

OCCURRENCE OF AFLATOXINS IN FEEDS AND FEEDSTUFFS: 2005 - 2009

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Aflatoxins are secondary metabolites produced by moulds belonging to *Aspergillus* species (*Aspergillus flavus* and *Aspergillus parasiticus*). Aflatoxins can be found in a wide variety of agricultural and food products especially in cereal and cereal products and animal feeds as a result of mould contaminations before or during harvest or improper storage (1, 2). There are four major groups of aflatoxins: B1, B2, G1 and G2. Aflatoxin M1, a metabolite of Aflatoxin B1 in mammals, may be found in the milk of animals eating feeds contaminated by Aflatoxin B1.

Aflatoxins are regulated in many countries world-wide. In the European Union, the maximum tolerable level for total aflatoxins is 20 ng/g in all feed materials and complete feeds for poultry, pigs, sheep, cattle and goats (except complete feeds for dairy animals, 5ng/g) (3). A total of 911 feed samples were analysed by the Veterinary Public Health Laboratory (VPHL) from year 2005 to 2009. The samples were categorized into four groups: raw feeds (wheat bran, maize, soya bean, palm kernel cake etc), complete feeds (poultry feeds, rabbit feeds, layer duck feeds, goat feeds, cattle supplements etc), by-product feeds (soya bean hull, brewers grain etc), and grasses. All samples were from Malaysian feedmillers, farmers, private and government sectors and researchers. Total aflatoxins were screened using ELISA technique. Members of the aflatoxin family (aflatoxin B1, aflatoxin B2, aflatoxin G1, aflatoxin G2 and aflatoxin M1) were further confirmed using solvent extraction, immunoaffinity column (IAC) clean-up and LC analysis with fluorescence detection according to the modified method of VICAM Instruction Manual (4).

From the 911 samples analysed, the highest contaminated samples were in the grasses group (Table 1). This effect was probably due to high humidity compared to other groups of samples. It was reported that the fungal species can produce aflatoxins on commodities in the field under stress conditions or when stored under high moisture and at warm temperatures (25-30°C) (5). However, 10% of the samples from by-product feeds were contaminated exceeding acceptable level of 20 ng/g, followed by 2.8% from raw feeds, and 0.8% from complete feeds. Aflatoxin B1 which is acutely toxic and most carcinogenic (3) was the prevalent compound in the samples.

Table 1: Percentage samples contaminated by aflatoxins (year 2005-2009)

Group types	Number of samples tested, (n)	Overall percentage samples contaminated by aflatoxins (%)	Percentage samples contaminated > 20ng/g (%)	Percentage samples contaminated < 20ng/g (%)
Raw feeds	218	20.2	2.8	17.4
Complete feeds	646	20.9	0.8	20.1
By-product feeds	20	30.0	10.0	20.0
Grasses	27	40.7	0.0	40.7

Overall, the results showed an increase in aflatoxins occurrence from year 2005 to 2008 but decrease in 2009 (Figure 1). This trend shows that these animal feedstuffs were not totally safe for animal feeding and may reduce animal performance as well as can affect food quality of animal origin. Aflatoxins can cause economic impact due to livestock losses and cost of regulatory programs that need to be designed to reduce risks to human and animal health. Therefore, action should be taken to reduce the risk of samples being contaminated with aflatoxin that may be developed in the field and while in the storage stage.

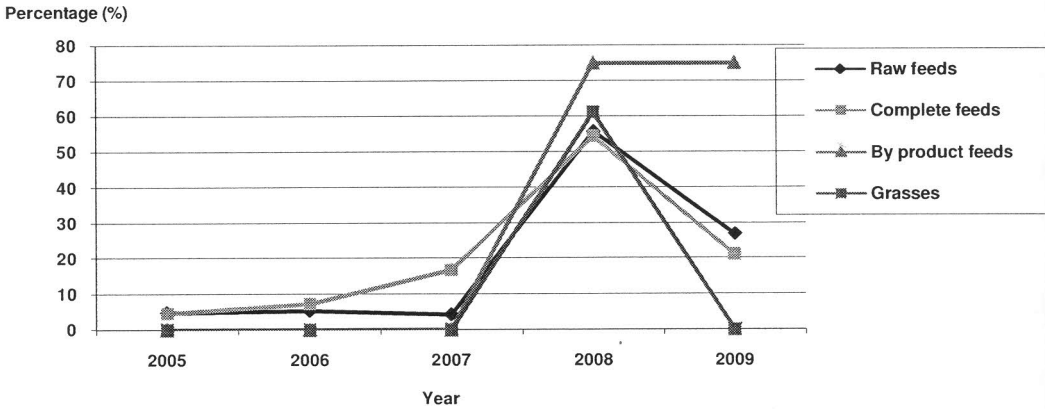


Figure 1: Trend of samples contaminated by aflatoxins from year 2005-2009

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- (2) Muscarella, M., Lo Magroa, S., Palermo, C. and Centonze, D., 2007. Validation according to European Commission Decision 2002/657/EC of a confirmatory method for aflatoxin M1 in milk based on immunoaffinity columns and high performance liquid chromatography with fluorescence detection. *Analytica Chimica Acta* 594, 257–264 E.C. 2002.
- (3) European Commission. Commission Directive No 2002/32/EC of 7 May 2002 on undesirable substances in animal feed. *Official Journal of the European Communities*. L140, 30.5.2002. p 10.
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