## Short Communication

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# SCREENING ANALYSIS AND QUANTITATION OF MYCOTOXINS SCREENED BY DIFFERENT FUNGAL PATHOGENS CAUSING FRUIT ROTS

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For screening the mycotoxin production, different species of fungi were isolated from various fruits obtained from local market. Aspergilli, Fusaria and Penicillia have had maximum frequency of occurrence on fruits. All the fungal isolates were screened for mycotoxin production, though only few of them secreted aflatoxin  $B_1$  and  $B_2$ , zearalenone and citrinin. Aflatoxin  $B_1$  was the common toxicant and was produced by maximum number of isolates. Some fungi elaborated more than one mycotoxin while same mycotoxin was produced by more than one fungal species.

Key words : Fruit rots, pathogens, mycotoxins.

Mycotoxins are highly hazardous for human beings. In the past pathologists mostly focussed their attention on the study of diseases of economically important crop plants, and the fruits and vegetables were grossly neglected (Tandon, 1967). Fruits and vegetables are prone to mouldiness due to their soft tissues and high moisture content. Therefore present study deals with the screening, analysis and quantitation of mycotoxins produced by different fungi associated with common fruits. addition, 10 isolates of A. fumigatus, 6 of A. tamarii and 3 of A. niger also produced aflatoxins. Third major group of toxicant fungi was Fusarium. Four species of this group namely F. moniliforme, F. oxysporum, F. semitectum and F. solani were identified. Of 27, 15, 20 and 10 isolates of these species 11,4,4 and 5 isolates produced mycotoxins respectively. Apart from these, species of Aureobasidium cladosporium and Curvularia also contributed toxigenic isolates. It is thus evident that toxin producing fungi exist in all major toxinomic groups. This conforms to the observation of Bilgrami (1987). The results further reveals that Aspergilli were dominant forms among fruit rot fungi both in terms of occurrence and toxin elaboration, followed by Fusaria and Penicillia. In majority of earlier studies also these were found to be widely spread common contaminant, especially in food and feed (Singh, 1983) and fruits (Verma et al., 1980). These results also strengthened the earlier observations of Agarwal et al. (1983), and Prasad et al. (1986) that there exist some sort of specificity in toxin elaboration because only a few of the prevailing isolates producing toxins.

Samples of apple, banana, grape, mango sweet orange and ash gourd were collected from local market of Agra. The associated fungi were isolated and purified on Czapek's dox agar medium. Test species of fungi were grown on SMKY liquid medium (Diener and Davis, 1966) at  $30 \pm 1^{\circ}$ C for 10 days. Chloroform extract obtained from culture filtrate of different test fungi was used for primary mycotoxin screening by using florisil test outlined by Velasco (1972). The tentative toxin producing isolates thus identified were subjected to quantitation methods. Quantitative estimation of aflatoxin was done by the method of Nabney and Nesbitt (1965) and those of other mycotoxins by Coker *et al.* (1984).

In all 14 fungal associates of various fruits were found to be toxigenic (Table 1). Out of the total 303

Two isolates of A. *flavus* from apple and 4 isolates of P. citrinum each from apple and sweet orange produced two toxins. Similarly Sinha (1983) has detected four aflatoxin a  $B_1, B_2, G_1$  and  $G_2$  from the same fungus. In contrast, the same toxin is produced by a range of fungi (Moreau, 1979). This is borne out by the fact that aflatoxin  $B_1$  was produced by A. *flavus*, A. *fumigatus*, A. tamarii, A. niger, and P. citrinum and

isolates, only 117 isolates secreted one or the other mycotoxin. Of 95 isolates of *Aspergillus flavus*, 33 isolates secreted aflatoxins and of 57 isolates of *Penicillium citrinum* 19 isolates produced aflatoxin and citrinin. Both these fungi were found on apple. In

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Table 1: Mycotoxin producing potentials of fungal associates of various fruits.

