Sponsors

University of Minnesota
College of Veterinary Medicine

College of Food, Agricultural and Natural Resource Sciences

Extension Service

Swine Center

Thank you to **IDEXX Laboratories** for their financial support to reproduce the conference proceeding book.

Production Leader
Steven Claas

Production Assistant
Steven Claas
Janice Storebo
Sarah Summerbell

Layout and CD-ROM
David Brown
Tina Smith

Logo Design
Ruth Cronje, and Jan Swanson;
based on the original design by Dr. Robert Dunlop

Occurrence of various mycotoxins in DDGS samples worldwide

Ursula Hofstetter
Biomin GmbH, Industriestrasse 21, 3130 Herzogenburg, Austria

Mycotoxins are secondary metabolites produced by fungi on almost all agricultural products before or after harvest. These toxic substances are known to be either carcinogenic (e.g. aflatoxins, ochratoxin, fumonisins), estrogenic (zearalenone), neurotoxic (fumonisins), dermatotoxic (deoxynivalenol and T-2 toxin) or immunosuppressive (aflatoxins, ochratoxin A, trichothecenes). Mycotoxin contamination of crops may cause economic losses at all levels of food and feed production. *Fusarium* mycotoxin contaminated diets can cause feed refusal in farm animals, poor feed conversion, diminished body weight gain, immune suppression, interference with reproductive capacities and residues in animal food products.

The production of ethanol by fermentation of grains for energy use produces co-products that can be fed to animals. Dried distillers grains with solubles (DDGS) are source of protein/amino acids and energy feed for livestock and may economically replace corn and soybean meal in animal diets. The concentrations of protein, fiber, fat and minerals are generally about three times higher in distiller grains than in corn. Unfortunately this implies also for the level of mycotoxins that might be present in corn as the fermentation process does not destroy them.

This study was initiated and backed by BIOMIN® GmbH to provide customers insights in the occurrence of mycotoxins in DDGS samples worldwide thereby enabling better feed management. The results of this report are based on 89 samples mainly received from the United States (63 samples or 70%) and Asia. They were tested for major mycotoxins of interest in animal husbandry – aflatoxin B1, zearalenone (ZON), deoxynivalenol (DON or vomitoxin), T-2 toxin and fumonisins (FUM). All tests have been conducted by Quantas Analytics GmbH., Austria, and Romer Labs Singapore Pte. Ltd. Aflatoxins, ZON and total FUM were analyzed by HPLC (High Pressure Liquid Chromatography) whereas DON values were obtained by TLC (Thin Layer Chromatography). For the purpose of data analysis, non-detect levels are based on the quantification limits of the test method for each toxin: Aflatoxin B1 <0.5 µg/kg, ZON <10 µg/kg; DON <150 µg/kg; T-2 toxin <30 µg/kg andFUM <25 µg/kg.

Table 1: Occurrence of AfB_1 and ZON in DDGS.

	AfB_1	**ZON**
No. total samples	89	89
No. pos. samples	7	81
% positive	8%	91%
Av. level [µg/kg]	2	325
Max. level [µg/kg]	89	8107

From all samples analyzed, ZON accounted for a 91% contamination rate; 57% of tested DDGS were positive for DON, only 15% for T-2 toxin and 85% for FUM. Almost no aflatoxins were found in the DDGS samples collected. Only 8% of the samples were positive for aflatoxin with an average contamination level of 2 µg/kg (max. 89 µg/kg). (refer to table 1 and 2). However the presence of "field mycotoxins" (ZON, DON, FUM) produced by *Fusarium* sp. which - despite Good Agricultural Practice – cannot be avoided totally is very frequent and the contamination levels can be considered as high (average ZON level: 325 µg/kg, average DON level: 1405 µg/kg and average FUM level: 935 µg/kg).

Table 2: Occurrence of DON, T-2 toxin and fumonisins in DDGS samples.

	DON	**T-2**	**FUM**
No. total samples	89	89	89
No. pos. samples	51	13	76
% positive	57%	15%	85%
Av. level [µg/kg]	1405	15	935
Max. level [µg/kg]	12000	218	10184

DDGS is a possible source of supplemental feed but the question is how far to push the inclusion rate to maintain animal health and performance. This study confirmed previous literature stating the high levels of mycotoxins in distillers grains.