

Protecting breeder health and profits from the threat of mycotoxins

Mycotoxins are toxic secondary fungal metabolites produced by moulds, both pre- and post-harvest. Their global presence in poultry feed can have a detrimental impact on the health and performance of both breeding poultry flocks and their progeny. With feed prices continuing to rise, it is more important than ever to take the necessary steps to protect feed quality and breeder health to safeguard the performance of future stock.

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In all species, including poultry breeding stock, it is unusual to find individual mycotoxins in isolation, with broad spectrum contamination being far more common.

Feed contaminated with a low level of several mycotoxins may be more problematic for breeding stock compared to single toxin contamination at a higher level, as they work in synergy resulting in mycotoxicosis.

Therefore, guideline limits for mycotoxins should never be perceived as a 'safe' threshold.

Ensuring the best fertility in breeders and the production of high-quality chicks is fundamental in optimising producer profitability, however problems associated with mycotoxin contamination, such as reduced egg production and quality, can hinder this success.

The difficult diagnosis of mycotoxins

It is not always easy to diagnose mycotoxin related issues, as they can affect poultry in various ways depending on the type of mycotoxin and the level of intake.

Mycotoxicosis is a term commonly used to define the harmful effect of mycotoxins. Many health and environmental factors contribute to the susceptibility of breeders to the effect of mycotoxins, including immune status, bird age, farm

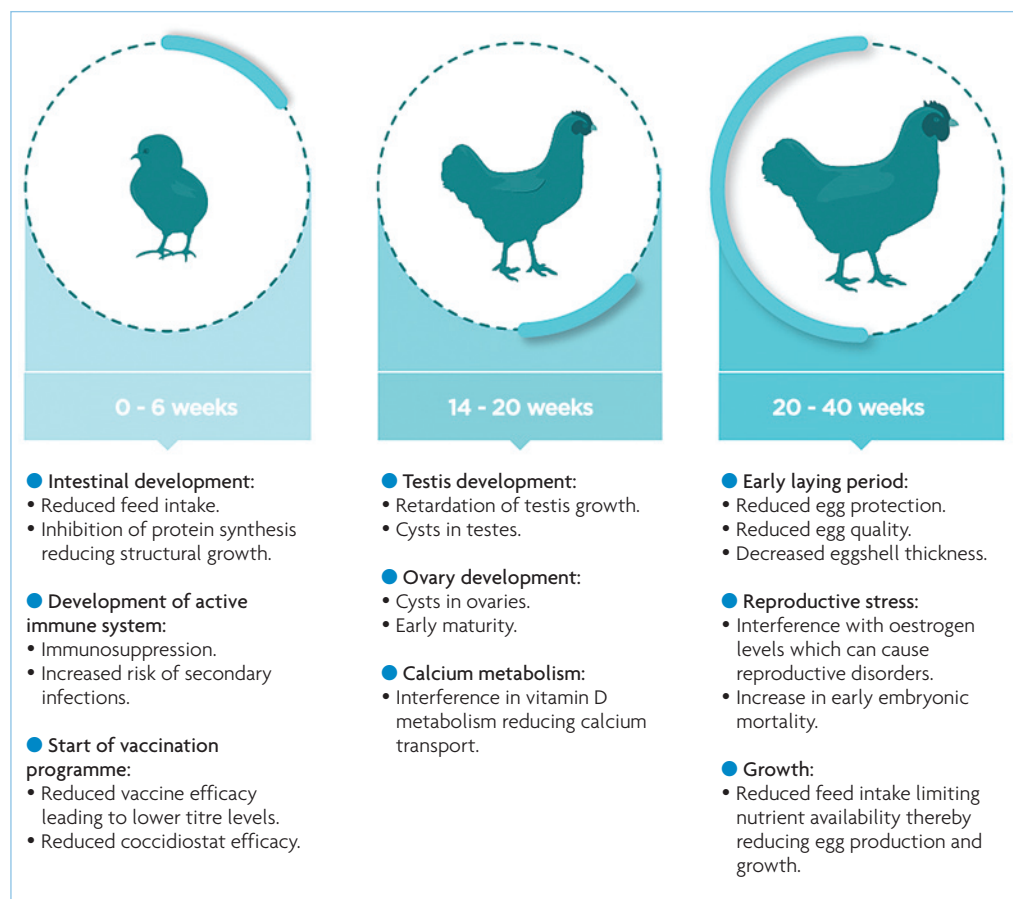


Fig. 1. Effects of mycotoxins during critical periods in the life of breeders.

management, hygiene and environmental temperatures. With all these factors at play, it is not surprising that breeders can exhibit symptoms of mycotoxicosis at seemingly low mycotoxin levels in feed.

The effect of mycotoxins on breeder production

The presence of mycotoxins can influence productivity, egg quality and hatchery performance, as well as chick quality and immunity.

