



Mycotoxins occurrence; animal health & food safety concern for food animal production

Introduction

Fungi are a natural contaminant of crop products, the hazard related to the presence of their metabolites is a real food animal producers concern. Hundreds of mycotoxins produced by several fungi genera have been identify and related to animal health disorders that negatively impact the performance in the animal production units. Immunosuppressive, estrogenic carcinogenic, hepatotoxic, neurotoxic, and nephrotoxic effects cause economic losses at all levels of farm production process.

Another complication must be considered in the mycotoxin damage approach and this is the accumulative effect of a multiple mycotoxins contamination on the animals diet, and probably this is the most frequent complicating factor in field conditions.

Material & methods

Feed samples collected form July of 2005 to December on 2007 were sent to the Laboratory to be analyze for the next six toxins: Aflatoxin, Ocratoxin (OTA), Fumonisin, Zearalenona (ZEN), Deoxinivalenol (DON) and T-2 toxin (T-2).

Three hundred and sixty five samples of swine feed were analyzed. These 365 samples had the next territorial origin: 65% from the northwest, 12% from the pacific, 12% from the southeast, 10% from the center and 3% from the north region of the country (Map 1).

Map 1

Regional distribution of the sampling

Region:

Northwest	orange
Pacific	green
Southeast	yellow
Center	red
North	blue



Results

Table 1 summarize the percentage of positive contamination by kind of feed and mycotoxin.

Table 1

Percentage of positive contamination occurrence by kind of feed and kind of mycotoxin

	Corn	Wheat	Conc.*	Sorghum	Soybean	N/D**
Aflatoxin	93%	68%	89%	95%	74%	85%
ZEN	95%	99%	85%	95%	89%	100%
Fumonisin	91%	77%	70%	42%	63%	38%
DON	87%	76%	79%	61%	74%	38%
OTA	87%	64%	72%	45%	74%	38%
T-2	92%	69%	89%	92%	68%	38%
Average	91%	76%	81%	71%	74%	56%
STDEV***	3	11	7	23	8	26

* concentrated processed feed

** non determined

*** standard deviation

Table 2 shows the percentage of positives to mycotoxins contamination over the non observable effects levels (NOEL)

Table 2

Percentage of positives to mycotoxins contamination over NOEL

	no. of samples	no of positives	over NOEL*	% of positives over NOEL
Aflatoxin	365	311	4	1
ZEN	365	344	116	34
Fumonisin	365	278	151	54
DON	365	285	118	41
OTA	365	265	1	0
T-2	365	303	9	3

* Non-observable effects levels

Table 3 two hundred and sixty one of the tree hundred and sixty five samples were analyze for full mycotoxins battery (the six mentioned) those samples were statistic correlated by the Pearson coefficient.

Table 3

Pearson correlation coefficient for the full battery analyze samples

	Aflatoxin	ZEN	Fumonisin	DON	OTA	T-2
Aflatoxin	1	-0.02	0.05	-0.03	-0.02	-0.04
ZEN	-0.02	1	-0.02	0.06	-0.05	0.17
Fumonisin	0.05	-0.02	1	-0.04	0.10	-0.23
DON	-0.03	0.06	-0.04	1	0.07	0.17
OTA	-0.02	-0.05	0.10	0.07	1	0.15
T-2	-0.04	0.17	-0.23	0.17	0.15	1

Biosecurity strategies

Biosecurity programs assure the swine health and the food safety in their derivate products (as pork meat). The Biosecurity Programs include Clean and Disinfection, Integrated pest Management, and food safety in the Feed-Farm-Food chain, that's why has been include a Mycotoxins Control Program to offer specialize programs to the swine producers.

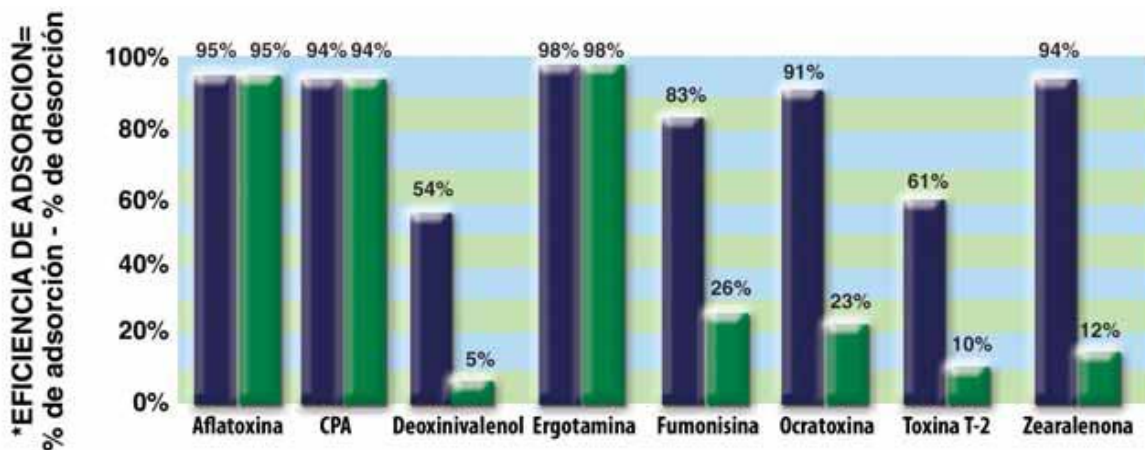
Mycotoxin binders

Mycotoxin binders are materials, added to the feed, capable of forming links with mycotoxins in the intestinal tract of the animals. Such complexes are not digestible, pass through the digestive system and are excreted with the faeces.

Some value characteristics of a Mycotoxin binder are: row materials quality assurance, granulometry control, adsorbent activation and technology, adsorption efficiency (percentage of adsorption with percentage of desorption) and the adsorption spectrum. (Figure 1 two different products adsorption efficiency profile)

Figure 1

Two products adsorption efficiency profile



Product:

Fixat

GREEN

Selected aluminum silicate, specific polar profile

Toxiorb

BLUE

Activated aluminum silicate, broad spectrum profile

Conclusions

The six mycotoxins occurred in the six categories of feed analyzed show a multiple contamination complex as a potential risk for swine producers.

The levels of contamination are differentiated but the NOEL are over passed in several samples, increasing the risk of mycotoxicosis in acute grade.

A complication factor is added with the contamination combinations and the possible synergism between two or more mycotoxins even below the NOEL.

The mycotoxin binders are a valuable tool developed to diminish to reasonable levels the toxins negative effects but several technical considerations must be done to assure the benefit of their use. The best approach to a mycotoxin control program is with a Biosecurity strategy that includes good farming practices to obtain the best solution.

References

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