

STUDY OF AFLATOXINS' CONTAMINATION IN WHEAT AND MAIZE FROM ALBANIA

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Abstract

Mycotoxins are toxic secondary metabolites produced by certain fungi that can infect various agricultural commodities in the field and/or during storage. Mycotoxins have various acute and chronic effects on humans and animals depending on species, susceptibility, sex and age. The major classes of mycotoxins are aflatoxins, *Fusarium* toxins, ochratoxin A, and ergot alkaloids. Aflatoxins, the most distinguished of them are produced by *Aspergillus* fungi, mainly *A. flavus* and *A. parasiticus*. Four major aflatoxins - B1, B2, G1, and G2 are natural contaminants of foods and feeds. They contaminate mainly maize and groundnuts, and are more distributed to warm climate regions, under 40° geographic latitudes north and south to equator. Acute exposure of consumers to aflatoxins may cause the disease called acute aflatoxicosis, while chronic exposure to AFB1 may cause hepatocellular carcinoma-liver cancer.

In this study we have analyzed the aflatoxins' contamination in cereals harvested during 2014 in different regions in Albania. Random samples (n = 20): winter wheat (14 samples) and maize (6 samples) were collected according to EU regulation 401/2006. The wheat and maize samples were collected in the Lushnja - Fieri region (n = 14) and Korça region (n = 6), according to their production distribution in the country. The objective of this study was to assess the risk of mycotoxin exposure posed to humans and animals. The samples were analyzed for AFB1 contamination by High Pressure Liquid Chromatography (HPLC) coupled with Cobra Cell detector.

Aflatoxin B1 was detected in 7 samples, and the levels varied from 1.47 to 143.55 µg/kg. The results of the infected samples with aflatoxin B1 were: 1.642 µg/kg to 74.804 µg/kg in maize samples, and 1.467 µg/kg to 143.55 µg/kg in wheat samples. Analytical data give indication that five of the analyzed samples, belonging to, wheat and maize contained aflatoxin B1 more than maximal values established by Commission Regulation 165/2010 amending EU Regulation 1881/2006 [11], AFB1 2mg/kg for wheat and 5 mg/kg maize commodities.

The wheat and maize samples collected directly after their harvesting season avoided the post-harvest contamination stage, which indicate that AFB1 origin of contamination to two cereals is of pre-harvest stage. Further investigation in other natural aflatoxins presence will give a clear picture of exposure to population groups.

Key words: Mycotoxins, Aflatoxin B1, Wheat, Maize, Albania.