Aflatoxins, a group of mycotoxins and secondary fungal metabolites, were reported by Danicke (2002) to negatively impact reproductive health, as a result of poor egg

production and reduced egg weights. This has been linked to the accelerated breakdown of ovarian follicles, and while ovarian degeneration is a normal process as birds age, the enhancement of this process due to aflatoxin presence could cause poor breeder productivity.

The impact of mycotoxin contamination on egg quality

Eggshell quality is essential for embryo protection and breeder producers can suffer huge losses from hatching egg breakages.

The eggshell not only helps to provide an incubation chamber, it

also plays a key role in gas exchange whilst protecting the embryo against invading pathogens.

Dietary mycotoxins can lead to defective eggshells, and in a study by Devegowda and Ravikiran (2008) mycotoxins were also shown to have adverse effects on egg weight, egg cracking and shell thickness.

Mortality and mycotoxins

DON, ZEA and T-2 toxin mycotoxins are associated with heightened embryonic mortalities in breeding hens, especially in early development. This was suggested by Leeson and Summers (2000) to be linked to their impact on eggshell strength, as this

Continued on page 22

Continued from page 21
 can cause moisture loss during the incubation period which reduces hatchability and can lead to early embryonic mortality.

Managing mycotoxins

The negative impact of mycotoxins and their secondary fungal metabolites on breeders can be significantly reduced with the addition of an effective, broad-spectrum binder in the feed.

Mycotoxins impair gut health by targeting protein synthesis inhibition. Cells in the gut have a high protein turnover and so are negatively affected.

Mycotoxin binders work by adsorption of mycotoxins onto binder sites, rendering the mycotoxin inactive and enabling it to pass through the birds' gastrointestinal tract without causing any problems.

There is a huge range of commercially available binders, all with various claims and studies demonstrating their toxin binding efficacy, meaning the choice can be overwhelming.

When choosing a binder, it is important to find one that is cost effective, low inclusion, effective at a wide range of pHs and one that does not bind dietary vitamins or

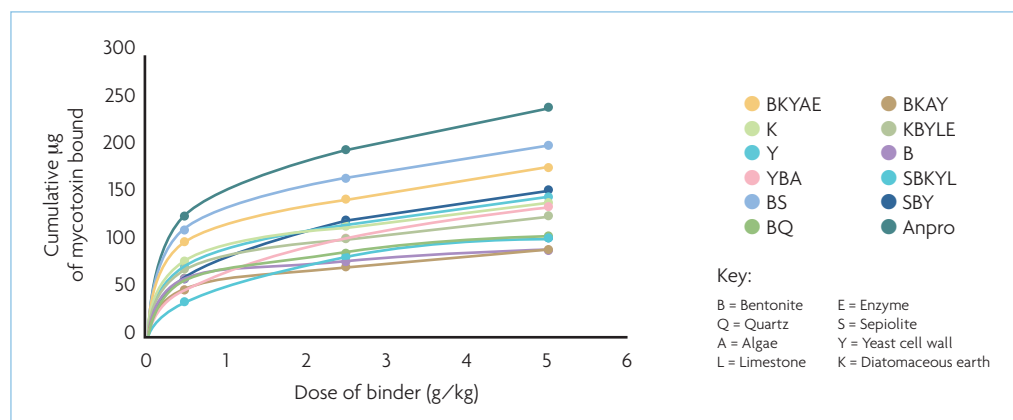


Fig. 2. Dose response of binders at pH 2.5.

minerals. A trial conducted in 2018 at the independent research laboratory, Alimetric Research in Finland, determined that the capabilities of different commercially available mycotoxin binder products to bind mycotoxins in vitro.

Both acidic (pH 2.5) and neutral (pH 6.5) conditions were tested to effectively mimic the gastrointestinal tract.

Fig. 2 shows the results of the dose response of binders at pH 2.5.

The results show that some products were effective at binding certain secondary fungal metabolites but not others, and that Anpro

(Anpario plc) was shown to have the broadest spectrum and the highest binding ability at both pH levels and at all doses.

The Anpro range of adsorbents have been developed to help mitigate problems associated with the potentially harmful effects of these secondary fungal metabolites present in the feed and litter of poultry species.

The range provides a broad spectrum, low inclusion control system and is effective within the birds' gastrointestinal tract, helping to maintain the immune function and support optimal performance.

Conclusion

The economic impact and effects of mycotoxins on breeder health within the poultry systems are a global issue. Thus, mitigating mycotoxins is a huge challenge for producers and solutions are increasingly sought after.

Finding a binder which can successfully bind a broad spectrum of mycotoxins, reducing the risks associated with multiple low level mycotoxin contaminations, is of the utmost importance in ensuring breeding hen health, performance and profitability of future stock. ■