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Screening for mycotoxins in feed ingredients used for livestock compounded feed preparation

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Abstract
A total of 30 maize samples, 30 deoiled rice bran (DORB), 20 groundnut oil cake (expeller) and 20 dried distillers grain soluble (DDGs) feeds samples were collected from different parts of Namakkal district. Aflatoxin B1 was estimated in all the samples by extracting the aflatoxin and spotted in an activated thin layer chromatography (TLC) plate method. Among 30 samples of maize, analyzed for Aflatoxins, 20 samples (60%) contained traces of aflatoxin B1 and 8 samples (26.6%) contained between 10-30 ppb. Two samples (6.66%) contained between 400-500 ppb. Similarly, among 30 samples of DORB analyzed for aflatoxins, 24 samples (80%) contained traces of aflatoxin B1 and five samples (16.6%) contained between 10-30 ppb. One sample contained between 50-100 ppb of aflatoxin. Three samples of GNC and Four samples of DDGS had 50-100 ppb of aflatoxin. It reveals that, very few samples of maize and DORB contained high level of aflatoxin. Hence the regular screening of toxins in every lot of feed prior to feeding the animals or poultry needs to be regularized.

Keywords: Aflatoxin, maize, groundnut oil cake, dried distillers grain solubles

Introduction
One of the most important issues in the poultry feed industry is production of safe and good quality feed, as it has a major impact on the product. The quality of compounded poultry feeds based on the quality of the raw materials used to formulate the ration. Feed ingredients should be obtained and maintained in a stable condition, so as to protect feed ingredients from contamination by pests, or by chemical, physical or microbiological contaminants. Aflatoxins are low molecular weight polar compounds, produced by certain mold fungi like *Aspergillus flavus* and *Aspergillus parasiticus* in/on foods and feeds. They are probably the best known and most intensively researched mycotoxins in the world. Aflatoxins have received greater attention than any other mycotoxins because of the huge economic loss in poultry sector. The present study was designed to assess the prevalence of aflatoxins in some commonly used feed ingredients in poultry ration.

Materials and Methods
A total of 30 maize samples, 30 deoiled rice bran (DORB), 20 groundnut oil cake (expeller) and 20 dried distillers' grain soluble (DDGs) feeds samples were collected from different parts of Namakkal district. AflatoxinB1 was estimated in all the feed samples by the method described by Romer (1975) [3]. The aflatoxin was extracted with acetone, treated with cupric carbonate and ferric gel to eliminate fluorescent materials other than aflatoxin, washed with acid and alkali and extracted with chloroform, dried, rediluted with chloroform and spotted in an activated thin layer chromatography (TLC) plate with standards and ascertained the concentration by visual comparison method in a UV viewing cabinet (Sundram *et al.*, 2001) [4]

Results and Discussion
Among 30 samples of maize, analyzed (Table 1) for aflatoxin, 20 samples (70%) contained traces of aflatoxin and 8 samples contained between 30-50 ppb. Two samples contained between 400-500 ppb. Similarly, among 30 samples of DORB analyzed (Table 2) for aflatoxin, 24 samples contained traces of aflatoxin and five samples contained between 30-50 ppb. One sample contained between 50-100 ppb of aflatoxin B1. It reveals that, very few samples of maize and DORB contained high level of aflatoxin. In GNC, 17 samples (Table 3) contained traces of aflatoxin B1 and three samples contained 50-100 ppb. In DDGs, 16 samples (Table 3) contained traces of aflatoxin B1 and four samples contained 50-100 ppb. Sample with high aflatoxin, had high level of moisture (13-15%) at the time of collection of raw material sample. Similar observations were made by Banu and Muthumary (2008) [3].

The environmental condition which includes the warm and humid storage conditions favor the aflatoxin development in feed ingredients (Deva gowda, 2001) [2].

Table 1: Level of Aflatoxin B1 (ppb), Moisture (%) and Crude protein (%) in Maize

S. No.	Number of samples	Percent incidence of aflatoxicosis	Level of Aflatoxin B1 (ppb)	Moisture (%)	Level of Aflatoxin B2 (ppb)	Crude protein (%)
1	20	66.6	Traces	10.89 ± 0.30	Not Detectable	9.40 ± 0.36
2	8	26.6	30-50 ppb	12.17 ± 0.40	Not Detectable	8.93 ± 0.37
3	2	6.6	400-500 ppb	15.03 ± 0.20	7-260	9.67 ± 0.12

Table 2: Level of Aflatoxin B1(ppb), Moisture (%) and Crude protein (%) in DORB

S. No.	Number of samples	Percent incidence of aflatoxicosis	Level of Aflatoxin B1 (ppb)	Level of Aflatoxin B2 (ppb)	Moisture (%)	Crude protein (%)
1	24	80.0	Traces	Not Detectable	10.87 ± 0.35	14.80 ± 0.23
2	5	16.6	30-50 ppb	Not Detectable	11.55 ± 0.60	14.76 ± 0.46
3	1	3.4	50-100 ppb	Not Detectable	15.63 ± 0.05	13.96 ± 0.05

Table 3: Level of Aflatoxin B1 (ppb) in GNC and DDGs

S. No.	Number of samples	Percent incidence of aflatoxicosis	Level of Aflatoxin B1 (ppb)
Groundnut oil cake (Expeller)			
1	17	85.0	Traces
2	3	15.0	50-100 ppb
Dried distillers grain solubles			
1	16	80.0	Traces
2	4	20.0	50-100 ppb

Conclusion

From the present study, it can be concluded that, incidence of Aflatoxin B1 is high in maize followed by deoiled rice bran. Sample with high aflatoxin, had high level of moisture content. Hence the regular screening of toxins in every lot of feed prior to feeding the animals or poultry needs to be regularized.

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