Effect of indigenous medicinal plants extract against selected seed borne fungi.

Gavit M.G[1*], Bhagat S.P[2], Palwe S. D[3], Borde M.Y[4], and Sonawane H.B[5]

[1]Department of Botany, K.A.A.N.M.S. College Satana, Nashik (MS) India.
[2]Department of Botany, Amruteshwar Arts, Commerce and Science College, Vinzar, Pune (MS), India.
[3]Mahatma Gandhi Vidymandir's Arts, Science and Commerce College, Surgana, Dist- Nashik (MS) India.
[4]Department of Botany, Savitribai Phule Pune University, Pune (MS), India.
[5]Department of Botany, Prof. Ramkrushana More College Akurdi, Pune (MS), India.

ABSTRACT

Fungi are most destructive pathogen for the crop plants. After harvesting crop, many microorganisms may be growing on the stored seeds. These fungal pathogen spores adhere to seeds or internally growing. Such affected seeds are not used for sowing or food purposes.

In the present study seeds of common vegetables have been selected for this study. Isolation of many fungi have been carried out by the method described by ISTA, 1966. Many fungi isolated from vegetables seeds, out of which four very common fungi have been selected and brought into pure culture. Out of these fungi *Aspergillusniger* and *Fusariumoxysporum* were very common than the *Curvularialunata* and *Drechsleralongirostrata.* Effect of very common ten medicinal plants extract have been tested against spore germination, dry mycelial weight and sporulation of these selected four fungi have been carried out. It is clear from the study that *Solanumxanthocarpum, Semecarpusanacardium, Dioscoreabulbifera and Aegle marmelos*leaf extract were found more inhibitory for spore germination, growth and sporulation of seed borne fungi. Similar studies have been carried out in Okra by MashoodaBegam and Lokesh (2008). Similar results have been reported by Prabha et al (2003), Ashish et al (2008), Muzumdar et al (2004).

Key Words: Medicinal plants, Spore germination, Dry mycelial weight, Vegetables seeds etc.

INTRODUCTION:

Agriculture is a back bone of our country, whole economy of India is related with agriculture. India is having the second largest population after the China. Plants are utilized as a food, clothes, shelter, medicinal, fertilizer, antimicrobial agent and many other purposes. Green manuring has been on agricultural practice among European farmers. Indian plants wealth is about 45000 plant species, every year huge waste biomass of selected wild medicinal plants going to be waste. It may be utilized for agriculture purposes because most of plant having antimicrobial activity.

India is one of the mega biodiversity centre of the world. We are unaware of biomass produced by wild plants which going waste every year. If it is utilized for various purposes in agriculture, it improves crop yield eco-friendly. Every year huge biomass of plant is going waste. It may be utilized for agricultural purpose because most of plants having anti-microbial activity. By using chemical fertilizer, pesticides causes imbalance in biodiversity. If we used plant based product as fertilizer, pesticide and seed dressing material which do not causes any hazardous effect on plants and soil micro flora. By considering above importance this study is undertaken. Methi is important and the nutritious vegetable which cultivated in our region.

In the present study seeds of Methi have been selected for this study. Isolation of many fungi have been carried out by the method described by ISTA, 1966. Many fungi isolated from vegetable seeds, out of which four very common fungi have been selected and brought into pure culture. Out of these fungi Aspergillus*niger* and *Fusariumoxysporum* were very common than the *Curvularialunata*and Drechslera*longirostrata.* Effect of very common ten medicinal plants leaf extract have been tested against spore germination, dry mycelia weight and sporulation of these selected four fungi have been carried out. It is clear from the study that *Solanumxanthocarpum, Semecarpusanacardium, Dioscoreabulbifera and Aegle marmelos*were found more inhibitory for spore germination, growth and sporulation of seed borne fungi of mehti. Similar study has been carried out in Okra by MashoodaBegam and Lokesh (2008). Similar results have been reported by Prabha et al (2003), Ashish et al (2008), Muzumdar et al (2004).

MATERIALS AND METHOD:

1. Collection of plant materials:

Ten very common and easily available wild medicinal plants were selected, the leaf of selected plants were surface sterilized, dried in oven and ground into fine powder with the help of blender. 5% aq. leaf extract was found more effective for control of seed mycoflora of vegetable seeds specially methi.

2. Testing of stem extracts & Effect of leaf extract on percent incidence of seed mycoflora:

Aqueous extract of different percentage of the selected biomass was prepared by dissolving 1, 2, 3..... gm of biomass leaf powder in 100ml sterile distilled water. The aqueous extract of biomass was tested against seed mycoflora. The biomass extract of effective percentage was determined. The biomass extract of five percent was found to be effective. Therefore five percent extract of medicinal plant biomass was used for further studied.

