

Characterization of fungal contaminants from wheat and the speculation of mycotoxin with reference to aflatoxin

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Thirty wheat samples procured from storage units in different zones of Coimbatore, Tamilnadu, India were processed to isolate the predominant fungal contaminants. Heterogeneous group of fungi were enumerated by standard plate count, among which four predominant organisms namely *Aspergillus flavus*, *Aspergillus tamarii*, *Rhizopus* spp. and *Fusarium* spp. were identified by macroscopic and microscopic observations. Since reputed journal reports, continuously highlight the impact of mycotoxin production in wheat by *Aspergillus flavus*, the isolate was chosen and processed to examine the production of aflatoxin and further analysis and confirmation was done using Albino rats and analytical techniques such as thin layer chromatography, immunodiffusion and Immunoelectrophoresis. TLC revealed the presence of G2 type of mycotoxin at a concentration of 15 ppb.

Key words : *Aspergillus flavus*, Mycotoxin, Aflatoxin, Immunodiffusion

INTRODUCTION

Wheat, the second largest cereal crop cultivated worldwide is a staple food used to make flour, live stock feed and for fermentation to make alcohol. Once a cereal crop is harvested, it may have to be stored for a period of time before it can be marketed or used as feed or seed. The length of time cereal can be safely stored will depend on the condition it was harvested and the type of storage facility being utilized.

Conditioning of grain has the single purpose of preserving the quality of grain. Low moisture content and temperature have been shown to be essential for successful storage of grain for a long period of time. A total of the fungal species belonging to several genera were recorded on wheat seeds stored under farm condition (Basak *et al.*, 1987). The survey on wheat storage mould in Government food storage and ration shops in Dhaka and Joydebpur, reported that all seed samples were infected with storage fungi like species of *Aspergillus*, *Rhizopus* and *Fusarium*. Among these *Aspergillus* species is highest (47%) followed by *Rhizopus* (30%) and *Fusarium* (20%) (Basak *et al.*, 1987). Apart from environmental pollution, the fungus causes several human and animal diseases (Khasim *et al.*, 2004).

Aspergillus is the most important fungi both medically and agriculturally. It infects important food and feed crops before and after harvest. It causes Aspergillosis in humans. *Aspergillus flavus*, *A. parasiticus* etc. produce

aflatoxin, which is carcinogenic. Aflatoxin belongs to a family of decaketides that are produced as secondary metabolites by *Aspergillus flavus* and *Aspergillus parasiticus* (Maggon *et al.*, 1977). The performance of different *in vitro* diagnostic tests for the diagnosis of Invasive Aspergillosis (IA) was investigated using a rat model (Gursoy *et al.*, 2008).

There are reports of outbreak of aflatoxin toxicity in many parts of the world, where people consume many common food items that contain aflatoxin even in small doses. So it is of paramount importance to detect and control these contaminants in food items (Koirala, 2005).

Keeping in mind the importance of wheat grain storage, the present investigation was attempted to screen the predominant fungal species that cause spoilage of stored wheat and special attention was made to characterize aflatoxin producers and its effect using Albino rats.

MATERIALS AND METHODS

Sample collection:

Thirty wheat samples were procured from storage units in different zones of Coimbatore, Tamilnadu, India were brought to the laboratory for processing.

Processing of the sample:

20 g of the sample collected from each unit was analyzed to identify the predominant fungal species causing