MYCOTOXINS

The annual multi-mycotoxin results on 100 out of the 1 000 samples analysed in this survey, are a good indication of the mycotoxin contamination in maize in South Africa. Results obtained with comprehensive mycotoxin surveys, such as the worldwide annual survey conducted by Biomin are useful to answer questions such as how severe is the mycotoxin contamination in different commodities, what is the situation worldwide and in different regions and which mycotoxins and concentration levels occurred. As an example, from January to December 2012, Biomin collected a total of 4 023 samples worldwide to be analysed for the presence of mycotoxins. In Africa, 80% of all analysed grain and feed samples tested positive for Aflatoxin and Fumonisin was present in all samples tested. [1]

The European Union specifies the following maximum levels for mycotoxins on maize in foodstuffs:

Aflatoxin

- Maize and rice to be subjected to sorting or other physical treatment before human consumption or used as an ingredient in foodstuffs, 5.0 µg/kg (B_1) and 10.0 µg/kg (Sum of B_1, B_2, G_1 and G_2).

Fumonisin

- Unprocessed maize with the exception of unprocessed maize intended to be processed by wet milling, 4 000 µg/kg.
- Maize intended for direct human consumption, maize-based foods for direct consumption, with certain exceptions, 1 000 µg/kg.
- Maize-based breakfast cereals and maize-based snacks, 800 µg/kg.
- Processed maize-based foods and baby foods for infants and young children, 200 µg/kg.
- Milling fractions and other milling products with particle size > 500 µm not used for direct human consumption, 1 400 µg/kg.
- Milling fractions and other milling products with particle size < 500 µm not used for direct human consumption, 2 000 µg/kg.

Deoxynivalenol (DON)

- Unprocessed maize, with the exception of unprocessed maize intended to be processed by wet milling, 1 750 µg/kg.
- Milling fractions of maize and other milling products with particle size > 500 µm not used for direct human consumption, 750 µg/kg.
- Milling fractions of maize and other milling products with particle size < 500 µm not used for direct human consumption, 1 250 µg/kg.

Zearalenone

- Unprocessed maize with the exception of unprocessed maize intended to be processed by wet milling, 350 µg/kg.
- Maize intended for direct human consumption, maize-based snacks and maize-based breakfast cereals, 100 µg/kg.
- Processed maize-based foods for infants and young children, 20 µg/kg.
- Milling fractions and other milling products with particle size > 500 µm not used for direct human consumption, 200 µg/kg.
- Milling fractions and other milling products with particle size < 500 µm not used for direct human consumption, 300 µg/kg.

Ochratoxin A

- Unprocessed cereals, 5 µg/kg.
- All products derived from unprocessed cereals, including processed cereal products and cereals intended for direct human consumption with the exception of food for infants and young children, 3 µg/kg. [2]

The European Union recommends the following guidance levels for mycotoxins on maize in animal feeds with a moisture content of 12%:

Fumonisin $B_1 + B_2$

- Maize and maize products, 60 000 µg/kg
- Complementary and complete feedingstuffs depending on the class and age of animal, 5 000 – 50 000 µg/kg

Deoxynivalenol (DON)

- Cereals and cereal products with the exception of maize by-products, 8 000 µg/kg
- Maize by-products, 12 000 µg/kg
- Complementary and complete feedingstuffs depending on the class and age of animal, 900 – 5 000 µg/kg

Zearalenone

- Cereals and cereal products with the exception of maize by-products, 2 000 µg/kg
- Maize by-products, 3 000 µg/kg
- Complementary and complete feedingstuffs depending on the class of animal, 100 – 500 µg/kg

Ochratoxin A

- Cereals and cereal products, 250 µg/kg
- Complementary and complete feedingstuffs depending on the class of animal, 50 – 100 µg/kg [3]

In the USA, the Food and Drug Administration (FDA) actions levels for Aflatoxin in animal feeds vary between 20 µg/kg and 300 µg/kg, depending on the intended use (species of animal). The action level for all commodities intended for human consumption is 20 µg/kg (excluding Aflatoxin M_1 (milk) where the maximum level is 0.5 µg/kg).

Advisory maximum levels for DON in animal feed varies between 5 000 and 10 000 µg/kg in grains and grain by-products and 1 000 to 10 000 µg/kg in the complete diet, depending on the species of animal as well as the percentage portion of the diet represented by the grain. Distillers grains, brewers grains, gluten feeds and gluten meals should not exceed 30 000 µg/kg.

Guidance levels for Fumonisin in maize and maize by-products used in animal feeds varies between 5 000 µg/kg and 100 000 µg/kg based on the class of animal and proportion of the diet and 1 000 µg/kg to 50 000 µg/kg for the complete diet.

Advisory limits for Fumonisins ($FB_1 + FB_2 + FB_3$) in foodstuffs are as follows: Degermed dry milled maize products (e.g. flaking grits, maize grits, maize meal, maize flour with fat content of < 2.25%, dry weight basis), 2 000 µg/kg. Whole or partially degermed dry milled maize products (e.g. flaking grits, maize grits, maize meal, maize flour with fat content of ≥ 2.25%, dry weight basis), 4 000 µg/kg. [4]

References:

1. BIOMIN Mycotoxin Annual Report 2012 www.biomin.net.
2. COMMISSION REGULATION (EC) No 1881/226 of 19 December 2006 setting maximum levels for certain contaminants in foodstuffs.
3. COMMISSION RECOMMENDATION of 17 August 2006 on the presence of deoxynivalenol, zearalenone, ochratoxin A, T-2 and HT-2 and fumonisins in products intended for animal feeding.
4. FDA Mycotoxin Regulatory Guidance, A Guide for Grain Elevators, Feed Manufacturers, Grain Processors and Exporters, August 2011.