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OCHRATOXINS - FOODER CONTAMINANTS AN IMPACT ON ANIMALS AND HUMAN HEALTH

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Abstract

Under certain conditions Aspergillus, Penicillium can produce and release secondary metabolites in feed type: Ochratoxin A (OTA). Ochratoxin A (OTA) has been shown to be highly nephrotoxic compounds, hepatotoxic and teratogenic. Ochratoxin affect animal health and can be found in animal products (meat, eggs, milk) presenting a potential risk to human health. Strategies to control OTA in feed and food requires early identification and removal of contaminated products in the food chain.Toxicity of mycotoxins depends on their source and dose, duration of exposure and composition. This paper aims to address this type OTA mycotoxins in feedingstuffs and possible risk you may present it on animals and man.

Key words: *ochratoxin A, mycotoxins, feed, human toxicity, animals toxicity*

INTRODUCTION

Ochratoxin A (*OTA*) was discovered in 1965 as a secondary metabolite of a strain of *Aspergillus ochraceus. OTA* is one of the highly dangerous mycotoxins for human and animals health [3].
Ochratoxins are produced by several species of the fungal genera *Aspergillus* and *Penicillium.* In genus *Penicillium*- OTA is produced by *P. verrucosum* and *P. nordicum* and in genus *Aspergillus* by *A. ochraceus*, *A. melleus*, *A. auricomus*, *A. ostianus*, *A. petrakii*, *A. sclerotiorum*, and *A. sulphurous*[7,14].
In recent years the analyses of some food products and fodder demonstrated that, P. *viridicatum*, P.*griseofulvum* and possibly P. *solitum* also produced ochratoxins. From genus *Aspergillus*: *A niger* and A.*carbonarius* have been reported as ochratoxigenic fungi[1,10,15]
OTA contamination of food products from animals (milk, eggs, meat) or processed, are usually explained as a result of the animal's digestive absorption of feed contaminated with OTA[21] .

OTA - TOXICITY IN ANIMALS AND HUMANS

*OT*A is mutagenic, immunosuppressive in several species of animals and in humans. Ochratoxin is primarily a kidney toxin but if the concentration is sufficiently high there can be damage to the liver as well. She affects mainly the kidneys, in which it can cause both acute and chronic lesions; a neurotoxin effect has been demonstrated in all mammalian species.

Animal toxicity

Nephrotoxicity: Pigs, being most sensitive to ochratoxins, suffer from porcine nephropathy. The kidney, there is a proximal tubular atrophy, fibrosis and sclerosis glomerulara These effects were observed after feeding the feed level of OTA was between 200 to 4000 g/Kg [18].
Carcinogenesis: To date known carcinogenic effects in the renal unit at: mice and rats [2,5,8]. Pigs although OTA is metabolized

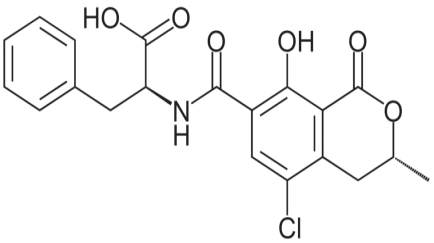
and excreted relatively quickly, there were no reported cases of kidney cancer, female, or after ingestion of two years.[6].

Human toxicity
Nephropathy: Epidemiological studies have shown that OTA can occure in humans a higher incidence of nephropathy and renal tumors.[4,18,20].
That is way the European Scientific Committee on Food indicates a lower tolerable intake, below 5 ng/kg /per day [20].
Liver toxicity: Following oral administration OTA is present in blood for 35 days [11].
Carcinogenesis: After studies found that renal tumors often occur in food consumption is greater than 70 g / kg per day of OTA. [12,13,14].

TYPES OF OCHRATOXINS AND CHEMICAL STRUCTURE

Currently known three types of ochratoxin A, B, C. Depending on the degree of toxicity they are: OTA, OTC, OTB
The chemical composition of Ochratoxin A is in the figure 1 [10] .

Fig. 1. Ochratoxin A from Aspergillus sp.



MATERIAL AND METHOD

To minimize the impact of the presence of mycotoxins in feed breeding pigs with direct influence on their determinations were carried out to establish the quality of feed used. This mycotoxin OTA was evidenced by using ELISA method of working, a rapid quantitative method of screening. The determination is made based on working kit protocol used is based on the reaction of antigen - antibody.

ELISA kit (Enzyme-linked immunosorbent assay-enzyme immunoassay) contains:
- Microtiter plate consisting of 12 strips with 8 wells each, coated with antigen;
- Standards of different concentrations of mycotoxins ;
- All reagents and buffers required (Anti-body - specifically of mycotoxin, Conjugate (with enzyme), Substrate Solution, Stop Solution , Washing buffer).

RESULTS AND DISCUSSIONS

This paper has proposed to address the presence of mycotoxins OTA in feed intended for pigs in 2010-2012. Samples were representative sample for each lot and have to comply with harvesting. If consumption of moldy feed containing secondary metabolites such as: Ochratoxin A (OTA).
Toxicity of mycotoxins depends on the source and their dose, duration of exposure and composition. Samples analyzed samples were represented by the following matrix: combined fodder for pigs, corn beans, bran, ground grain.
The results of determinations made are shown in the table below (Table 1).

Table 1

Matrices	Nr. Samples			OTA, (µg/ Kg)		
	2010	2011	2012	2010	2011	2012
Mixed fodder for pigs	3	3	4	Ned…0 ,478	Ned.	Ned.
corn beans	6	4	3	Ned.	Ned.	Ned.
bran	3	4	4	Ned.	Ned.	Ned.
ground grain	6	5	6	0,36.. 0,74	0,12.. 0,24	0,12..0 ,21

Ned.- undetectable

Values obtained from determinations were performed according to the legislation. The Commission of the European recommended guidelines for the maximum tolerable limits of different mycotoxins in feed, cereal and cereal products for animal feeding [22] (Table 2).

Table 2

Mycotoxin	Products intended for animal feed value	Maximum level (µg/kg
OTA	Feed materials (*) Cereals and cereal products; Completary and complete feedstuffs for pigs	250 50

CONCLUSIONS

- Worldwide OTA contamination of feed and food is a major concern because it is considered a nephrotoxic and carcinogenic agent,the origin of many kidney diseases;
- Mycotoxins toxicity depends on the source and their dose, composition and duratio of exposure ;
- Due to the toxic effect of mycotoxins the maximum level in fooder and food in subject to European legislation
- Since the values obtained from analyzes did not exceed the maximum permitted by law, they pose no risk to animal and human health

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