3) Detection of seed mycoflora:

a) Moist blotter plate method:

The isolation of seed borne fungi was carried out by blotter test method, described by ISTA (1966), Agarwal and Sorbhoy (1978). A pair of white blotter paper of 8.5 cm diameter was jointly soaked in sterile distilled water and placed in pre-sterilized Petri-plates of 10 cm diameter. 10 Seeds of Methi were placed equal distance on moist blotter paper. More than 400 seeds were tested for each treatment. Plates were incubated at room temp. for seven days. Identification and confirmation of different fungi on seed was made by preparing slides (Mukadam, D.S., 1997). Many fungi were isolated, out of these four were very common fungi brought in to the pure culture and further used.

b) 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; Jha, 1993 and Mukadam, 1997). Pure culture of the identified fungi were prepared and maintained on PDA (Potato Dextrose Agar) slants.

4) Preparation of spore suspension:

For this 10ml sterile distilled water was poured in to the sporulating pure cultures of the seed borne fungi maintained on PDA slants for seven days at room temperature. The slants were shaken and the content was filtered through muslin cloth. The filtrate was used as spore suspension.

5) Study of spore germination:

During the present studies, 25ml of GN medium supplemented separately with 2ml of 5% plant extract was poured in 100ml borosil conical flasks. The flasks were autoclaved and inoculated separately with 2ml spore suspension of the test seed borne fungi which were maintained on PDA slants for seven days. The flasks were incubated at room temperature for twenty four hours. After incubation the spore germination was studied by preparing slides of the incubated solution and observing under the compound microscope.

The germ tube lengths of the germinating spores were measured in microns (µ) with the help of calibrated microscope. The flasks poured with 25ml of GN medium without the supplementation of 2ml of 5% plant extract inoculated separately with spore suspensions of test fungi were served as control.

6) Study of growth and sporulation of seed borne fungi:

During the present studies some common and dominant seed borne fungi of vegetable Methilike *Aspergillusniger, Curvularialunata, Drechsleralongirostrata and Fusariumoxysporum* were grown in GN medium supplemented separately with 2ml of five percent plant extracts of medicinal plant biomass for seven days at room temperature. After incubation contents of the flasks were filtered through pre-weighed Whatman filter paper No. 1. The filter papers with mycelial mat were oven dried for twenty four hours at sixty degree centigrade and reweighed. Growth of the seed borne fungi in terms of dry mycelial weight was measured by substracting the initial weight of the filter paper from the final weight of filter paper with mycelial mat. The seed borne fungi grown in GN medium without supplementation of medicinal plant biomass extract were served as control. The sporulation was studied by preparing slides of the seed borne fungi before filtration.

Table-1: Effect of leaf biomass of selected medicinal plants on spore germination, growth and sporulation of *Aspergillusniger; Curvularialunata; Drechsleralongirostrata* and *Fusariumoxysporum*.

Sr. No.	Medicinal plants	*Aspergillusniger*			*Curvularialunata*			*Drechsleralongirostrata*			*Fusariumoxysporum*		
		SG	DMW	SPN	SG	DMW	SPN	SG	DMW	SPN	SG	DMW	SPN
1	***Abrusprecatorius* L.**	60	40	++	35	30	++	45	36	++	40	25	++
2	***Aegle marmelos*(L.) Corr.**	22	22	++	30	16	+	30	12	+	24	30	++
3	***Balanitesaegyptica*Delile.**	62	50	+++	70	42	+++	69	38	+++	62	45	+++
4	***Daturametel* L.**	52	35	++	35	22	++	35	32	++	30	30	++
5	***Dioscoreabulbifera* L**	32	25	++	28	20	++	20	18	++	24	15	++
6	***Helicteresisora*L.**	60	29	+++	50	27	+++	50	22	+++	60	16	++
7	***Sapinduslaurifolius*Vahl.55**	50	25	+++	30	24	+++	30	32	++	32	25	+++
8	***Semecarpus80anacardium* L.**	26	20	+	22	15	++	28	15	+	22	20	++
9	***Solanumxanthoc***	28	19	++	26	14	+	24	20	++	18	13	+

	***arpum*Schra.**												
10	***Vitexnegundo*L.**	70	40	+++	60	28	+++	52	35	+++	56	35	+++
	Control	80	58	+++	84	50	+++	70	48	+++	80	50	+++

SG: spore germination %; **DMW:** dry mycelial weight (mgs); **SPN:** sporulation
+= Low**,** ++=**M**edium**,** +++= High

RESULT AND DISCUSSION:

It is clear from the result presented in Table 1 that the leaf biomass in the form of extract (5%) of all the test medicinal plants were found more or less inhibitory to spore germination, growth in the form of dry mycelial weight and sporulation of all selected seed borne fungi.

