

# Newsletter

BIOMIN Newsletter Vol. 4, No. 40, July 2006

## > EDITORIAL



*Although worldwide mycotoxin regulations mainly affect the food sector there will also come up some impacts on animal producers. Contamination of feedstuffs with mycotoxins occurs despite the most strenuous efforts on prevention. The economic consequences are felt by crop- and animal producers as well as by food- and feed processors.*

*In case that mycotoxin manifestation was evident, the first and most practical approach so far has been blending of low or non-contaminated grain with grain above the limits but this approach is now prohibited by law in the European Union. Since all mycotoxins are quite stable substances, no physical or chemical treatment can be applied without altering the nutritive value of the grain or causing too high cost implications. Therefore the danger is evident that "low quality" grain could be used for preparation of feed especially in so-called home-mixing countries where the animal producers are preparing their feedstuffs on site, as an adequate control will not be possible.*

*Although scientific literature offers a broad variety of information on the effects of individual mycotoxins in various animal species, it is the multiple mycotoxin contamination that matters the pig and poultry industry most, as it refers to the naturally occurring circumstances. Poor livestock performance and disease symptoms observed in commercial operations may be due to the synergistic interactions between multiple mycotoxins. Identification of a mycotoxin in a grain sample is only an indication of contamination as there may be other unknown and even masked mycotoxins present. A further complication is that the effects of mycotoxins are influenced by hygiene status, health status and, in particular, stocking density. Mycotoxins at all levels will affect the immune system of the animals and make them more susceptible to disease of all kinds, decreasing the productivity of the herd.*

*Thus, despite all regulations, products like Mycofix® Plus will remain indispensable to obtain a sustainable animal production.*

**Ursula Hofstetter**

**Mycofix® Plus product line –  
always a step ahead in  
mycotoxin deactivation!**



**Mycofix® Plus product line**

**Mycotoxins are health hazards that contaminate a wide variety of crops. Human and animal health can be at risk due to mycotoxin contamination. In order to reduce this risk, regulations and laws are enforced by the respective authorities.**

**Public health matters are only one aspect of this subject. How do regulations that are different from one country to the next influence the worldwide trade of agricultural commodities? What is the economic impact? Who benefits, who loses? Many questions occur once we look deeper into this matter.**

## **Impacts of Mycotoxin Regulations on World Trade**

by Elisabeth Pichler

### **Worldwide regulations**

The last survey of worldwide mycotoxin regulations was published by the FAO in 2003<sup>(1)</sup>. The number of countries setting regulatory limits for mycotoxins in food and feed is rapidly growing. By the end of 2003 it reached a level of approximately 100 countries which regulated Aflatoxin B1 or total Aflatoxins.

The trends observed in regard to mycotoxin regulations are

- more mycotoxins in more commodities were regulated compared to earlier observations,
- limits remained or tightened,
- regulations became more detailed regarding e.g. sampling or analytical methodology,
- harmonization between countries belonging to economic communities occurred.

Still, the regulatory levels differ widely if we compare major economic communities: e.g. the European level for total aflatoxins in commodities like cereals for human consumption is five times lower than the U.S. level of 20µg/kg.

## What are regulatory levels based on?

Many factors influence regulatory levels for mycotoxins. The most important factor is the toxicity of a given mycotoxin. But whether the toxic effects are a real threat depends primarily on the exposure to the toxin - which makes exposure another influential factor. The distribution of the toxin in contaminated crops should be considered as well as the availability of analytical methods to detect and quantify the mycotoxin at the intended regulatory limit.

