

**ABSTRACTS OF  
LECTURES AND POSTERS**

**THE**  
**World**  
**Mycotoxin**  
**Forum**<sup>®</sup>  
**13<sup>TH</sup>**  
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study, performed on a commercial farm in the Philippines, consisted out of two trials: T1 performed in nursery gilts and T2 in growing gilts. Both trials started when the gilts showed signs of VH. Gilts from the same batch were allocated into three groups. The groups were fed three different types of multicomponent mycotoxin adsorbents A, B or C. For both trials, weight and feed intake were recorded and feed conversion ratio (FCR) was calculated. Vulva hypertrophy was noted per animal, initially and at the end of the trials. Both trials lasted until the gilts were 180 days old and were selected either as replacement gilts or sold as finishers with selection criteria being occurrence of oestrous during these first 180 days. In both trials, considering the overall period, gilts from group C had numerically higher final body weight and daily gain, and numerically lower FCR compared to groups A and B (Table 1). From all the gilts in T1, only two were selected as replacement gilts, both from group C. In T2, 12 gilts were selected as replacement (4 in group A, 3 in B and 5 in C). Group C resulted in the numerically highest reduction of VH cases (-54%) in T1. In T2, groups B and C reduced VH cases in more than 30%, with group A increasing appearance of VH. Overall, the inclusion of Excential Toxin Plus (group C) to the diets of replacement gilts resulted in improved growth performance and reduced signs of vulva hypertrophy. These results indicate that this mycotoxin adsorbent reduces the negative effects of ZEN on reproductive and growth performance compared to the two other adsorbents.

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#### EVALUATION OF THE EFFICACY OF AN ANTI-BIOTOXIN SOLUTION SUPPLEMENTED IN FEED IN DAIRY COWS

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Main mycotoxins effects on ruminants have been reported considering high dosage and/or single mycotoxins. However, little is known about the effects of naturally low levels of multiple mycotoxins on the performance, metabolism, and immunity of dairy cattle. The objective of the trial was to evaluate the efficacy of an anti-biotoxins product in feed containing naturally mycotoxins contamination in commercial farms. The trial was investigated in a French farm on 120 lactating Holstein dairy cows receiving diet supplemented by an anti-biotoxin (MPY) during 60 days at 50g/cow/day. Mycotoxins and metabolites analysis were performed in ration and urine. Milk production, immunological, blood serum chemistry, biomarkers of oxidative status and liver and kidney functions, serum immunoglobulins concentration were measured. Ration analysis have shown low but multiple *Fusarium* mycotoxins contamination. Deoxynivalenol (DON), fumonisins (FB1, FB2, FB3), zearalenone (ZEA) and H-T2 toxin were found during the whole studied period in the total mixed ration at levels above 0.36, 0.14, 0.02 and 0.02 mg/kg, respectively. A decrease of DON metabolite (DOM-1) in urine was observed during supplementation period. Milk production persistency was evaluated at 96.8% during the trial period, allowing a calculated gain of 0.9 kg milk/cow/day with supplemented diet (vs. milk persistency during pre- and post-trial period). Mean IgG concentration was 30 mg/ml at T0 and decrease in a range of 16-27 mg/ml after diet supplementation. Inflammation diagnostic, evaluated by total protein value and albumin/globulin ratio, indicated that animals were in chronic inflammation state and that supplementation allowed them to ameliorate their health status. Supplementation was associated with a decrease of liver/kidney functions biomarkers such as urea, total bilirubin, and creatinine. Our results indicated that feed contaminated with regular levels of *Fusarium* mycotoxins adversely affected the performance and immunity of dairy cows, and that supplementation with anti-biotoxin product (MPY) counteracted most of these negative effects.

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#### CARBOXYPEPTIDASE IMMOBILIZATION ON NYLON NANOFIBROUS MEMBRANES FOR OCHRATOXIN A DETOXIFICATION

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Ochratoxin A (OTA) is a mycotoxin that can be found in products as grape juice and wine. Biological detoxification methods are gaining interest as they constitute green processes and are less likely to cause loss in nutritional value and palatability of food. Carboxipeptidase A (CPA) was the first enzyme demonstrated to be effective in the degradation of OTA, being also used as a reference for other OTA-degrading enzymes. CPA acts on OTA by hydrolysing the amide bond, producing the less toxic ochratoxin alpha (OT $\alpha$ ). So far, studies have assessed free enzymes on OTA degradation. However, free enzymes are very sensitive to pH, temperature, and the presence of inhibitors. Enzyme immobilization increases the rigidity of the attached molecule's structure, thereby enhancing its stability

