University of Tirana

UNIFood2021 Conference

24th-25th September 2021 University of Belgrade

2nd International UNIfood Conference

# *STUDY OF TOTAL AFLATOXINS IN WHEAT, CORN, CEREALS REGARDING TO CHEMICAL AND MICROBIOLOGICAL CHARACTERISTICS.*

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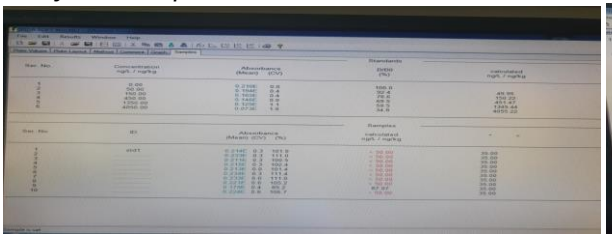
**Abstract**

The study was undertaken to assess food safety for the parameter of total aflatoxins in cereal samples, through measurements of chemical and microbiological characteristics to see their level in accordance with the norms established by European legislation. In total, 10 samples were analyzed taken from the market randomly or different cities of Albania. Cereal samples were subjected to chemical analysis such as moisture and Aw, as well as ELISA (immunological analysis) for the determination of total aflatoxins and were analyzed too by microbiological part for total microflora and fungi. Based on the chemical analyzes performed, the samples mainly turned out to be within the norms set by the European legislation. Aflatoxins are derivatives of difuranocoumarins. They are among the most poisonous mycotoxins. The main naturally produced aflatoxins based on their natural fluorescence (blue or green) are named $B_1$, $B_2$, $G_1$ and $G_2$. They are unstable under the influence of ultraviolet light, in the presence of oxygen, at pH extremes (<3,> 10) and to oxidizing agents. Aflatoxins are produced only from a closely related group of Aspergillus: Aspergillus flavus, A.parasiticus and A.nomius strains. Other species such as A.bombycis, A.ochraceoroseus and A.pseudotamari are also species that produce aflatoxin, but they are found less frequently. Aflatoxins pose a problem in relation to many food products (nuts, spices), however, in terms of cereals they are especially problematic in the case of corn.

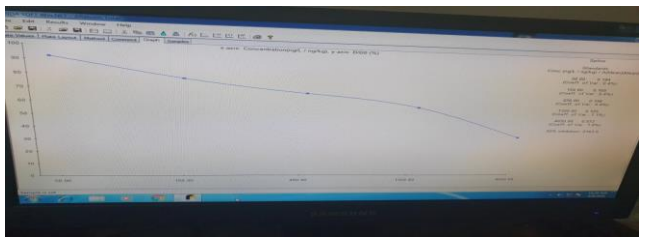
**Results:** Experimental evidence showed that the level of contamination with microorganisms was low. It turned out that the samples were at the right level of humidity. This means that storage conditions were good. The highest moisture values resulted in sample $S_{10}$ (Corn) and the lowest value in sample $S_2$ (Corn flakes with gluten-free honey-Nestle). Samples $S_1$, $S_2$ and $S_3$ did not have water activity above the norm which would affect their crocanticity. Corn grain, respectively samples $S_4$ and $S_{10}$ had lower values than the optimal one, (<0.87). Wheat grain $S_8$ and $S_9$ also had lower values, Au <0.80. Wheat flour $S_6$ and $S_7$ were within normal. The highest Au turned out to have samples $S_{10}$ (corn) and the lowest samples $S_2$ (Corn flakes with gluten-free honey-Nestle). The sample which had the highest level of total aflatoxins was sample $S_9$ (87.07 ng / kg). Meanwhile, other samples have a level <50 ng / kg, so no value was detected within the range of concentrations used to construct the calibration curve. The maximum level of total microflora resulted in sample $S_8$ (Wheat). In terms of mold contamination, the sample which resulted in a high level of contamination was sample $S_{10}$. The sample $S_9$ showed a low level while the other samples were not contaminated with mold.

**Conclusions** This study was achieved by correlating with the measurements of humidity, water activity and fungal microbial load, which were below the value of legislation, indicate good storage conditions of samples which had not developed fungi and had not produced aflatoxins.

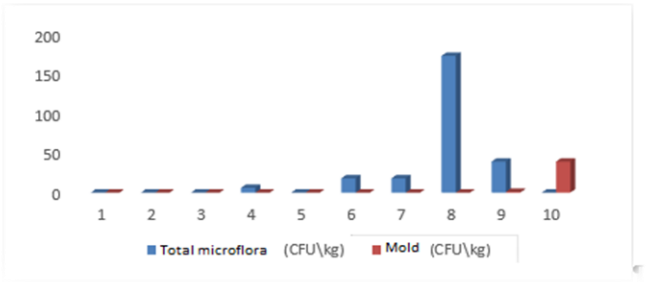
*Keywords: aflatoxin, ELISA, moisture, Aw, microbial load etc.*



**Graph. No 1. Results of aflatoxins calculated by *Rida soft cubic spline function***



**Graph. No. 2 Calibration curve of standards**




**Graph. No. 3 Total microflora and molds in samples**