Existing regulations in countries of trade partners play a roll as well. An area of concern for regulatory authorities that establish

Comparison of maximum tolerated levels of mycotoxins in the EU and USA:

Country	Commodity	(Sum of) Mycotoxin(s)	Limit (µg/kg)
<b>European Union</b>			
FOOD	cereals and processed products thereof intended for direct human consumption or use as an ingredient in foodstuffs	aflatoxin B <sub>1</sub> aflatoxin B <sub>1</sub> ,B <sub>2</sub> ,G <sub>1</sub> ,G <sub>2</sub>	2 4
	cereals, with the exception of maize, to be subjected to sorting, or other physical treatment, before human consumption or use as an ingredient in foodstuffs	aflatoxin B <sub>1</sub> aflatoxin B <sub>1</sub> ,B <sub>2</sub> ,G <sub>1</sub> ,G <sub>2</sub>	2 4
	maize to be subjected to sorting, or other physical treatment, before human consumption or use as an ingredient in foodstuffs	aflatoxin B <sub>1</sub> aflatoxin B <sub>1</sub> ,B <sub>2</sub> ,G <sub>1</sub> ,G <sub>2</sub>	5 10
	raw cereal grains (including raw rice and buckwheat)	ochratoxin A	5
	all products derived from cereals (including processed cereal products and cereal grains intended for direct human consumption)	ochratoxin A	3
	cereal products as consumed and other cereal products at retail stage	deoxynivalenol	500
	DAIRY	milk (raw milk, milk for the manufacture of milk-based products and heat-treated milk as defined by Council Directive 92/46/EEC, as last amended by Council Directive 94/71/EC)	aflatoxin M <sub>1</sub>
FEED	all feed materials	aflatoxin B <sub>1</sub>	20
	complete feedingstuffs for pigs and poultry (except young animals); cattle, sheep and goats with the exception of: - complete feedingstuffs for dairy animals - complete feedingstuffs for calves and lambs	aflatoxin B <sub>1</sub>	20
	complete feedingstuffs for dairy animals	aflatoxin B <sub>1</sub>	5
	complete feedingstuffs for calves and lambs and other complete feedingstuffs	aflatoxin B <sub>1</sub>	10
	complementary feedingstuffs for pigs and poultry (except young animals); cattle, sheep and goats (except complementary feedingstuffs for dairy animals, calves and lambs)	aflatoxin B <sub>1</sub>	20
	other complementary feedingstuffs	aflatoxin B <sub>1</sub>	5
<b>United States of America</b>			
FOOD	all foods except milk	aflatoxin B <sub>1</sub> ,B <sub>2</sub> ,G <sub>1</sub> ,G <sub>2</sub>	20
	finished wheat products for consumption by humans	deoxynivalenol	1000
DAIRY	milk	aflatoxin M <sub>1</sub>	0.5
FEED	corn and peanut products intended for finishing (i.e., feedlot) beef cattle; cottonseed meal intended for beef cattle, swine and poultry	aflatoxin B <sub>1</sub> ,B <sub>2</sub> ,G <sub>1</sub> ,G <sub>2</sub>	300
	corn or peanut products intended for finishing swine of 100 pounds or greater	aflatoxin B <sub>1</sub> ,B <sub>2</sub> ,G <sub>1</sub> ,G <sub>2</sub>	200
	corn and peanut products intended for breeding beef cattle, breeding swine and mature poultry	aflatoxin B <sub>1</sub> ,B <sub>2</sub> ,G <sub>1</sub> ,G <sub>2</sub>	100
	corn, peanut products, and other animal feeds and feed ingredients, excluding cottonseed meal, intended for immature animals	aflatoxin B <sub>1</sub> ,B <sub>2</sub> ,G <sub>1</sub> ,G <sub>2</sub>	20
	corn, corn products, cottonseed meal and other animal feeds and feed ingredients intended for dairy animals, for animal species or uses not specified above, or when the intended use is not known	aflatoxin B <sub>1</sub> ,B <sub>2</sub> ,G <sub>1</sub> ,G <sub>2</sub>	20
	grains and grain byproducts destined for ruminating beef and feedlot cattle older than 4 months and for chickens	deoxynivalenol	10000
	grain and grain byproducts destined for swine	deoxynivalenol	5000
	grain and grain byproducts for all other animals	deoxynivalenol	5000

source: Worldwide regulations for mycotoxins in food and feed in 2003; FAO Food and Nutrition Paper No. 81; 2004

regulatory limits is ensuring that a guaranteed food supply will be available for the population. It does not and would not make sense to protect people from mycotoxin contaminations by starving them. In this context, a statement given by Kofi Annan, Secretary-General of the United Nations, at the 2001 U.N. Conference on the least developed Countries in Brussels, illustrates the broad effect of this issue very well: "A World Bank study has calculated that the European Union regulation on aflatoxins costs Africa \$670 million each year in exports of cereals, dried fruit, and nuts. And what does it achieve? It may possibly save a life of one citizen of the European Union in every two years [...] Surely a more reasonable balance can be found."

