

# Leading the international war against mycotoxins in feed and grain

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In-feed mycotoxin contamination is an ubiquitous problem with far reaching consequences for global animal production and can be tricky to tackle.

The existence of hundreds of mycotoxins with different frequencies and patterns of occurrences, as well as synergistic complications arising from the co-existence of more than one mycotoxin in any given sample, underscores the need for creative and targeted solutions in mycotoxin counteracting strategies.

In October 2013, Biomin became the first company to receive authorisation within the EU for products with proven mycotoxin counteracting abilities. Mycofix Secure and Biomin BBSH 797, two ingredients from the well established Mycofix product line, are currently the only feed additives worldwide to meet the requirements established by the European legislation.

Since 2004, Biomin has conducted annual surveys to analyse the occurrence of mycotoxins in feed and feed grain samples worldwide.

These extensive surveys have been crucial towards furthering the understanding of mycotoxin occurrences and their trigger factors, and subsequent research on specific strategies for their counteraction.

Out of the total 4,023 samples analysed in 2012, up to 82% are estimated to contain at least one mycotoxin.

Deoxynivalenol and fumonisins were the most prevalent mycotoxins found to contaminate 64% and 56% of all samples, followed by zearalenone (46%), ochratoxin A (31%) and aflatoxins (25%).

## Mycotoxin deactivation

Research on mycotoxin deactivation has been at the heart of the Biomin business for 30 years, with the focus on providing scientifically proven solutions derived from nature.

In addition to the global mycotoxin sur-

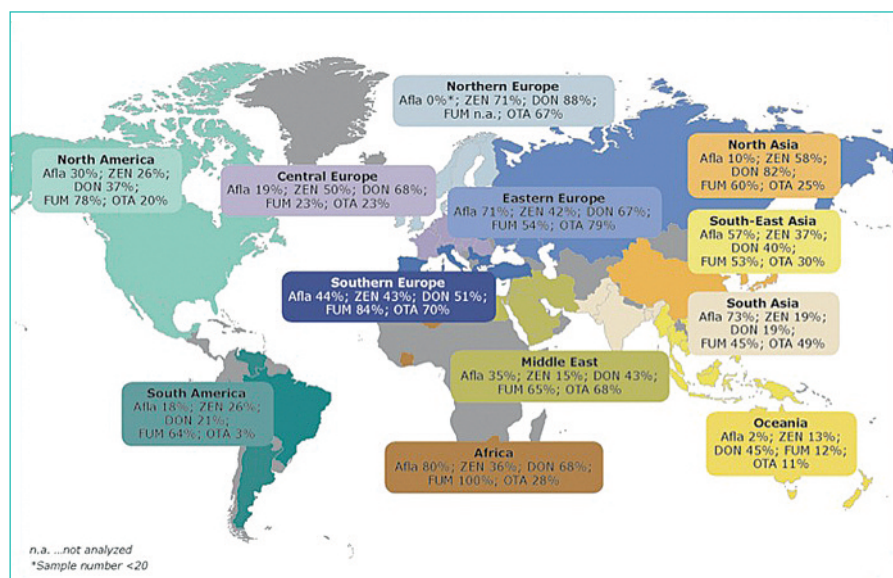


Fig. 1. Prevalence of mycotoxins in 2012 in different geographic regions according to percentage of positive samples (>LOQ).

veys, Biomin has also developed a strong research and development network comprising universities and institutions in Europe, the Americas and Asia who work in collaboration with the Biomin Research Centre in Austria in the field of mycotoxin analysis and research.

The strategic partnership with the EU Association of Specialty Feed Ingredients, FEFANA, paved the way for the creation of the Biomin-led Task Force 'Mycotoxins' in 2005, which succeeded in opening a new functional group for mycotoxin deactivating products within the EU, in March 2009.

The rest, as they say, is history. The landmark developments of a new functional group for mycotoxins and subsequent stringent guidance for anti-mycotoxin product registrations by the European Feed Safety Association (EFSA) provided the basis for the official recognition of feed additives with proven mycotoxin counteracting properties.

From 2009, companies wishing to register their products legally as mycotoxin deactivators within the EU have to submit EFSA-guidance-compliant dossiers for scientific scrutiny and assessment, a painstaking but compulsory process necessary in order for

a positive scientific opinion by EFSA that would precede the eventual approval by the EU Standing Committee on the Food Chain and Animal Health.

