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BOOK OF ABSTRACTS

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COMPARISON OF COMMERCIAL AVAILABLE COMPLEX MYCOTOXIN BINDERS ON IN VITRO MYCOTOXIN BINDING PROPERTIES

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ABSTRACT

Clay-based binders play an important role in the prevention of mycotoxicosis in livestock. Next to this, yeast-based organic components, other organic components and chemical substances can be a good addition to relieve the animal of mycotoxic stress, by binding or otherwise. Multiple *in vitro* trials were performed to assess the binding capacity of different types of binders. The in vitro experiments were designed in close collaboration with MYTOX (Ghent University, Belgium), and executed by the Laboratory of Food Analysis (Ghent University, Belgium). The mycotoxins ochratoxine A (OTA), zearalenone (ZEN), deoxynivalenol (DON), fumonisin B1/B2 (FUMB1, FUMB2), aflatoxin B1/B2/G1/G2 (AFB1, AFB2, AFG1, AFG2), HT-2 toxin (HT-2), T-2 toxin (T-2) and enniatin B (ENN B) were mixed into a buffer solution together with the different binders (0.5%) at pH 3 (one solution per binder). Under gentle, constant shaking (to mimic peristalsis of the gastro-intestinal tract), these solutions were kept at pH 3 for one hour, and analyzed by LC-MS/MS. The remaining solution was brought to pH 7 (by adding NaOH), to mimic the condition in the intestine, and kept stable for three hours. Afterwards a sample was analyzed by LC-MS/MS. Clay-based binders possess high binding properties towards the tested aflatoxins and ENN B. OTA and the tested trichothecenes (DON, T-2 and HT-2) were hardly bound by the majority of the tested binders, and there was a large variety between pH 3 and pH 7. For ZEN, a large variety could be observed between different binders. Clay-based binders and yeast-based binders show the highest binding efficiencies towards ZEN. For the tested fumonisins (FUMB1, FUMB2), many binders had a very high binding efficiency at pH 3 (as high as 100%), but poorly bound at pH 7 (as low as 0%). Based on these results, an optimal mixture of the ingredients with high-binding properties was designed (Excential Toxin Plus by Orffa). This mixture was compared to 11 commercially available mycotoxin binders in the same *in vitro* model. Five of them were products selected on the basis of their worldwide presence in the mycotoxin binder market. All products showed a very high binding of the tested aflatoxins and ENN B. Towards the binding of ZEN, there was a large variety between products. A pH effect could also be observed. The tested trichothecenes were difficult to bind at any pH, and only one product showed overall binding (DON excluded). As recovery of the tricothecenes (DON in particular) in the supernatant was high, biotransformation by any ingredient into less toxic metabolites by the commercial available binders was minimal. Fumonisins were difficult to bind, especially at pH 7, but some products were able to bind at both pH 3 and 7. It can be concluded from this last test that there are differences in mycotoxin binding efficiencies *in vitro* between commercial products, although some commercial binders have a higher binding efficiency towards specific mycotoxins.