

Assessment of Mycoflora of some Spices from Aurangabad

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Abstract: The present investigations were conducted during 2019-20 in the Department of Botany. Spices are most important agricultural commodities, commonly used to flavor the food preparations. For the study five spice were selected for screening the mycoflora. The seed-borne pathogens are one of the major causes of serious diseases in growing crops because of poor health and quality of seeds. To realize this aspect, the study has been undertaken of spices for seed mycoflora studies. The fungi detected from seeds were *Aspergillus flavus*, *A. niger*, *A. fumigatus*, *Alternaria alternata*, *Curvularia lunata*, *Fusarium solani*, *F. chlamydosporum*, *Rhizopus stolonifer* and *Trichoderma virides*. Among these *Aspergillus flavus*, *A. niger* and *Fusarium* were predominant. The agar plate method was found superior than blotter paper method.

Keywords: *chlamydosporum*, *Curvularia lunata* and Agricultural commodities etc.

Introduction:

Spices constitute an important group of horticultural commodities which play a significant role in national economy. They are the plant substances from indigenous or exotic origin. According to the International organization for Standardization (ISO) the term 'spices and condiments' refer to an aromatic or pungent vegetable substances used for flavouring and also have several commercial uses. Spices includes leaves seeds (coriander, mint), flower (clove), , fruit (red chilli, black pepper), and other plant parts (Ram Kumar and Parany Jain, 2010). They have been used as an integral part of our daily diet, medicine, religious rituals, cosmetics and perfumery. Spices are used as a raw material in folk medicine, as an ingredient in drug preparations of traditional medical systems, in pharmaceutical and as a supplement for dietetic products especially for self medication (Weiser et al., 1971). The therapeutic activity of spices is due to the presence of tartaric acid, acetic acid, citric acid, succinic acid, gums, pectin, sugars, tannins, alkaloids , flavinoids, glycosides and sesquiterpenes The earliest evidence of the use of spice by man was around 50,000 BC. The spice trade developed through the Middle East in around 2000 BC with cinnamon and pepper .Pepper was considered as the most valuable spice and a "sack of pepper" was said to be a worth a man's life. From time immemorial India is known as "The Home of Spices" and about 63 different spices are cultivated in the country (Divakar and Sharma, 2001). The spices contaminated by fungi might cause the health hazards for humans. The spoilage of spice quality and mycotoxin production mainly influenced by type of fungi, food composition and also handling and storage practices. Several other reports have shown fungal contamination of different spices and other agricultural commodities.

Material and Methods

Collection of Seed Sample: The five spice samples Viz *Coriandrum sativum* L. (Coriander), *Cuminum cyminum* L. (Cumin); *Pepper nigrum* L. (Pepper), *Foeniculum vulgare* (Fennel) ,*Syzygium aromaticum* (clove) were collected from Local market area Kirana merchant shops and spice sailors of Aurangabad etc. Samples were collected from during the period of April to October 2019. The selected spice samples of unknown variety was collected in sterile polyethylene bags separate.

Isolation of fungi from Spice seeds: For the detection of seed-borne fungi ISTA techniques were used (Anon., 1993). By using Standard blotter And Agar plate about hundred seeds of each sample were tested.

Standard blotter method: Untreated and seeds after treatment with 1% $HgCl_2$ for 2 minutes were placed on three layers of moistened blotter paper, 20 seeds per Petri dish. The dishes were incubated for 5-7 days at $28 \pm 2^\circ C$ under 12h, alternating cycle of artificial day light (ADL) and darkness (Anon., 1993).

Agar plate method: Untreated and seeds after treatment with 1% $HgCl_2$ for 2 minutes were placed on Potato dextrose agar (PDA), 20 seeds per Petri dish. The dishes were incubated for 5-7 days at $28 \pm 2^\circ C$ under 12h, alternating cycle of artificial day light (ADL) and darkness (Anon., 1993).

