MYCOAD A-Z®

SWINE TECHNICAL MANUAL

SPECIAL NUTRIENTS, INC.
The mycotoxins specialist

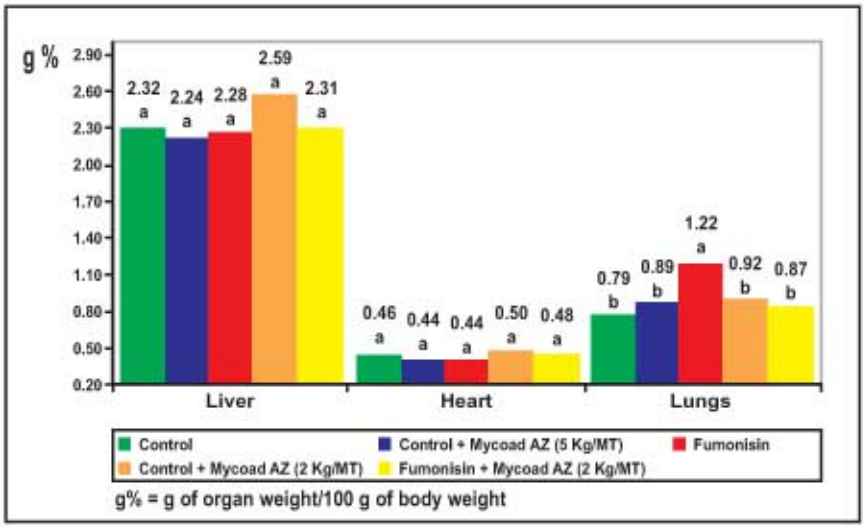

Figure 8. Effect of fumonisin and Mycoad AZ on the relative organs weights of gilts.

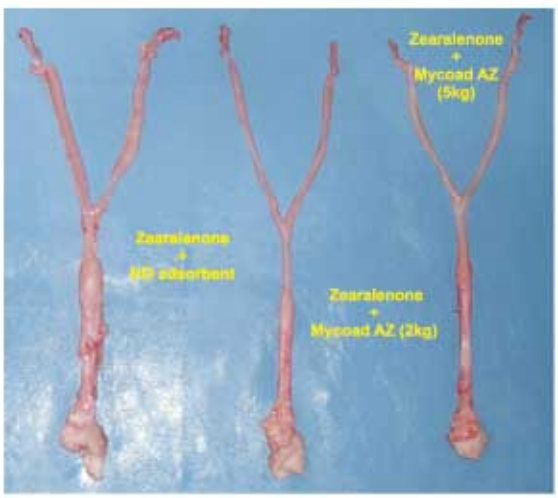

Figure 9. Zearalenone and Mycoad AZ effect on the reproductive tract of sows fed 2 ppm of zearalenone.

Conclusions

Based on the macroscopic lesions observed in the animals evaluated at necropsy, Mycoad AZ prevented the gross lesions caused by fumonisin in the lungs and part of the damage produced by zearalenone in the reproductive system.

Mycoad AZ effect on the macroscopic damage caused by zearalenone in the reproductive tract of gilts (experimental conditions)

Facilities: Trilogy Laboratory. Experimental farm in Missouri, USA.

Type of animals: Eighteen 20-day-old, Yorkshire- cross, weaned gilts obtained from a commercial swine producer and divided in 3 treatment groups (6 animals each).

Mycoad AZ inclusion rate: 1 kg/MT of feed

Concentration of Zearalenone: 750 ppb for 28 days.

Reference: Malone, B., C. Bond, C. Maue, Z. Scheitegger, and D. Zaviezo. Evaluation of the efficacy of a commercial purified phylosilicate to reduce the toxicity of zearalenone in gilts. Scientific poster presented at the American Society of Animal Science Meeting. San Antonio, Texas, USA. 2007.

