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Aflatoxin Production and Changes in protein and Caloric Value of Some cereals Infected by *Aspergillus parasiticus*

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Aflatoxin production, changes in protein and caloric value of seeds of gram, maize and rice infected by *Aspergillus parasiticus* were studied. Aflatoxin production ranged from 8.5 to 48 mg B_1/100 g in various seeds. Loss in protein and caloric value occurred in the infected seeds in the range of 8.5 to 24.2% and 7 to 21%, respectively.

Key Words : Aflatoxin Calory Grains Infection Protein.

Cereals, pulses and oil seeds constitute a major part of our diet (Anonymous, 1986). This spoilage in storage is caused by seed borne fungi (Vidhyasekaran *et al.*, 1973; Bilgrami *et al.*, 1979). Invasion by toxigenic strains of *Aspergillus flavus* group of fungi, along with spoilage, results in the accumulation of aflatoxins in the grains, which on consumption lead to liver disorders (Krishnamachari *et al.*, 1975). In this communication, aflatoxin production, changes in protein content and caloric value in the seeds of rice *(Oryza sativa L.)*, maize *(Zea mays L.)* and gram *(Cicer arietinum L.)* infested with A *parasiticus* are reported.

MATERIALS & METHODS: Surface sterilized seeds 25 g each of rice, maize and gram were soaked in distilled water and autoclaved at 15 lb. pressure ffor 20 min in a 250 ml Erlenmeyer flask. Flask were inoculated with 0.5 ml spore suspension of *A. parasiticus* (NRRL-3240), a potent aflatoxin producing strain obtained from Dr. C.W. Hesseltine, Northern Regional Research Laboratory, U.S.D.A., Illinois (U.S.A.). Flasks were incubated at 28 ± 1°C for 7 days. Active ingredients from the seeds were extracted with cloroform and estimated by the method of Jones (1972)

Protein was estimated by the method of Lowry *et al.* (1951). For the determination of caloric value, thoroughly washed and dried seeds were ground and the flour was pressed to form pellets. Caloric value of the samples was estimated by the method of Lieth 1975).

RESULTS: In the seeds, the amount of aflatoxin B_1 was produced in variable quantities i.e. 10.0, 8.6 and 48 in maize, gram and rice respectively (Table 1). Loss in caloric value and protein content of the seeds was well marked

Table 1 Changes in Caloric Value and Protein in Healthy and Infested Seeds

Seeds	Caloric value K. Cal/g dry wt.			Protein (%)			Aflatoxin B_1 (mg/100g seed)
	Healthy	Infested	% loss	Healthy	Infested	% loss	
Cicer arietinum	7	6	14	15	14	7	8.6
Oryza sativa	4	3	21	1	0.5	20	48.0
Zea mays	5	4	8	8	7	11	10.0

Percentage of caloric value was reduced in maize, gram and rice by 7, 11 and 21 respectively. The percentage loss in protein contents was also recorded. It was 9, 8 and 17% in maize, gram and rice after 7 days of incubation.

DISCUSSION: Aflatoxin producing mould affects the quality of seeds by utilizing food stored inside, thereby causing a loss in caloric value of the seed. They also produce certain toxic metabolites which make the grains hazardous for human as well as animal consumption (Detroy *et al.*, 1971). The varioation in quantitative production of aflatoxin B_1 might be due to differences in the susceptibility of the seeds. Decrease in the amount of protein content is apparently due to the utilization by the fungus for the systhesis of fungal protein. Decreased level of protein in infested seeds was recorded by Cherry *et al.* (1974) and Sinha *et al.*, (1981).

Calorific value of any food is directly related to its nutritional component. Substantial fall in protein content ultimately results in loss of caloric value of the seeds.

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