### Effect of mycotoxin regulations on price, trade and health status

In a paper recently published by Felicia Wu<sup>(2)</sup>, the complex effects of regulatory limits for mycotoxins on price, trade, public health, selling and purchasing decisions of nations was presented.

Developed countries face economic losses as a result of mycotoxin regulations. These losses are caused when disposing highly contaminated crops or by lower productivity of animal livestock due to chronic intoxication.

On the other hand, the effects on the economy in developing countries are more indirect ones, but far more dramatic for the population: The highest quality crop is exported to the developed countries, while the lower quality is consumed locally. This applies to food as well as to animal feed. This can lead to severe acute or chronic intoxications in both, animals and humans. But there is also a direct impact on the economy of developing countries: Due to a lack of monitoring at the export points, or – if monitoring is present – a lack of confidence in the existing test management, exported goods get rejected at the importing points of developed countries leading to pricing pressure.

Based on an empirical model developed and published by Felicia Wu, the economic impact of different regulation scenarios can be determined.

Two scenarios for the three biggest peanut exporters (US, China, Argentina) were assumed. In the first one, Wu based her calculations on the assumption that the US-Aflatoxin limit of 20µg/kg was adapted worldwide, for the second she used the current EU limit of 4µg/kg. The latter resulted in an export loss of 450 million US dollars annually, while adopting the US limit globally would only cause an export shortfall of 92 million US dollars annually. Interestingly this model shows a linear relation between mycotoxin regulations and export losses.

### Current discussion and efforts of harmonization

There are lively discussions about this issue among different stakeholders and at different occasions. At the recent World

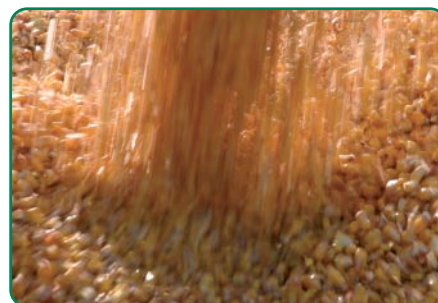
Mycotoxin Forum (WMF) in the Netherlands, a panel discussion was organized where representatives of the USDA, the EU and of various industries debated about mycotoxin hazards and regulations. Not all conclusions of the discussion were new and quite a few points had been published previously<sup>(3)</sup>:

According to the Joint FAO/World Health Organization (WHO) Expert Committee on Food Additives (JECFA), which is the scientific body that develops advisory international standards on food additives and contaminants for the Codex Alimentarius Commission, reaching consensus on maximum levels for aflatoxin (and other mycotoxin) standards is complicated by the fact that: Levels of contamination of feed- and foodstuffs vary tremendously around the world, and with respect to trade, the perspectives of delegations differ profoundly. Those representing countries in which aflatoxin contamination is not prevalent want low standards, those delegations from countries in which aflatoxin contamination is a problem because of their climatic conditions naturally wish to have standards in which higher levels of contamination are permitted, so that they can sell their products on world markets with greater ease.

### Conclusion

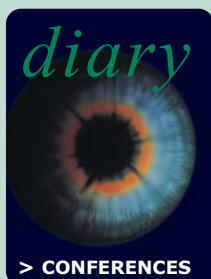
**Evidently, this issue is highly complex. Many contrary arguments like consumer protection, free trade, costs but also protection of local markets become important. No easy or rapid solution is in sight, but from the point of view of a mycotoxin testing company, it seems obvious to agree with the OECD report „The impact of regulations on Agro-food trade“<sup>(4)</sup>, where it is mentioned that regulatory limits are not only a hindrance for exporters in developing countries because they can not reach the limits or because their products were not safe. It is mainly because they lack in infrastructure of monitoring, testing and certification. Without this infrastructure they can not demonstrate compliance of their products with the regulation of the importing country.**

