ABSTRACT

Thauria Mabruok Mohamed Abo El Wafa : Pre and Post Harvest Treatments for Limiting Peanut Contamination with Aflatoxins. Unpublished M. Sc. Thesis, Department of Plant Pathology, Faculty of Agriculture, Ain Shams University, 2011.

Peanut pods and seeds are subject to infection with several field and storage fungi. Some of these fungi could produce mycotoxins. Pre harvest infestation of peanut with toxigenic fungi, especially *Aspergillus* spp., poor management practices during and after harvest, and adverse storage conditions can result in contamination of peanut and peanut products by mycotoxins, especially aflatoxins. Aflatoxins have been associated with liver diseases and other public health concerns. Peanut also carries perceived and real health risks to consumers due to the nature of proteins and the oils in the commodity. The present study aimed to evaluate the effect certain preharvest and postharvest treatments on suppression of contamination of peanut with aflatoxins.

The results showed that peanut samples obtained from Qalyubia and Sharkia governorate recorded the highest frequency of infection with *Aspergillus spp*. Variation in susceptibility of five peanut cultivars to infection with *Aspergillus* spp was recorded. Cultivars Giza-5, Giza-6 and Gregory showed high incidence of fungal infection in seeds of freshly harvested pods, while Virginia cv. recorded lowest infection. When peanut seeds (Giza-6, Giza-5 and Ismailia-1 cvs) stored at 21ºC and 30ºC for up to 6 months, incidence of *Aspergillus* section Flavi was low in seeds stored at 21ºC than that stored at 30ºC. Twenty four isolates of aflatoxigenic fungi (*Aspergillus flavus* and *A. parasiticus*), from six governorates, showed ability to produce aflatoxins and isolates obtained from Behera recorded the highest aflatoxins production. Aflatoxin

formation by *Aspergillus flavus* was affected by storage period and temperature. Aflatoxin formation begun after 1 day incubation period and increased by increasing incubation period till the end of incubation period (2 weeks). During the 1st and 2nd days, only aflatoxin B_1 was formed, while aflatoxin B_2 was detected commencing from the 3rd day. However, aflatoxins G_1 or G_2 were not detected thought the incubation period. Aflatoxin-B_1 formed by *A.flavus* at 15℃, and increased by increasing temperature to 20℃, however, no aflatoxin formation has occurred at 5℃ or 10℃. In field experiment, foliar applications of peanut plants with different concentrations of calcium salts reduced infection of seeds with *Aspergillus* section Flavi, up to 2 months storage period. However, calcium chloride was more effective than Calcium Nitrate. The suppressive effect of high Co_2 concentration in the atmosphere on linear growth of *Aspergillus flavus* and formation of aflatoxins was oblivious. At 80% CO_2, linear growth was very slight and aflatoxin formation was negligible. To detoxify aflatoxins from culture filtrate of *Aspergillus flavus*, addition of Calcium Chloride prove to be more effective to reduced aflatoxins B_1,B_2, and total by 50% or more, while Calcium Chloride was less effective.

Soaking peanut seeds in Calcium Chloride solution markedly decreased aflatoxins contamination. However, soaking seeds for 2, 4, and 8 minutes led to about 50 reduction in aflatoxins B_1 and B_2, while soaking for 16 or 20 minutes nullified aflatoxin contamination. Peanut seeds were treated with Calcium Chloride or Sodium Chloride (3g/l) just before roasting at 140 or 160℃ for 18min. to study their effect on aflatoxin contamination. Roasting treatment at 140℃ for 18 minutes, without salting, slightly aflatoxins contaminations. Seed roasting at 160℃ for 18 minutes drastically reduced aflatoxins contamination.

Key words: Peanut, *Aspergillus flavus, Aspergillus parasiticus*, Aflatoxins, cultivar reaction, Management, Calcium

Salts, Seed roasting, Detoxification, Modified atmosphere.

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