Biological Control of Seed borne Pathogen of Spices

Baig Mumtaz

Dr.Rafiq Zakaria College for Women, Aurangabad.
Maharashtra 431001.India

***Abstract*: Spices are frequently infected by fungal pathogen mostly which can include seed borne fungi. In majority of cases the fungal pathogen is present already within or on the surface of seed and which are responsible of the deterioration of seeds in storage which makes the seeds unfit for consumption, meanwhile also causes seed rot and seedling plant diseases .Seeds are the most critical input in crop production 90% of all the world .In the past few years chemical are widely used for seed treatment .However rising their negative impact on the environment and human health. The aim of the present investigation is to determine the prevalence of seed borne fungi of spices seeds and control with plant extract .The experiment was carried out in pathology laboratory for efficacy of extract as seed treater. Four spices cardamom, Clove, Pepper and Fennel has selected for the study. The major predominant identified fungi were Alternaria solani, Aspergillus flavus, A.niger, Fusarium sp. In this study evaluated Marigold leaves for observing the action of this plant extract on seed borne fungi of spices. The study revealed that the most effective methanolic extract against Alternaria solani has been observed.**

***Keywords*: Aspergillus flavus, deterioration, Methanolic etc.**

Introduction:

Spices are essentially flavouring agents having antimicrobial properties (Atanda et,.al 2006).Spices are the plant substance from exotic or indigeneous origin with strong aroma and taste. Spices are associated by fungi in the field during storage ,transport processing and handling (Elshafie et,.al 2002).Fungi are normal component of food mycoflora and cause spoilage and mycotoxin production .The most frequent fungal pathogen of selected spices such as Alternaria ,Aspergillus ,Penicillium and Fusarium(Koci et,.al 2007).Marigold Tagetes sp.erecta L.belongs to family Asteraceae (Compositae) and the genus Tagetes.Marigold gained popularity among florist on account of its easy cultured and wide adaptability .It is originated from Africa ,Mexico and in British society ,Tagetes erecta L..are erect tall growing 90 cm plants having large globular flowers .Yellow ,orange ,golden yellow etc. Common cultivated varieties Apricot .This plants also represents as medicinal as a rich source of anti- microbial agents (Mahesh and Satish 2008).There are several reports on the antimicrobial activity of different herbal botanical extracts in different regions of the world(Singh and Pandey 1998; Kuttan 1996). The Plant extract are capable for the control of seed borne Pathogen (Baig Mumtaz 2006).Marigold plants are rich in orange yellow carotenoid and are used as food colorant .It is also used medicinally as a condiments and herbal tea. It has medical benefits such as remedy for colds, stomach problem antiseptic antiparasitic ,insecticide .It is also used for healing effects on wounds,cuts skin infection (Rahimi etal). Now-a-days use of chemical for control of crop and seed deterioration is being discouraged due to health hazard and also there is environmental pollution. Also the fungicides are very expensive for the farmers seed treatment ecofriendly botanical fungicides extracted from plants have drawn the attention of plant pathologist all over the world. Use of the plant extract for seed treatment has open a new way method for controlling the seed borne fungal pathogen of spices.

In present investigation was to observe the antifungal activity of Marigold leaves against pathogenic fungi like Alternaria solani, Aspergillus flavus, and Fusarium oxysporum.

Material and Methods:

Collection of Seed Sample:

The cultivars of seed sample were collected from retailer shops and godowns. The seeds were tested as recommended by the rules of the International Seed Testing Association (ISTA) 1966.

Detection of Seed borne Mycoflora of spices seeds:

Mycoflora associated with the seeds different cultivars was detected by using standard blotter paper method (ISTA) 2011.

Identification of Isolated fungi:

The isolated fungi were identified using macroscopic features based upon colony morphology and microscopic observation of mycelia and spore .The test microorganism are like Alternaria solani, Aspergillus flavus, and Fusarium oxysporum etc.

Collection of Plant material and preparation of leaf extract:

The plant of Marigold spp was selected for investigation .Its leaves were collected and identified with the help of taxonomic key and confirmed.The leaves were collected and sun dried leaves extracted with methanol and ethanol using a Soxhlet apparatus in 25%, 50%, 75% and 100%.The extract were filtered and stored at 4℃ in air tight bottles.