Identification of fungi: Mycoflora growing on seeds were identified after referencing to Barnett and Hunter (1998), Domsch et al. (1980), Ellis (1971), Gilman (1950), Hanlin (1989), MycoBank (2013), Nelson et al. (1983), Raper et al. (1965) .

Observation Table:**Different fungal species isolated from five Spices from Aurangabad**

Sr. No	Name of the Fungi	Spices				
		Cumin	Coriander	pepper	Fennel	Clove
1.	<i>Aspergillus candidus</i>	+	-	+	+	-
2.	<i>Aspergillus flavus</i>	+	+	+	+	+
3.	<i>Aspergillus fumigatus</i>	-	-	-	+	-
4.	<i>Aspergillus niger</i>	+	+	+	+	+
5.	<i>Aspergillus terreus</i>	+	+	-	-	-
6.	<i>Aspergillus ustus</i>	+	+	-	+	-
7.	<i>Aspergillus rubrer</i>	-	+	-	+	-
8.	<i>Aspergillus ochraceus</i>	+	+	-	+	-
9.	<i>Aspergillus tericola</i>	-	+	-	+	-
10.	<i>Aspergillus versicolor</i>	+	+	-	-	-
11.	<i>Alternaria alternata</i>	+	+	+	+	+
12.	<i>Alternaria tetramera</i>	-	-	+	+	+
13.	<i>Alternaria amaranthi</i>	+	+	-	+	-
14.	<i>Botrytis cineria</i>	+	+	+	-	-
15.	<i>Bipolaris tetramera</i>	+	+	+	+	-
16.	<i>Cladosporium cladosporidies</i>	-	+	+	+	+
17.	<i>Chaetomium caprophilum</i>	+	+	-	+	-
18.	<i>Chaetomium spirale</i>	+	+	-	-	-
19.	<i>Curvularia indica</i>	+	+	-	+	-
20.	<i>Curvularia lunata</i>	-	+	+	-	+
21.	<i>Curvularia senegalensis</i>	+	+	-	+	-
22.	<i>Fusarium oxysporum</i>	+	+	+	+	+
23.	<i>Fusarium udum</i>	-	-	+	+	-
24.	<i>Geotrichum candidum</i>	+	-	+	-	-
25.	<i>Phoma herbarum</i>	-	+	-	-	+
26.	<i>Verticillium luteo-album</i>	+	+	-	+	-
27.	<i>Trichoderma viride</i>	-	-	-	+	-
28.	<i>Trichoderma koningii</i>	-	+	+	-	-
29.	<i>Penicillium rubrum</i>	+	-	+	+	-
30.	<i>Penicillium nigricans</i>	+	+	+	+	-

Results and Discussion

The present study reveals the isolation of fungi from the seeds of spices. Six fungal species viz. *Aspergillus flavus*, *A.niger*, *Fusarium oxysporum*, *penicillium notatum* and *Trichoderma viride* were found on common fungal species on all five spice. The predominant fungal genera were *Aspergillus*, *Cladosporium*, *Curvularia*, *Penicillium*, *Alternaria* and *Fusarium*. *Chaetomium* is dominant and in *Rhizopus*, *Mucor* and *Absidia* were dominant. Among the five selected spices samples of Coriander and Cumin samples shows highest number of fungi. Isolation of Fungi with respect to the different isolation methods Agar plate method shows higher number of fungal species as compared to respective method.

Conclusion

Spices are most important agricultural products because of their taste and aroma they are commonly used to flavor the food preparations. India is known as home of spices and one of the largest producer spices and they occupy a prominent place in traditional culinary practices, because of poor agriculture, storage and handling practices spices become contaminated at each level. When the contaminated mycoflora get conducive atmosphere for their growth; they grow and alter the quality and taste of the spices by secreting enzymes, toxins and other secondary metabolites during their growth and development.

The present investigation resulted in the isolation and identification 30 species of fungi belongs to different genera. Improving the conditions of spices under processing, storage and transport and continuous mycological and mycotoxicological control prior to food processing is necessary to lower the risks from incompatibility of seeds in order to efficiently protect human health and for welfare.

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