Mycotoxin survey reveals interesting results and upward trends

Biomin have just published the results of their 2008 Mycotoxin Survey and the results make interesting reading.

The survey covers 1,086 samples that were collected between October 2007 and September 2008 and these were tested for aflatoxin B1, zearalenone, deoxynivalenol, fumonisin B1 and ochratoxin A.

Table 1 shows the results by global regions. North Asia (mainly China) accounted for more than half of the samples tested and, as in the previous year, the occurrence of deoxynivalenol was widespread.

Region	Aflatoxin B1	Zearalenone	Deoxynivalenol	Fumonisin B1	Ochratoxin A
North Asia	20	57	76	60	21
South East Asia	52	39	27	58	13
South Asia	71	20	19	44	36
Oceania	8	19	29	11	12
Americas	4	43	39	39	0

Table 1. Survey results by region (% samples positive).

High levels in China

The highest level of deoxynivalenol (32,893ppb) was found in a sample of finished feed from China. This region also provided the samples (both corn) with the highest levels of zearalenone and fumonisin B1 at 3,112 and 9,481ppb respectively.

Samples from South-East Asia were less contaminated than those from North Asia except when it came to aflatoxin B1 which was found in 52% of samples. The most prevalent mycotoxin was fumonisin B1 at 58%.

South Asia, which includes India, Pakistan and Bangladesh, had a high prevalence of aflatoxin and produced the highest result with 2,483ppb in a corn sample from Pakistan. This region also produced the highest result for ochratoxin A with 197ppb.

Oceania, for which most of the samples came from Australia and New Zealand, tended to have lower prevalence percentages but when mycotoxins were present they were at quite high levels. This region produced the highest result for zearalenone (332ppb).

The number of samples from the Americas was limited but the concentrations of fumonisin B1 were rather high emphasising the significance of this mycotoxin for the Americas.

When it came to commodities, corn was the most extensively and highly contaminated commodity with 71% positive results for fumonisin B1, 59% for deoxynivalenol and 40% for aflatoxin B1.

Soybean meal was the commodity which showed the lowest prevalence of mycotoxins. Even so, the co-occurrence of mycotoxins was present and, therefore, the synergistic effects of mycotoxins should not be overlooked.

Deoxynivalenol was the most prevalent mycotoxin in wheat/bran and it was present in 61% of wheat/bran samples tested from this region. A wheat/bran sample also provided the highest level of ochratoxin A (25ppb).

Corn gluten meal, which is a by-product of corn processing, showed a very high prevalence of mycotoxins with 88% positive for zearalenone and fumonisin B1. Mean levels of zearalenone (1,151ppb), fumonisin B1 (1,357ppb) were the highest found in the survey and the average level of aflatoxin B1 (81ppb) was also very high.

Relatively fewer samples of rice/bran tested positive for mycotoxins. As in the case of soybean meal the importance of the negative effects of co-occurring mycotoxins, even at low levels, should not be overlooked. DDGS showed similar results to the previous year with high prevalences of three important mycotoxins.

The highest level of deoxynivalenol was found in a sample of DDGS.

If the results from the 2005, 2006, 2007 and 2008 surveys are studied there have been upward trends in the percentages of positive samples of aflatoxin B1, zearalenone, deoxynivalenol and fumonisin B1, although, for the last three, 2007 was a year which bucked the trend.

Table 2. Prevalence (%) of mycotoxins in different commodities.

Commodity	1st	2nd	3rd	4th	5th
Corn	71	59	40	37	15
Soybean meal	28	19	13	5	4
Wheat/bran	61	29	21	16	4
Corn gluten meal	88	88	59	53	40
Rice/bran	34	23	10	3	-
DDGS	90	85	76	13	8

n Fumonisin B1 n Deoxynivalenol n Aflatoxin B1 n Zearalenone n Ochratoxin A

Upwards trend

The upwards rise in the prevalence of samples positive for aflatoxin B1 has been accompanied by an increase in the average aflatoxin B1 contamination from 27ppb in 2005 to 60ppb in 2008. Conversely, zearalenone contamination decreased over the same period.

More than half the samples analysed since 2005 were contaminated with more than one mycotoxin with 25% having only one mycotoxin and 17% were 'mycotoxin free'.

However, 'mycotoxin free' only means that the level of mycotoxin contamination was below the detectable limit, so, even in these samples, synergistic effects from co-occurrence could have been present.

The take home messages from this survey include:

- The presence of mycotoxins is ubiquitous both in terms of geography and in terms of commodity.
- Even at low contamination levels mycotoxins have negative impacts on bird health and performance and these are enhanced by production stresses.
- Synergistic effects due to the presence of two or more mycotoxins can occur.
- The use of mycotoxin risk management tools is a prudent strategy to adopt. ■