Results

TREATMENT	OVARY + BURSA g/100 g BW x 1000	UTERUS g/100 g BW x 1000	CERVIX g/100 g BW x 1000	TOTAL REPRODUCTIVE ORGANS g/100 g BW x 1000
Control	3.0 a	28.9 a	3.0 a	37.1 a
750 ppb zearalenone	4.2 b	55.9 b	10.8 b	73.5 b
750 ppb zearalenone + 1 kg/mt Mycoad AZ	3.7 ab	41.9 c	7.3 c	55.8 c

a, b, c Values within columns with no common letter are significantly different (P<0.05).

Table 2. Zearalenone and Mycoad AZ effect on the weight of the reproductive organs of gilts after treatment for 28 days.

Conclusions

There is a measurable benefit with the addition of Mycoad AZ to the diet of sows contaminated with zearalenone, as demonstrated by the statically significant reduction in total reproductive organs, cervix and uterus weights.

Mycoad AZ effect on reproductive parameters of sows fed rations naturally contaminated with zearalenone (commercial conditions)

Facilities: Commercial farm in Jalisco, Mexico.

Type of animals: 250 commercial sows free of PRRS, classic swine fever, and Aujezsky's disease.

Mycoad AZ inclusion rate: 1.5 and 2.0 kg/MT of feed used for 1 year.

Concentration of mycotoxins present in the feed. Sixty five to 167 ppb of zearalenone were detected during this experiment (ELISA test).

Reference: Wence, J., and B. Reyes. Reproductive behavior of sows fed rations naturally contaminated with zearalenone treated with Mycoad AZ. Avimex Bulletin, Mexico. 2004.

Results

Figure 10. Farrowing rate during a 12-month period, years 2002 and 2003, in 250 sows fed Mycoad AZ.

Conclusions

The positive effect of adding Mycoad AZ to the ration was noticed during the whole year when the product was used, as indicated by the presence of a higher farrowing rate.

Mycoad AZ and a MOS mycotoxin binder effect on piglets exposed to a ration naturally contaminated with fumonisin and T-2 toxin (commercial conditions)

Facilities: Commercial farm in Jalisco, Mexico.

Type of animals: Commercial sows positive to PRRS and Aujezsky's disease. Before the treatments a high mortality rate after weaning was reported, with the presence of pulmonary edema, and ulcers in the mouth and esophagus. Nineteen houses where included in each treatment. 1,796 weaning pigs were treated with Mycoad AZ and 1,952 were treated with the MOS (mannan oligosaccharide) product.

Mycotoxin binder's inclusion rate (used for 8 weeks):

Mycoad AZ = 0.5 kg /MT of feed.

MOS product. = 0.5 kg/MT of feed.

Reference: Wence, J., and B. Reyes. Mortality rate at weaning suggestive of fumonisin and T-2 toxin contamination. Avimex Bulletin, Mexico. 2004.