fumigatus(18) AppleAflatoxin $B_1$ (10)0.85 to 2.203. Aspergillus tamarii(10) AppleAflatoxin $B_1$ (6)0.92 to 5.04. Aspergillus niger(10) BananaAflatoxin $B_1$ (2)0.69 & 1.51Aflatoxin $B_2$ (1)0.635. Aureobasidium pullulans(2)Sweet0.100 AppleZearalenone (2)in traces6. Cladosporium cladospoiriodes(10) AppleZearalenone (2)in traces7. Cladosporium herbarum(5) AppleZearalenone (3)in traces8. Curvularia lunata moniliforme(8) PearCitrinin (8)0.99 to 5.909. Fusarium oxysporum(15) AshgourdZearalenone (4)0.99 to 5.3210. Fusarium oxysporum(15) AshgourdZearalenone (5)0.82 to 4.5111. Fusarium citrinum(20) Sweet OrangeCitrinin (4)0.69 to 0.9112. Fusarium solani citrinum(10) AshgourdZearalenone (5)0.82 to 4.51(20) Sweet semitectum(18) AppleCitrinin (3) Lot o 4.31 & Aflatoxin $B_2$ (4)0.69 to 0.91(20) Sweet Orange(10) Sweet Citrinin (4)0.69 to 0.91(20) Sweet Aflatoxin $B_1$ (4)0.69 to 0.91(20) Sweet Orange(20) Sweet Citrinin (4)0.69 to 0.91(20) Sweet Orange(21) 0.69 to 0.91(20) Sweet Orange(21) 0.50 (Citrinin (4) Orange0.69 to 0.91(20) Sweet Orange0.69 to 0.91 (20) Sweet Orange0.69 to 0.91 (20) Sweet Orange0.69 to 0.91 (20) Sweet Oran	A f	ungal species tested		Fruits	Mycotoxins produced	Range of mycotoxin concen tration
	1.	Aspergillus flavus	(30)	Apple	Aflatoxin B <sub>2</sub> &	0.85 & 2.20 and
$(15) Mango Aflatoxin B_{1}(7) 0.90 to 3.10 (25) Pear Aflatoxin B_{1}(7) 0.90 to 4.71$ 2. Aspergillus (18) Apple Aflatoxin B_{1}(10) 0.85 to 2.20 3. Aspergillus (10) Apple Aflatoxin B_{1}(6) 0.92 to 5.0 (10) Banana Aflatoxin B_{1}(2) 0.69 & 1.51 Aflatoxin B_{1}(1) 0.63 5. Aureobasidium (2) Sweet pullulars Orange Zearalenone (2) in traces 6. Cladosporium (2) Sweet Zearalenone (2) in traces 7. Cladosporium (5) Apple Zearalenone (3) in traces (10) Sweet Zearalenone (7) 0.82 to 4.51 Orange 8. Curvularia lunata (8) Pear Citrinin (8) 0.99 to 5.90 (10) Sweet semitectum (27) Banana Zearalenone (11) 0.90 to 5.32 (10) Fusarium (20) Sweet semitectum (20) Sweet (20) Sweet Semitectum (20) Sweet Semitectum (20) Sweet Aflatoxin B_{1}(4) 0.69 to 0.91 (20) Sweet Aflatoxin B_{2}(4) 0.69 to 0.91 (20) Sweet (20) Sweet Aflatoxin B_{2}(4) 0.69 to 0.91 (20) Sweet Aflatoxin B_{2}(4) 0.69 to			(25)	Banana	Aflatoxin B. (7)	6.72 to 0.90
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OrangeCitrinin (4)0.82 to 1.45(19) PearCitrinin (8)0.99 to 5.9014. P. implicatum(6) AppleCitririn (4)0.91 to 4.50					Aflatoxin B <sub>2</sub> (4)	0.69 to 0.91
(19) PearCitrinin (8)0.99 to 5.9014. P. implicatum(6) AppleCitrinin (4)0.91 to 4.50			(20)	Sweet	Aflatoxin $\mathbf{B}_{1}$ &	0.69 to 0.91 &
14. P. implicatum (6) Apple Citririn (4) 0.91 to 4.50				Orange	Citrinin (4)	0.82 to 1.45
			(19)	Pear	Citrinin (8)	0.99 to 5.90
Total isolates (3(13) (117)	14.	P. implicatum	(6)	Apple	Citninin (4)	0.91 to 4.50
		Totalicalata	/2/12	)	(117)	

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citrinin was elaborated by P. citrinum, P. implicatum, Fusarium semitectum and Curvularia lunata. Similarly zearalenone was produced by Aureobasidium, Cladosporium, Fusarium moniliforme, F. oxysporum and F. solani.

A considerable degree of variation was noticeable in the amount of toxins elaborated by different isolates, even from the same fungi (Table 1). Existence of weaker isolates is well known (Prasad *et al.*, 1986). Ciegler (1977) opined that the mycotoxin producing Diener UL & ND Davis 1977 Aburn Unv Bull, 493 p. Moreau C 1979 In Moulds, *Toxin and Food* (Translated and edited by MO Moss) John Wilay & Sons. New York.

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potentials of the fungus depends upon their genetic makeup, susceptibility of the host plant or community.