIVE RESEARCH THOUGHTS (IJCRT)

An International Open Access, Peer-reviewed, Refereed Journal

Effect of extracts of various plant parts on seed mycoflora and seed germination of Brinjal var. Hirwa kateri

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Abstract-

The common and dominant seed borne fungi were found to be inhibitory for seed germination and caused great loss in seedling vigor, seed and seedling rots of the Brinjal var. Hirwa kateri. The root stems, leaf and bark extracts of some common and easily available plants were screened for the Bio-control of the seed mycoflora of the Brinjal. Root, stem and leaf extracts of all the test plants were found to be inhibitory in more or less degree for the incidence of seed mycoflora while with a few exceptions, they were found to be stimulatory for seed germination.

Key words: *Solanum melongena*, seed mycoflora, seed germination, seedling vigor, seedling emergence, leaf extract.

Introduction- Solanaceae family includes a large number of annual or perennial herbs, shrubs, small trees and climbers. More than seventy species belonging to twenty-one genera are found in India. Economically the family is fairly important, as it comprises several crops of food value, medicinal value, vegetables and ornamentals. Several plants of this family are cultivated all over the world for their economic importance.

Brinjal – Egg Plant (*Solanum melongena*) is grown commonly in almost all the parts of the country and fruits are liked by both the poor and the rich as vegetables. It is available more or less throughout the year. It also contains many medicinal properties in ayurvedic medicines.

It has been found that due to hot and humid conditions in the region the fruits and their seeds of these crop plants may be covered with fungal mycelial mats, which are black orange or white in colour depending upon the specific fungus present. These fungal infections are known to cause heavy damages and impair the quality of fruits and seeds.

In the present studies ten local and easily available plants in the near by area were selected for their root, stem, leaf and bark extracts and the effects of these extracts on seed mycoflora and seed germination was studied.

Materials and methods:

1. Collection of seed samples

The methods described by **Paul Neergaard (1973)** have been adopted for the collection of seed samples. Accordingly, seed samples of different var. of Brinjal (Half kg each) were collected from ripe dried fruits from field, storehouses, market places and research centers. A composite seed sample for each of the var. was prepared by mixing the individual seed samples together and preserved in gunny bags at room temperature during the studies.

2. Detection of seed mycoflora:

The seed-borne fungi of different varieties of seeds of Brinjal were detected by moist blotter (B) and agar (A) plate methods as recommended by **ISTA (1966), De Tempe (1970), Neergaard (1973) and Agarwal et al. (1976).** The procedure of moist blotter (B) and agar (A) plate methods are described as below.

3. Identification of seed-borne fungi

The seed-borne fungi were preliminary identified on the basis of sporulation characters like asexual or sexual spores or fruiting structures. Detailed examination of fungal characters was done under compound microscope and their identification was confirmed with the help of latest manuals [Subramanian (1971), Neergaard and Mathur (1980), Jha (1993) and Mukadam et al (2006)]**.** Pure cultures of the identified fungi were prepared and maintained on PDA (Potato Dextrose Agar) slants for further experiments.

4. **Effect of culture filtrates on percent seed germination, root length, shoot length and seedling emergence**.

Production of toxin was studied by growing some common and dominant seed-borne fungi of plants like *Alternaria tenuis, Aspergillus flavus, Curvularia lunata* and *Fusarium moniliforme* on liquid GN medium of pH 5.6 for ten days.

Twenty-five ml of the medium was poured in 100 ml borosil glass conical flasks, autoclaved and inoculated separately with 2 ml spore suspension of the test seed-borne fungus that was maintained on PDA slants for seven days. The flasks were incubated at room temperature (27±1^{o}C) for ten days. After incubation, the culture filtrates were collected in pre-sterilized culture bottles from the flasks by filtering the contents through Whatman filter paper No.1 and treated it as crude toxin preparation.

5. Collection of plant material for extracts

During the present studies, ten common and easily available plants in the vicinity like *Acacia nilotica, Adhatoda zeylanica, Annona squamosa, Azadirachta indica, Curcuma longa, Lawsonia inermis, Murraya koenigii, Ocimum sanctum, Terminalia bellerica* and *Terminalia chebula* were selected. Their identification was confirmed using the **'Flora of Marathwada' (Naik, 1998)**. The roots, stems, leaves and barks of the selected plants were collected separately, surface sterilized with 0.1 % $HgCl_2$ and washed repeatedly with sterile distilled water for several times and kept for drying in hot air oven (Metalab) at 60°C temperature for 48 hours. After drying, the roots, stems, leaves and barks were preserved separately in polythene bags at room temperature (27± 1°C) during the studies.

The dried roots, stems leaves and bark of selected plants were crushed separately in to fine powder with the help of blender (Remi). 5 gm powder each of the plant parts was dissolved separately in 100 ml sterilized hot distilled water in 250 ml borosil glass conical flasks. The flasks were kept in oven (Metalab) for 24 hours at 60°C and the content was filtered through Whatman filter paper No.1. The filtrates were used as 5% aqueous plant extracts.

6. Effect of extracts of various plant parts on seed mycoflora and seed germination

During the present studies, the seeds of different varieties of Brinjal were placed on blotters in Petri plates as described earlier and irrigated just enough to keep blotters moist separately with the root, stem and leaf extracts (5%) of the selected plants. Percent seed germination and associated seed mycoflora were recorded on seventh day. Seed plates irrigated with sterile distilled water served as control.

Result and discussion: In the present studies, the seeds of Brinjal var. Hirwa kateri were placed on blotters in Petri plates and irrigated with root, stem and leaf extracts of different plants (Total ten plants). The plates were incubated for seven days at room temperature and the incidence of seed mycoflora and seed germination was studied. The plates irrigated with sterile distilled water served as control.

From the results it is evident that, the root, stem and leaf extracts of all the test plants were found to be inhibitory in more or less degree for the incidence of seed mycoflora while with a few exceptions, they were found to be stimulatory for seed germination.

The seeds treated with in leaf extracts of *Azadirachta indica,* leaf and root extracts of *Ocimum sanctum* and leaf extracts of *Murraya koenigii* showed very reduced incidence of seed mycoflora and maximum seed germination while, the seeds treated with the stem and root extracts of *Lawsonia inermis* and *Acacia nilotica*, leaf extract of *Curcuma longa* showed maximum incidence of seed mycoflora and reduced seed germination.

Table: Effect of extracts of various plant parts on percent seed mycoflora and percent seed germination of Brinjal var. Hirwa kateri on blotter paper (after seven days)

Sr.No.	Source plant	Part used for extracts	% Seed mycoflora	% Seed germination
1	*Acacia nilotica*	Root	71	38
		Stem	80	36
		Leaf	65	44
		Bark	66	53
2	*Adhatoda zeylanica*	Root	55	29
		Stem	59	44
		Leaf	39	64
3	*Annona squamosa*	Root	49	53
		Stem	39	61
		Leaf	20	74
4	*Azadirachta indica*	Bark	13	88
		Leaf	10	89
		Kernel	15	91
5	*Curcuma longa*	Dried rhizome	25	79
		Leaf	55	31
6	*Lawsonia inermis*	Root	54	50
		Stem	77	32
		Leaf	34	67
7	*Murraya koenigii*	Root	15	88
		Stem	18	75
		Leaf	07	90
8	*Ocimum sanctum*	Root	05	91
		Stem	10	91
		Leaf	05	89
9	*Terminalia bellerica*	Root	52	38
		Bark	53	46
		Leaf	43	19
10	*Terminalia chebula*	Root	36	37
		Bark	35	51
		Leaf	36	28
	Control (Sterile distilled water)	--	100	25

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