DETERMINATION OF THE PRESENCE OF AFLATOXIN B1 IN FEED IN REPUBLIC OF SRPSKA (BiH) IN THE PERIOD OF 2017-2019

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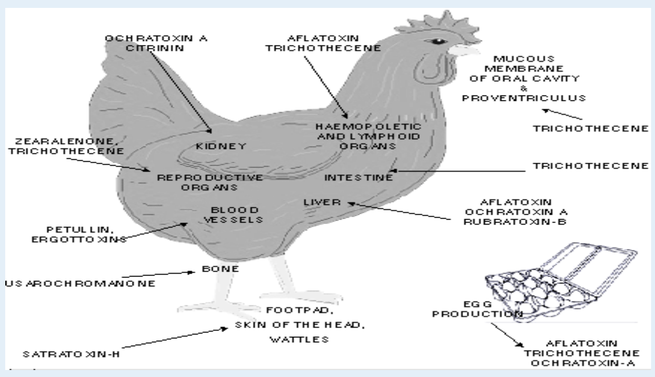
Introduction

Mycotoxicosis problems burden agriculture and livestock production worldwide. Mycotoxins in food and feed are recognized as a public health problem. Fungal toxins dealt with many researchers which established their carcinogenicity. Aflatoxins (AFB1, AFB2, AFG1, AFG2, AFM1, AFM2) are a potential teratogenic and carcinogenic metabolic products of Aspergillus flavus, Aspergillus parasiticus and Aspergillus nomius (Kurtzman at all.1987) fungy are commonly found on the grains, almonds, walnuts, peanuts. According to FAO data from 2018, cereal contamination with mycotoxins at the world level is 25-30% of the harvest.

Aflatoxins are a mixture of related chemical compounds. Series of aflatoxin B has the structure of molecules, which a cyclopentane ring is replaced by a G in the series of the -lactone. Three structural variations give 18 molecules of aflatoxin, of which 8 is toxic and so far known aflatoxin B1 is the most toxic (Sinovec at all. 2006). Clinical signs of an acute aflatoxicosis include loss of appetite, lethargy, weight loss, neurological disorders, jaundice mucous membranes and cramps. High doses of aflatoxins are acutely toxic, causing substantial damage to the liver and intestinal and peritoneal bleeding, which can be letal (Marriott and Gravani 2006).



Advers effects in polutry industry. (Sinovec et all 2006)

Material and methods

As the material in our testing we used a feed (silage, maize, concentrate feed). Analyses were performed by ELISA method, using test kit produce by manufacturer Bioscinetific, Max signal, (Austin USA).

Pictures 1. Aspergillus flavus

Results and discussion

The obtained results for feed samples are shown in Table 1

	2019 year				2018 year				2017 year			
	µg/kg											
	<0,5	0,5 -5,0	5,0 - 20,0	>20,0	<0,5	0,5-5,0	5,0-20,0	>20,0	<0,5	0,5 - 5,0	5,0-20,0	>20,0
Maize	49	14	-	1	129	20	10	-	106	11	29	1
Concentrate feed	27	27	1	-	31	59	8	1	57	50	22	1
Other feed	30	26	-	-	29	19	3	-	22	92	19	-

Table 1 shows review for period 2017-2019 where we have analyzed a total of 894 samples. 46,30% (414 samples) were contaminated by aflatoxin B1. 2,46% (22samples) at concentrations higher than allowed by valid regulation. The greatest number of samples (480) had a concentration of aflatoxin B1 less than 0,5 µg/kg, and 318 samples in the concentration range from 0,5µg/kg -5,0 µg/kg, 92 samples in the concentration range from 5,0 µg/kg -20,0 µg/kg, The highest detected concentrations of aflatoxin B1 in maize was 30,0 µg/kg, and at concentrate feed was 25 µg/kg, and other feed 15 µg/kg.

Results of our studies are compared with results of available literature. Kos et al. (2013) in their studies found that of the 78 analyzed samples, in 44 was detected presence of aflatoxin B1. The most contaminated samples had a concentration (17.9%) of 1-10 ppb. Škrinjar et al. (2013) reported that in 12 of the tested samples the concentration aflatoxin B1 in feed material was from 6 µg/kg to 145.8 µg/kg, while we in our studies recorded a highest concentration of 30 µg /kg. Nedic et al. (2014) in their work detected 7.21% of positive samples in concentrate feed analyzed in 2013, which is slightly higher than the results of our examination. Increased values of concentration of aflatoxin B1 (51%) found Škrinjar et al. (2013) in their studies. Almeida et al. (2013) in thier research repored that the largest number of analyzed samples has a concentration of aflatoxin less than 5 µg/kg, which would correspond to our test results. Results of analysis Nedic et al. (2014) and Škrinjar et al (2013), indicates on increased concentration of aflatoxin B1 in feed in 2012 which is direct consequence of drought that happened that year in this region. Similar results were obtained in our studies get Dojčinović et al (2017). According to official data (FAO 1995), the average content of aflatoxin B1 varied between 4 and 8 µg/kg with a maximum value of 30 µg/kg. In world-wide scale in the period 1986-1997 from 2,460 tested samples of grain 1273 of the sample contained B1 at concentrations of 7-44 µg/kg. In Brazil, from 2 546 samples of corn, 51% were contaminated with aflatoxin B1, a maximum quantity amounted to 2440 µg/kg (Sinovec at all.2006), which is more than what we have found in our tests. Higher concentrations of aflatoxin B1 (251 µg/kg), are recorded and in researchers in China.

Conclusion

Based on the results obtained in this experiment it is possible to conclude that is necessary to do monitoring of concentration aflatoxin B1. Concentration aflatoxin B1 depends on climate changes.So it is necessary to apply agro technical measures, make selection of species of corn and other food and feed, which are more resistant to contamination of aflatoksin B1.