and resistance, allowing its repeated application. The main aim of this work was to immobilize CPA into a nylon nanofibrous membrane and to verify if the OTA degradation capacity was maintained. In addition, an unusual spacer for enzyme immobilization was used, the bovine serum albumin (BSA), which has the advantage of showing low toxicity. Enzyme immobilization on nylon membranes was accomplished after activation with 12.5% aqueous solution of glutaraldehyde, washing with ultrapure water, immersion into BSA solution (0.1 mg/ml), and immersion into CPA solution in 10 mM sodium acetate, 5 mM calcium acetate buffer (pH 7.5). The OTA degradation assays were performed at 37°C and pH 8.5, during 168 h. The membranes loaded with immobilized enzyme were incubated in 200 µg/l OTA solution in tris buffer (pH 8.5). In the same way a subset of analyses was made with a solution of OTA and free CPA solution in tris buffer (pH 8.5). The OTA and OTα concentration was measured using UPLC-FL. The results showed that both the free and immobilized CPA caused OTA degradation, however, a reduction of CPA activity was observed for the immobilized enzyme when compared with assays using free enzyme. The optimization of the immobilization process is underway to improve the retention of enzyme activity and, at the same time, to achieve better stability and reuse. It is expected that the overall process will become cost-effective and that the developed material will contribute to make biocatalysis a feasible and attractive alternative for mycotoxin detoxification.

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#### EFFICACY OF TOXO®-XL ON EMERGING MYCOTOXIN ADSORPTION AT DIFFERENT pH LEVELS

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Emerging mycotoxins are those mycotoxins which are neither routinely analysed nor legislatively regulated, but the evidence of their incidence is rapidly increasing. Symptoms associated with emerging mycotoxins in animal production include reduced feed intake, increased intestinal permeability, hepatic necrosis, and increased morbidity. There is also potential additive or synergistic negative effect among emerging mycotoxins. In the present study, the adsorption efficacy of TOXO®-XL, an integrated mycotoxin-mitigating feed additive, on three emerging mycotoxins (roquefortine C, enniatin B and sterigmatocystin) was measured via an *in vitro* assay. 1000 ng/ml roquefortine C, enniatin B or sterigmatocystin each with 0.20% w/v TOXO-XL were performed at two pH levels (3.0 and 6.5; pH 3.0 to simulate stomach where main digestion occurs, while pH 6.5 to simulate small intestine where main absorption occurs) in two replicates per group. The adsorption efficacy of TOXO-XL was measured and expressed as a percentage relative to the control (emerging mycotoxins with no TOXO-XL). At pH 3.0, the binding efficacy of TOXO-XL on roquefortine C, enniatin B and sterigmatocystin was 96.4, > 85.0, and > 98.0%, respectively. At pH 6.5, the binding efficacy of TOXO-XL on roquefortine C, enniatin B and sterigmatocystin was 74.9, > 85.0, and 83.1%, respectively. In conclusion, TOXO-XL showed promising results in its adsorption efficacy on 1000 ng/ml roquefortine C, enniatin B or sterigmatocystin at both pH 3.0 and 6.5, which provides a solid basis from the solution development perspective. Further studies should be conducted to confirm the *in vivo* implications of the described *in vitro* results.

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#### EFFICACY OF TOXO®-MX ON ERGOT ALKALOIDS ADSORPTION AT DIFFERENT pH LEVELS

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Ergot alkaloids, a group of mycotoxins which are produced by fungi of the genus *Claviceps*, are well known to cause vasoconstriction of small arteries and consequent lameness or even gangrene, all of which lead to a suboptimal animal health and performance. The reported contamination of ergot alkaloids in rye, wheat, barley, and other cereal varieties in Europe has increased since 2021. In the present study, the adsorption efficacy of TOXO®-MX, a commercial bentonite-based mycotoxin adsorbent, on 213-221 ng/ml natural extract which consists of 12 ergot alkaloid varieties (ergometrin, ergometrinin, ergosin, ergosinin, ergotamin, ergotaminin, ergocornine, ergocorninin, ergocristin, ergocristinin, ergocryptin, and ergocryptinin) was measured at both pH 3.0 and 6.5. The adsorption efficacy was expressed as a percentage relative to the control (ergot alkaloids with no TOXO-MX). At pH 3.0, the adsorption efficacy on total natural extract of ergot alkaloids was 92.90%. At pH 6.5, the adsorption efficacy was 87.20%. In conclusion, TOXO-MX showed promising results in its adsorption efficacy on 213-221 ng/ml ergot alkaloids at both pH 3.0 and 6.5, which provides a solid basis from the