The lack of such a process in the past had meant that the feed additives markets was awash with products offering a myriad claims, making it difficult for buyers to differentiate between specialist mycotoxin deactivating substances with specific modes of action, and mass market products with non-mycotoxin-specific product claims, such as anti-caking agents and so-called 'binders'.

## Safety, specificity & efficacy

EFSA published a strict guidance document that stipulates requirements that must be met in order for products to be officially registered as mycotoxin deactivating feed additives.

Products must be safe for use in the target species and end-consumers, and be specific in their action toward a target mycotoxin and animal species.

To prove the efficacy of the product, evi-

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dence had to be provided in the form of scientifically recognised relevant biomarkers, such as levels of aflatoxins M1 in milk for products such as Mycofix Secure or deoxynivalenol metabolites in serum for products like Biomin BBSH 797.

These rigid guidelines have discouraged many manufacturers from legally registering their products as anti-mycotoxin substances.

## New authorisation

As the first-ever product authorised as a mycotoxin biotransforming micro-organism, Biomin BBSH 797 is capable of biodegrading trichothecenes such as deoxynivalenol (DON) which cannot be readily adsorbed.

The patented active bacterium in Biomin BBSH 797 modifies the structure of trichothecenes, a biotransformation process that occurs right in the gastrointestinal tract of animals.

Non- and less-adsorbable mycotoxins such as DON are biodegraded into harmless metabolites, a process that is specific and irreversible.

This makes Biomin BBSH 797 efficacious as a valuable feed additive for pigs, considered the species most susceptible to in-feed DON contamination.

To date, renowned researchers in the field of mycotoxin research are unanimous in their opinion that no other relevant technology or scientifically proven method exists, besides biotransformation, that can successfully deactivate trichothecenes, considered the most prevalent and hence, agriculturally relevant group of mycotoxins.

Mycofix Secure is a bentonite (dioctahedral montmorillonite) authorised for its proven aflatoxin-binding capacity according to the European Union Reference Laboratory (EURL) method.

## Next, fumonisins

With product registrations for the aflatoxin-binding Mycofix Secure and the trichothecene- biotransforming Biomin BBSH 797 under its belt, Biomin is looking ahead to the next scientific opinion on FUMzyme in 2014. FUMzyme is the first commercially available purified enzyme for the biotransformation of fumonisins into non-toxic metabolites.

In 2013, Biomin submitted a dossier on FUMzyme for 'fumonisin biotransformation', a specific and irreversible action that takes place in the gut of animals. By systematically tackling one mycotoxin after another, Biomin is today recognised as having the clear lead in advanced and proven solutions for a range of mycotoxins. ■

# NIR ensures safety and purity

Dairy products provide an important source of nutrition globally and have a very high economic value in the food sector. Consumers expect milk and other dairy products to be pure, unadulterated and free from both accidental and deliberate contamination. Fast, reliable and cost effective analyses are essential to ensure that products are pure and safe when they are sold.

The Journal of Near Infrared Spectroscopy has published a Special Issue on Milk and Milk Products, containing papers reporting new developments and uses of NIR spectroscopy as a valuable tool along the full dairy chain.

This issue updates researchers and the dairy industry on the rapid and reliable analysis of liquid milk and the products derived from it, while also exploring some new applications, and presenting practical experiences and outcomes from an industrial perspective.

Near infrared or NIR spectroscopy has been used for quality assurance purposes by the dairy industry for over 40 years. It has been used to predict the chemical composition of milk and dairy products, to monitor the cutting-point during cheese manufacturing and even predict sensory characteristics such as hardness and tenderness.

Several papers help readers understand how light interacts with complex matrices such as milk. The issue includes papers which explain how the contribution to apparent absorption due to scattering can be separated from that due to true absorption by the sample. The benefits which this offers include being able to obtain important information on the chemical composition and micro-structural properties which are not available with the traditional techniques used in dairy production.

Modern dairies measure the output from each quarter of the udder and a paper in this issue reveals the potential of real time in vivo spectroscopy for diagnosing mammary gland inflammation in dairy cow udders before milking.

The issue also includes papers on assessing the degree of homogenisation of milk and the monitoring of milk powder in a production line where the challenges to accurate analyses include variations in the operating temperature.

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