

Aflatoxin Contamination of Mustard and Taramira Seeds Under Storage in Rajasthan

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Abstract *Aspergillus flavus* strains isolated from seeds of mustard (*Brassica juncea*) and taramira (*Eruca sativa*) collected from different parts of Rajasthan were screened for aflatoxin producing potentials. Forty nine out of 50 and 71 out of 75 isolates from mustard and taramira respectively were toxigenic and elaborated varying amount of aflatoxins. Similarly when 27 and 38 naturally infested samples of taramira and mustard were analysed for the presence of aflatoxins, 13 and 10 samples were positive for aflatoxin contamination. Aflatoxin B₁ was invariably present in all the contaminated samples and the amount of aflatoxin B₁ varied from trace to 489 µg/kg in taramira, while in mustard it ranged from trace to 729 µg kg⁻¹.

Key words Mustard, taramira, Aflatoxin, *Aspergillus flavus*

In the recent past, aflatoxins have gained importance, due to their hepatotoxic, carcinogenic, mutagenic and teratogenic properties (Bilgrami 1987, Groopman & Donahue 1988). Studies by Prasad and Sahay (1986), Sinha *et al.* (1988) and Bilgrami (1990) point towards the presence of these toxins in *Brassica* from Bihar. However, no such information is available from Rajasthan, which produce approximately 40 and 100% of country's produce of *Brassica* and toria respectively. Further the fluctuating climate may promote the mould infestations in seeds. Hence, a study was undertaken in different regions of Rajasthan and the results are discussed in this communication.

Materials and Methods

Samples of mustard (*Brassica juncea*) and taramira (*Eruca sativa*) were collected from different geographical regions with varying annual rainfall from 360 to 853 mm. *A. flavus* was isolated by blotter paper technique (ISTA 1966) and their toxigenic potential was determined in SMKY liquid medium (Diener & Davis 1966). Visibly infested seed samples were observed under long wave UV light (365 nm) for BGYF test (Fennell *et al.* 1973). The samples positive to BGYF test were subjected to extraction (Thomas *et al.* 1975) and estimation of aflatoxins by the methods suggested by Reddy *et al.* (1970) and Stack and Pohland (1975). The quantity of aflatoxin B₁ was determined by fluoro-den-

sitometrically using CAMAG TLC scanner. On the basis of amount of aflatoxin production the toxigenic isolates were grouped into high (20-60 µg g⁻¹) moderate (10-20 µg g⁻¹) and low (1-10 µg g⁻¹) toxin producers.

Results and Discussion

Out of 75 and 50 isolates from taramira and mustard, 71 and 49 respectively were toxigenic. 89.7% per cent isolates from taramira produced aflatoxin B₁ and only 5.3% aflatoxin G₁. 80% isolates from mustard elaborated aflatoxin B₁ and only 2% aflatoxin B₂, while 16 per cent of the isolates produced aflatoxin G₁ along with B₁.

Twenty three isolates from taramira and 19 isolates from mustard were highly toxic (20-60 µg g⁻¹) while 13 isolates from taramira and 12 isolates from mustard synthesized aflatoxin in the range of 10 to 20 µg g⁻¹. However, 35 isolates from taramira and 18 from mustard were low (1-10 µg g⁻¹) producer of aflatoxins. The amount of aflatoxin B₁ produced by different isolates varied from 0.127 to 1.98 µg g⁻¹ in taramira while in case of mustard it was in the range of 0.048 to 2.06 µg g⁻¹.

Out of 27 and 38 samples of taramira and mustard, subjected to BGYF test for the natural occurrence of aflatoxins, 18 and 27 samples of taramira and mustard were aflatoxin contaminated. Ten and 13 samples of taramira and mustard con-

tained aflatoxin B₁ while 7 and 3 samples of taramira and mustard contained aflatoxin G₁ alongwith B₁, and G₂ could not be detected in any of the sample. Higher amount of aflatoxin contamination was observed in the samples collected from Bhilwara followed by Dungarpur, Chittaurgarh, Bharatpur, and Jodhpur. The concentrations of aflatoxin B₁ in taramira and mustard were traces to 489 µg kg⁻¹ and traces to 682.92 µg kg⁻¹ respectively.

The present findings clearly indicate that mustard and taramira seeds are prone to aflatoxin contamination in storage. The high incidence of toxigenic isolates and the higher amount of aflatoxin contamination in samples collected from Bhilwara, Dungarpur and Chittaurgarh districts of Rajasthan might be due to heavy pre-and post monsoon rain as well as cloudy and foggy nights alternating with moderate hot days in these areas. Reports such as of Jones *et al.* (1981), Prasad and Sahay (1986) and Bilgrami and Chaudhary (1990) also support the view.

Majority of contaminated samples contained B₁ more than the tolerance level of 20 ppm fixed by WHO (Anonymous 1979). Consumption of such seeds with high level of aflatoxin will be health hazardous. Therefore, there is need for monitoring these commodities for the presence of aflatoxins.

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