It is evident from the result that leaf extract of *Aegle marmelos, Dioscoreabulbifera, Semecarpusanacardium and Solanumxanthocarpum*were found more inhibitory for spore germination, growth in the form of dry mycelial weight and sporulation of all selected seed borne fungi of methi than the other test medicinal plants. Effect of leaf extract of *Aegle marmelos*was found more inhibitory for spore germination of *Aspergillusniger* (22%), similarly growth in the form of dry mycelial weight in the leaf extract of *Solanumxanthocarpum* was 19 mg and sporulation of the fungus more inhibited by the leaf extract of*Semecarpusanacardium* as compared with the other test medicinal plants.

Effect of leaf extract of test medicinal plants on the spore germination of *Curvularialunata*found more inhibitory in the leaf extract of *Semecarpusanacardium* (22%), growth more inhibited in the leaf extract of *Solanumxanthocarpum* (22 mg) and sporulation also very low in the same plant extract than the other test medicinal plants.

Effect of leaf extract of test medicinal plants on the spore germination of *Drechsleralongirostrata*was found more inhibitory in the leaf extract of *Dioscoreabulbifera* (20%), growth and sporulation was found more inhibitory in the *Aegle marmelos* (12 mg.).

Effect of leaf extract of selected medicinal plants on the spore germination, growth in the form of dry mycelial weight and sporulationof *Fusariumoxysporum* was found more inhibitory in the leaf extract of *Solanumxanthocarpum* (18%) and (13 mg) respectively than the other test medicinal plants.

REFERENCES:

Agarwal D. K. and A. K. Sorbhoy (1978): Physiological studies of four species of *Fusarium* pathogenic to soybean. Indian Phytopathology, 31:24-31.

Amer Habib, S.T. Sahi, M.U. Ghazanfar and S. Ali (2007): Location of seed borne mycoflora of egg plant (*Solanummelongena* L.) in different seed component and impact on seed germinability, Int. Journ. Of Agriculture and Biology, 1560-8530/2007/09-3-514-516

I.S.T.A. (1966): International rules of seed testing, 1966. Inter. seed test. Ass. 31:1-152.

Jha,D.K. (1993): A text book on seed pathology. Vikas publishing house pvt. Ltd. New Delhi, 132 pp. (reprint 1995).

Kuhajek, J.M.; A.M. Clark and M. Slattery (2005): Ecological patterns in the antifungal activity of root extracts from rocky mountain wetland plants. Pharmaceutical Biology 2003; V.41(7): 9-522-530.

Mashooda Begum and S. Lokesh (2008): Synergistic effect of fungicides on the Incidence of Seed mycoflora of Okra. International Journal of Botany 4(1) : 24-32, 2008.

Mazumdar, A.; B.P. Saha; S.P. Basu and R. Mazumdar (2004): Antibacterial activity of methanolic extracts of leaves of *Lagestroemiaparviflora*. Indian journal of Natural products 2003; V/ 19(3):p-20-23.

Mughal, A.H. (2000): Allelopathic effect of leaf extract of *Morus alba* L. on germination and seedling growth of some pulses. Range management and Agro forestry 2000, 21(2):164-169.

Mukadam, D.S. (1997): The illustrated kingdom of fungi (some selected genera). Published by Aksar Ganga Prkashan, Aurangabad, India.

Musyimi, D.M.; J.M. Ogur and P.M. Muema (2008): Phytochemical compounds and antimicrobial activity of extracts of *Aspilia* plant *(Aspiliamossambicensis)*(Oliv) Wild. International Journal of Botany 4(1): 56-61.

Pandey, K.N. **(1982):** Antifungal activity of some medicinal plants on stored seeds of Eleucinecornacana. Indian phytopath 35:499-501

Perumal, G.; C. Subramanyam; D, Natrajan; K. Srinivasan; C. Mahanasundari and K. Prabhakar (2005): Antifungal activities of traditional medicinal plant extracts- A preliminary survey. Journal of physiological Research, 2004, V. 17(10) : p.81-83.

Prabha, T.; Dora Babu, M.; P riyambada, S; V.K. Agarwal and R.K. Goel (2003): Evolution of *Pongamiapinnata* root extract on gastric ulcers and mucosal offensive and defensice factors in rats. Indian Journal of Experimental Biology, V. 41(4) : P. 304-310.2003.Proc. 77 the Indian Sci. Cong. Part III Abst. (Bot): 30.

Subramanian, C.V. (1971): Hyopomycetes. An account of Indian species except *Cercospora*. ICAR, New Delhi: 930 pp.

Vyas, N.L. (1988): Observation on some cucurbitaceous seed mycoflora in Mizoram. Indian J. Mycol. And plant pathology, 2,5, (1,2) : 44pp.