**Consequently, a major leap forward would be to install area-wide testing management, certified by acknowledged bodies. These testing systems must be based on harmonized criteria regarding the major steps in mycotoxin testing like sampling, sample preparation, detection and interpretation of results. E.g. if the same method of detection is used in the harbor of the exporting country and by the authorities of the importing country, if the labs are certified by acknowledged bodies it should be possible to reduce the number of rejected goods together with the costs for shipment or even destruction significantly.**



> **ABOUT THE AUTHOR:**

**Name:** Dr. Elisabeth Pichler  
**Position:** Product Manager  
**Education:** Technical University of Vienna, Spec. Analytical and Physical Chemistry  
**Doctoral thesis:** Study of the microbial degradation of the mycotoxin ochratoxin A by means of optimised chromatographic techniques as a contribution to the development of detoxifying agents for feeding stuffs.  
 (Center for Analytical Chemistry, IFA-Tulln)  
**2001 - 2003:** R&D Manager Analytics, Biomin Austria  
**Since Oct. 2003:** Product Manager (Chromatography)  
**Address:** Romer Labs Diagnostic GmbH, Technopark 1, 3430 Tulln  
 Phone: +43 2272 61533 0, Fax: +43 2272 61533 111,  
 e-mail: elisabeth.pichler@romerlabs.com



**ADSA/ASAS/CSAS Joint Annual Meeting**  
 Minneapolis, Minnesota, USA, 9<sup>th</sup> – 13<sup>th</sup> July 2006

**INDO Livestock 2006**  
 Jakarta, Indonesia, 11<sup>th</sup> – 13<sup>th</sup> July, 2006

**PSA Annual Meeting**  
 Edmonton, Alberta, Canada, 16<sup>th</sup> – 19<sup>th</sup> July, 2006

**IPVS**  
 Copenhagen, Denmark, 16<sup>th</sup> – 19<sup>th</sup> July, 2006

**XIX Central American and Caribic Congress on Poultry**  
 San Salvador, El Salvador, 23<sup>rd</sup> – 25<sup>th</sup> August, 2006

**Ildex India**  
 Dehli, India, 27<sup>th</sup> – 29<sup>th</sup> August, 2006

**World Nutrition Forum**  
 Vienna, Austria, 7<sup>th</sup> – 8<sup>th</sup> September, 2006

> **LITERATURE**

- |   |  |
|---|--|
| <p>(1) Worldwide regulations for mycotoxins in food and feed in 2003; FAO Food and Nutrition Paper No. 81; 2004</p> <p>(2) Wu, F. "Mycotoxin Risk Assessment for the Purpose of Setting International Regulatory Standards"; Environmental Science &amp; Technology Vol. 48 No. 15; 2004</p> <p>(3) Dohlman, E. "Mycotoxin Hazards and Regulations: Impacts on Food and Animal Feed Crop Trade," chapter 6 in</p> | <p>International Trade and Food Safety: Economic Theory and Case Studies. J. Buzby (ed.). USDA, Econ. Res. Serv., AER-828, Nov. 2003. <a href="http://www.ers.usda.gov/publications/aer828/">www.ers.usda.gov/publications/aer828/</a></p> <p>(4) The impact of regulations on Agro-food trade; 2003 OECD, Paris, 2003</p> |
|---|--|

> **IMPRESSUM**

Newsletter is published by Biomin GmbH  
 Editors: Michaela Mohnl, Dian Schatzmayr, Verena Starkl, Sigrid Pasteiner, Barbara Rüel,  
 Arthur Kroismayr, Christian Lückstädt, Tobias Steiner, Ursula Hofstetter  
 Industriestrasse 21, A-3130 Herzogenburg, Austria  
 Tel: +43 2782 803-0, Fax: +43 2782 803-40; e-Mail: [office@biomin.net](mailto:office@biomin.net), [www.biomin.net](http://www.biomin.net), Publisher: Erich Erber