Advantages of yeast cell walls feed supplementation: mycotoxin adsorbent, antibacterial and immunostimulant effect

Introduction

According to FAO, mycotoxins are toxic secondary metabolites of fungi belonging, essentially, to the *Aspergillus*, *Penicillium* and *Fusarium* genera. It is estimated that at least 25% of the world’s food crops are contaminated with mycotoxins (FAO, 2020). Mycotoxins exert adverse health effects in humans and animals. Between 300-400 types of mycotoxins have been described. In animal production, the presence of aflatoxins, ochratoxins, zearalenone, deoxynivalenol (DON or vomitoxin) and fumonisins is specially controlled. Mycotoxins negatively impact the performance (lower feed intake, slower growth, worse feed conversion rate, etc.), cause immunosuppression, increasing the susceptibility to other infections, and worsening results of vaccination programs, among others. Feed is generally contaminated by multiple mycotoxins, which amplifies its toxic effects.

Mycotoxin adsorbent effect of yeast cell walls

One of the most practical strategies to control the detrimental effects of mycotoxins is to supplement feed with mycotoxin adsorbents. Adsorbents form irreversible and indigestible complexes with toxins, and they are excreted through feces. There are multiple types of adsorbents, among them are organic adsorbents such as the yeast cell walls (Vila-Donat et al., 2018).

Yeast cell walls from, for example *Saccharomyces cerevisiae*, have high content in mannan-oligosaccharides (MOS) and β-glucans, and exhibit a wide variety of viable locations for mycotoxin adsorption, as well as different binding mechanisms (hydrogen bonds, ionic or hydrophobic interactions) (Ringot et al., 2007). These yeast cell walls extracts have high adsorption efficiency against a broad spectrum of mycotoxins such as zearalenone, ochratoxins, fumonisins (Pfohl-Leszkowicz, et al., 2015), including deoxynivalenol which the responsible fraction for the binding process is the β-D-glucan (Faucet-Marquis et al., 2014). Mannan-oligosaccharides are also effective in neutralizing DON at different pH values (Cravet et al., 2010).

Antibacterial and immunostimulant effect of yeast cell walls

The MOS and β-glucans have other advantages and can exert an antibacterial and immunostimulant effect (Figure 1).
As shown in Figure 1, mannan-oligosaccharides competitively bind to type-1 fimbriae of Gram negative bacteria such as *E. coli* and thus reduce the adhesion of pathogens to the intestinal epithelium (Chacher et al., 2017). Both MOS and β-glucan supplementation generate an immunostimulant effect. β-glucans promote immunomodulation and favor the production of post-vaccine antibodies. Approximately ¾ of all immune cells are in the intestine forming the “Gut-associated lymphoid tissue” (GALT), explaining the considerable beneficial impact of these supplements.

**Solution developed by MPA Veterinary Medicines and Additives**

*MycoActive Plus* adsorbs a broad spectrum of activity and stimulates the immune system. It combines activated sodium bentonite and yeast cell walls with high content in MOS and β-glucans. Both adsorbents have a complementary spectrum of activity. Activated sodium bentonite, compared to other aluminosilicates, has a high adsorption capacity (mycotoxins and bacterial toxins). The activation process optimizes the physicochemical properties of sodium bentonite by maximizing its adsorption capacity. The effectiveness of MycoActive Plus has been confirmed through studies led by Dr. Antonio Ramos, Professor of Food Technology, at the University of Lleida - Spain.
References:


*For any questions related to MycoActive Plus or any other MPA Veterinary Medicines and Additives products, kindly contact us by email ([info@mpaveterinary.com](mailto:info@mpaveterinary.com)) or telephone (+34 93 747 96 59).*