INTRODUCTION
Mycoxotins are secondary toxic metabolites that are produced by fungi growing on food products, such as corn, peanut, and wheat, among others. Exposure occurs predominantly by the ingestion of contaminated feed, when contaminated cereals such as corn, wheat, peanuts and sorghum, as well as other raw materials, are used in the preparation of animal feed. Aflatoxins are produced by fungi of the genus Aspergillus, particularly A. flavus, A. parasiticus and A. nomius. Seventeen metabolites have been identified as aflatoxins, with aflatoxin B1 (AFB1) being the most commonly found metabolite in cereals and the one that exhibits the highest toxicogen effects. Fumonisins are secondary toxic metabolites produced by fungi belonging to the genus Fusarium, mainly the species F. verticillioides. To date, 16 fumonisins have been identified, however the predominant toxin produced by F. verticillioides strains is fumonisin B1 (FB1). Fumonisin B1 is the most abundant and toxic of the fumonisins, representing about 70% of the total contamination of food and feed naturally contaminated. Both, aflatoxin and fumonisin can interfere with the broiler performance through the toxic effects in the liver and intestines. A common practice in the industry is the addition of absorbents to broiler diets aiming to block the negative effects of the mycotoxins. Milbond-TX® is a commercial available anti-mycotoxin additive used to decrease aflatoxin and fumonisin effects. The objective on this study was to evaluate the Milbond-TX® efficacy in adsorption of aflatoxin and fumonisin and its influence in the performance and blood parameters of broilers.

MATERIALS AND METHODS
1200 day old male broilers with same origin were divided in 10 treatments with 12 replicates of 10 birds each. The four groups were divided accordingly with the presence of mycotoxins to the diet and the presence of not of Milbond TX® (according Table 1). The experiment was done in SAMITEC Institute. The experimental room, measuring 22 m², was kept heated in the ideal temperature for the development of animals according to age. The birds were housed in cages with 4 batteries arranged in overlapping cages, each divided into 2 boxes, with dimensions of 0.5 X 0.5 m (area 0.25 m²) and 0.33 m high. Each box was equipped with nipple drinkers and feeders to provide feed and water ad libitum during all experimental period. Body weight and feed intake were measured at 7, 14, and 21 days. Total plasma proteins were analyzed from 120 samples for (PPT) being 12 blood samples per treatment. The Bluetor technique and its measurements were performed on equipment Thermo Plate® Analyzer. The relationship between sphinganine and sphingosine (SA/SO) was performed with the technique of Liquid Chromatography Coupled to Mass Spectrometry (LC/MS/MS). Weight gain will be analyzed by repeated measures mixed model with fixed factors of feed, Milbond, day, and all interactions, and random factors of block, block by treatment interaction, animal within block by treatment, and block by treatment by day. Other variables (feed conversion, relative liver weight, serum levels of total plasma proteins, LSI and ELISA liter) will be analyzed by a mixed model with feed and Milbond as fixed factors and random factors of block and block by treatment.

RESULTS
• The deleterious effects of fumonisin at 100 ppm, aflatoxin at 2.8 ppm and aflatoxin-fumonisin at 2.8 and 100 ppm, respectively were significantly demonstrated during the period of 21 days (Figure 1).
• Milbond-TX® helped to mitigate the negative effects of aflatoxin and fumonisin on body weight and on Feed Intake at 7, 14 and 21 days (Results not shown).
• Milbond TX® at 0.25% and 0.50% inclusion significantly decrease the effects of aflatoxin for 21 days (Figure 2).
• Milbond TX also significantly decrease the effects of fumonisin on body weight gain when used at 0.5% inclusion rate (Figure 3).
• Broilers fed with aflatoxin and fumonisin combined had a significant positive impact in serum levels of total plasma proteins, levels and lower Sa/So ratio when feed had Milbond-TX® included (Figure 4).

CONCLUSIONS
Milbond-TX® mitigated the mycotoxin toxic effects when birds were fed contaminated feed with 2.8 ppm of aflatoxin and/or 100 ppm of fumonisin. Milbond TX® helped to protect broilers from deleterious effect of mycotoxins in liver and intestines, demonstrated by the better profile of serum protein, relative liver weight and broiler performance.

REFERENCES

Table 1. Experimental Design

<table>
<thead>
<tr>
<th>Group</th>
<th>Aflatoxin (ppm)</th>
<th>Fumonisin (ppm)</th>
<th>Milbond (%)</th>
<th>PPS/pen</th>
<th>Pen Treatment</th>
<th>Total birds/treatment</th>
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<td>A</td>
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Figure 1. Effect of Aflatoxin and Fumonisin on cumulative weight gain

Figure 2. Effect of Milbond on cumulative weight gain in Broiler fed Aflatoxin contaminated feed

Figure 3. Effect of Milbond on cumulative weight gain in Broiler fed Fumonisin contaminated feed

Figure 4. Total plasma protein and SA/SO ratio in Aflatoxin+Fumonisin fed groups

Figure 5. Effect of broiler liver appearance at 21 days of age on different treatments.

Data on file, Study Report No. 03-13-70AQQ, Zoetis Inc.