

## AN UPDATE OF MYCOTOXINS CONTAMINATION IN FEED INGREDIENTS IN MALAYSIA FROM 2012 TO 2013

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### ABSTRACT

Mycotoxins contamination is a global issue that gives direct or indirect impact to livestock and poultry industries. This study as an update of the mycotoxins contamination in feed ingredients used in Malaysia, aflatoxin B1, deoxynivalenol (DON), ochratoxin A, fumonisin B1, T-2 and zearalenone ( $n=133$ ) were tested by LC-MS/MS where 21.1% 30.1%, 9.8%, 66.2%, 0.8% and 33.8% were detected respectively; and aflatoxins ( $n=47$ ), DON ( $n=29$ ), ochratoxins ( $n=19$ ), fumonisins ( $n=26$ ), T-2 ( $n=25$ ) and zearalenone ( $n=27$ ) were tested by ELISA method, found that 38.5%, 62.1%, 10.5%, 69.2%, 8.0% and 18.5% were detected respectively.

### INTRODUCTION

The mycotoxins contamination is not only affect the animal health and production lost; economic losses were also reported in Third Joint FAO/WHO/UNEP International Conference on Mycotoxins by Baht and Vasanthi, 1999. Dersjant-Liet *al.* (2003) stated that each mg/kg estimated for every mg/kg increase in the diet, the depression effects in growth rates reported were a) aflatoxin B1 - 16% and 5% for pigs and poultry respectively; b) DON - 8% for pigs and c) fumonisin B1 - 0.4% for pigs. This study is an update to the study by Limet *al.*, 2011 which was conducted for similar mycotoxin detection study conducted between 2009 and 2011.

### MATERIALS AND METHODS

A total of 180 specimens were tested between 2012 and 2013 by enzyme-linked immunoassay (ELISA) method and liquid chromatography tandem mass spectrometry (LC-MS/MS). The tested specimens were predominantly maize and feed followed by soy bean meal and wheat.

AgraQuant® test kits: total aflatoxins, DON, total ochratoxins, total fumonisins, zearalenone (ZEA) and T-2 toxin (T-2), from Romer Labs® were used in ELISA method. Agilent 1260 liquid chromatography tandem 6460 mass spectrometer (LC-MS/MS) was used in determination of aflatoxin B1, DON, ochratoxin A, fumonisin B1, T-2 and ZEA as LC-MS/MS method.

### RESULTS AND DISCUSSION

The summary of the results are shown in Tables 1 and 2. There was an overall increase in the detection of mycotoxin contaminated samples over the period 2009-2011 (0.0-66.0%) and 2012-2013 (0.8-66.2%). Fumonisins were the most common

mycotoxin detected in the period of 2012-2013 (66.2-69.2%) and with increased frequency (0.3% and 7.6%) for LC-MS/MS and ELISA methods respectively) over the two reported periods. The positive value in the detection rate of T2 by LC-MS/MS decreased positively with a lower contamination level (542  $\mu\text{g}/\text{kg}$  to 82  $\mu\text{g}/\text{kg}$ ). Ochratoxin detection by ELISA increased by 650% with higher contamination levels (2.1  $\mu\text{g}/\text{kg}$  to 14.5  $\mu\text{g}/\text{kg}$ ).

Table 1. Summary of the determination of mycotoxins by using ELISA method

Mycotoxin tested	Total Aflatoxins	DON	Total ochratoxins	Total fumonisins	T-2	ZEA
No. of samples	47	29	19	26	25	27
Detected range ( $\mu\text{g}/\text{kg}$ )	4-35	270-3,400	9-20	360-2,750	91-107	34-201
Mean of detected levels ( $\mu\text{g}/\text{kg}$ )	11.6	741.0	14.5	1,178.0	99.0	104.0
Limit of determination ( $\mu\text{g}/\text{kg}$ )	4	250	2	250	75	40
No. of positive samples	18	18	2	18	2	5
Positive rate in 2012-2013 (%)	38.5	62.1	10.5	69.2	8.0	18.5
Positive rate in 2009-2011 <sup>a</sup> (%)	26.1	55.0	1.4	64.3	0.0	12.1

<sup>a</sup> data from Limet *et al.*, 2011

Table 2. Summary of the determination of mycotoxins by using LC-MS/MS method

Mycotoxin tested	Aflatoxin B1	DON	Ochratoxin A	Fumonisin B1	T-2	ZEA
No. of samples	133	133	133	133	133	133
Detected range ( $\mu\text{g}/\text{kg}$ )	2-44	16-992	2-394	35-75,665	82	10-2,567
Mean of detected levels ( $\mu\text{g}/\text{kg}$ )	15.1	153.6	85.4	2,431.9	82.0	126.7
Limit of determination ( $\mu\text{g}/\text{kg}$ )	2	10	2	10	10	10
No. of positive samples	28	40	13	88	1	45
Positive rate in 2012-2013 (%)	21.1	30.1	9.8	66.2	0.8	33.8
Positive rate in 2009-2011 <sup>a</sup> (%)	8.5	17.9	7.6	66.0	0.9	15.1

<sup>a</sup> data from Lim *et al.*, 2011

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