Mycotoxins in Cereals Cultivated in Romania: Screening and Quantification

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Abstract

Our researches want to establish the mycoflora and the natural occurrence of mycotoxins in grains for industrialization and fodder from our country. We intend to compare these levels with the international ones and to change the legal level of mycotoxins admitted by our laws and to align these levels with the European legislation.

Different random samples of grains (130 samples of wheat, 60 samples of corn, 6 samples of *Triticale* and 6 samples of rye) were collected from 14 districts of Romania and were analysed from mycological point of view. We identified potential toxigenic mycoflora in 130 samples from 202 samples of grains. Moulds evaluation was determined using conventional methods as blotting test and Ulster test. The predominant genera of toxigenic fungi found were *Penicillium, Aspergillus* and *Fusarium*.

We can notice frequencies of *Penicillium* above 70% in almost of the samples (50% samples by blotting test and 100% in Ulster test) and *Aspergillus* above 70% in 25,1% samples analyzed by blotting test and in 41,7 samples analyzed on Czapek Dox medium. In this perspective, owing to the positive indicia obtained in that preliminary test we reiterated the mycological analyze of the contaminated samples. We used the dilution test applied by Mahmoud and all (2001) and described by Christensen (1963). We've determined a high number of colonies and the fungal charge of grains for food and fodder on all samples is enough high to alarm us, indifferent of the method of analyze. We have to corroborate this data with mycotoxins analyses to know if our food and fodder is dangerous or not.

Our studies were continued on finding rapid methods for screening of aflatoxins B1, (AB1), aflatoxin B2 (AB2), aflatoxin G1 (AG1), aflatoxin G2 (AG2) and ochratoxin A. Mycotoxins were extracted in chloroform, separated on silicagel thin-layer chromatography plates and quantificated using densitometric analysis. There were analyzed 39 cereal samples (wheat and maize) from different Romanian districts.

The contamination range was: aflatoxin B1: 1.7 - 5.7 μg/kg, aflatoxin B2: 0.02 -2.8 μg/kg, aflatoxin G1: 1.1 – 5.7 μg/kg, aflatoxin G2: 0.12 – 1.8 μg/kg, total aflatoxins: 1.2 – 10.8 μg/kg and ochratoxin A: 4.4 - 30.0 μg/kg. The higher number of contamination rate was in the case of wheat samples.

In conclusion we established: 1. TLC coupled with densitometry has been shown to be an accurate, specific and reliable detection method for aflatoxins at level as low as 0.87 μg/kg for aflatoxins and 10 μg/kg for ochratoxin A and 2. TLC coupled with densitometry is a fast method that can be used for mycotoxins screening

The mycotoxin analyses revealed to us a high and dangerous level of ochratoxin A and total aflatoxins. Our food and fodder are dangerous and our legislation is way too permissive and we have to change it.

Key words: mycotoxins, mycoflora, toxigenic fungi, grains

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