Disc Diffussion Method:

Disc diffusion bioassay was used for testing antifungal activity of plant extract (Linday 1962).The potato Dextrose Agar medium was prepared .The extraction impregnated disc absorbs moisture from the agar and fungicide diffuses into the agar medium. The fungus were inoculated in PDA and incubated at 37+_℃ and all test fungi were as inoculums. After few minutes settled of medium

four disc placed with 25 % ,50% ,75% and 100 % methanolic and ethanolic extract which were kept at equal distance in petriplate. The petriplates were kept at 37 ℃ for 48 hours for incubation. The inhibition zone was measured and compared with the standard reference .Three to four replicates were maintained for each treatment.

Observation Table : Effect of different concentration of leaf extract on inhibition of Mycelial growth.

Solvent Used for Extraction	Fungal Species	Different Concentration in Percentage				
		25%	50%	75%	100%	control
Methanol	Alternaria Sp.	0.9	1.3	1.9	3.0	-
	Asperfillus flavus	0.5	0.6	0.8	1.3	-
	Fusarium sp.	0.3	0.4	0.6	1.0	-
Ethanol	Alternaria Sp.	0.3	0.4	0.7	0.9	-
	Asperfillus flavus	0.3	0.4	0.5	0.6	-
	Fusarium sp.	0.1	0.2	0.3	0.5	-

Result and Discussion:

Effect of different solvent extracts of Marigold tagetes sp. leaves were used against three fungi in table found growth inhibitory as zone of inhibition were observed .In present investigation it is clear that among two extract the most effective was methanolic extract of marigold spp.against Alternaria solani has been observed. Study of screening the natural plant extract against fungal and bacterial pathogens was well illustrated in literature (Ahmad etal. 2000; Fabry etal ;1998;DeBoer etal.2005Nair etal. 2005 ;Chung etal. 2004. Thus such plants are source of antifungal agent and further investigation are necessary to identify the bioactive agents.

Conclusion:

Many of today's synthetic chemical fungicides are expensive and have side effects are hazardous effect on environment. The present investigation has revealed that the extract of marigold species possess remarkable antifungal activity against many pathogenic fungi .This activity is due to presence of Cis-ocimene, E-oscimene ,b-caryophyllene E-tagetone and di-limonene are antibiotic principles are defensive mechanism of plants against different pathogen .This study recommend the use of natural botanical plant extracts for safer than the chemical fungicides.

Acknowledgement:

The author express gratitude to the Dr. Babasaheb Ambedkar Marathwada University ,Aurangabad for financial assistance during present investigation also thank ful to Principal Dr. Maqdoom Farooqui for providing required laboratory facility.

References:

Atanda o.o,Akpan I and oluwafemi.F.2006.The potential of some spices essential oils in the controls of A.parasiticus and aflatoxin production .Elesevier.1-7

Baig Mumtaz 2006: Seed health Testing: oil seeds Ph.d thesis submitted to Swami Ramanand Teerth Marathwada university ,Nanded.

De Boer H.J, kool A,Broberg etal. Antifungal and antibacterial activity of some herbal remedies from Tanzania .J Ethnopharma co.96:461-469.

Elashafie A.E, Al-Rashdi, T .A.A Bahry 2002.Fungi and aflatoxins associated with species in the sultanate of oman Mycopathologia 155(3):155-160

Koci-Tanackov S.D Dimi G.R and Karali D.2007. Contamination of species with moulds potential producers of sterigmatocystine A .PTEFF. 38:1-190.

Linday E.M Practical Introduction to Microbiology (E and FN Spon Ltd) 1962:77 2005.

Mandeel, Q.A 2004.Fungal contamination of some imported spices, Mycopathologia 159:291-298.

Rahimi R.Shams Mr.2010.Areview of the efficacy of traditional Iranian medicine.world .J.Gastroenterol 16:4504 -4514.

SinghV.P and Paney R.P.1998.Ethanobotany of Rajasthan ,In India.Scientific Publisher Jodhpur:India .212

Satish .S,Raghavenda MP,Mohana DC and Raveesha K.A (2008).Antifungal activity of a known medicinal plant.Mimusopselengi L.against grain moulds.j Agri Technol 4(1) 151-165.