Results

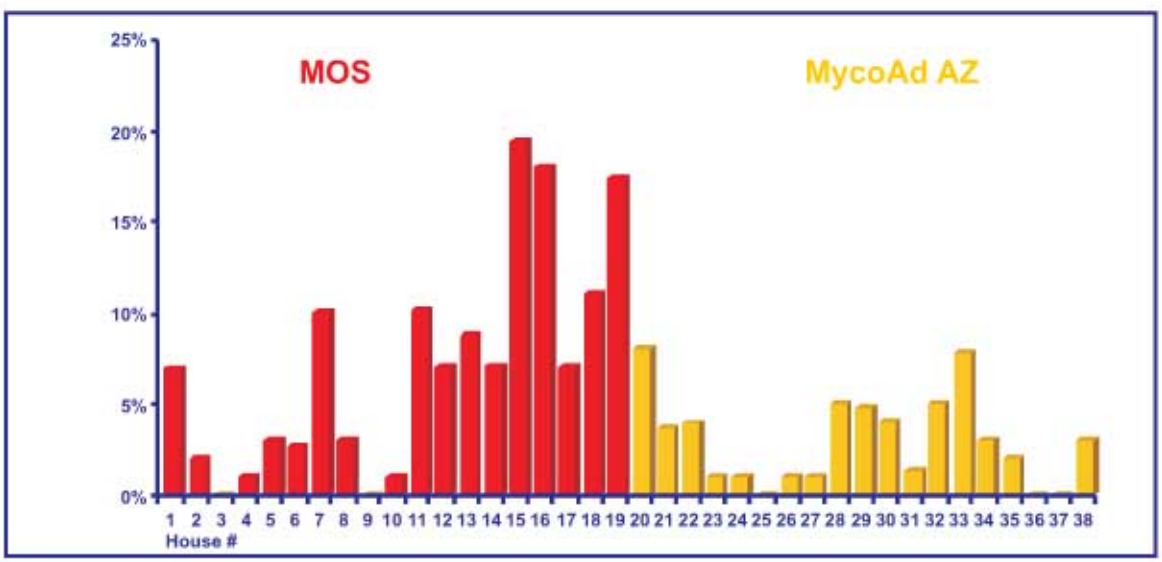

Figure 11. Mortality rate recorded in 38 houses treated with a MOS mycotoxin binder and Mycoad AZ.

Figure 12. Average mortality reported in the 38 houses treated with MOS and Mycoad AZ.

Conclusions

The houses treated with Mycoad AZ showed a lower mortality rate than the houses treated with MOS.

Performance evaluation of sows treated with Mycoad AZ and exposed naturally to T-2 toxin, aflatoxin, and zearalenone (commercial conditions)

Facilities: Commercial farm in Thailand.
Type of animals: 33 commercial sows per treatment.
Mycoad AZ inclusion rate: 0.5 and 1.0 kg/MT of feed. The additional mycotoxin binder (product A) was tested at 1 kg/MT of feed. Both products were tested for 15 days.

Concentration of natural mycotoxins present in the feed.
Zearalenone (59 - 130 ppb)
Aflatoxin = 3 - 44 ppb
T-2 toxin = 5 - 15 ppb

Reference: Personal Communication- Innovet, Thailand. Mycoad AZ versus another mycotoxin binder effect on commercial pigs exposed to low levels of mycotoxins. Bangkok, Thailand. 2005.

Results

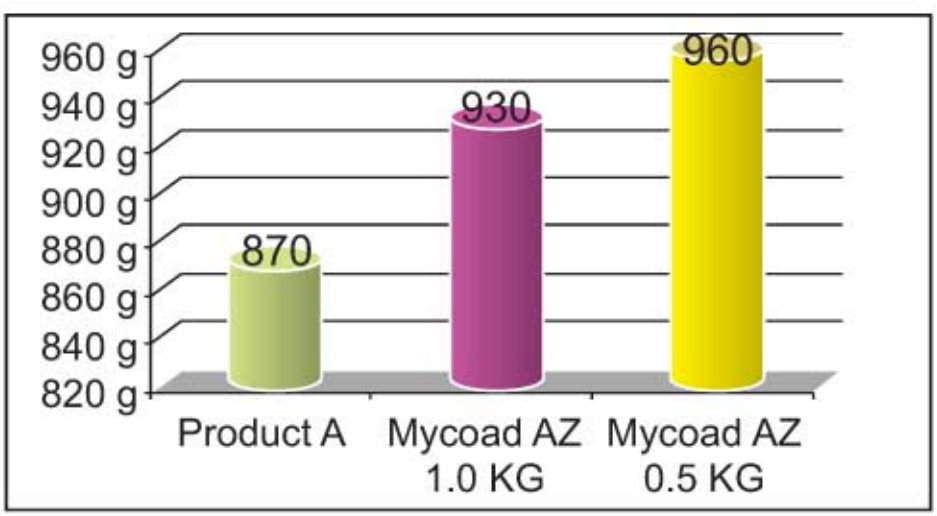

Figure 13. Average feed intake recorded in commercial sows exposed to a ration naturally contaminated with zearalenone, aflatoxin and T-2 toxin, and treated with two mycotoxin binders.

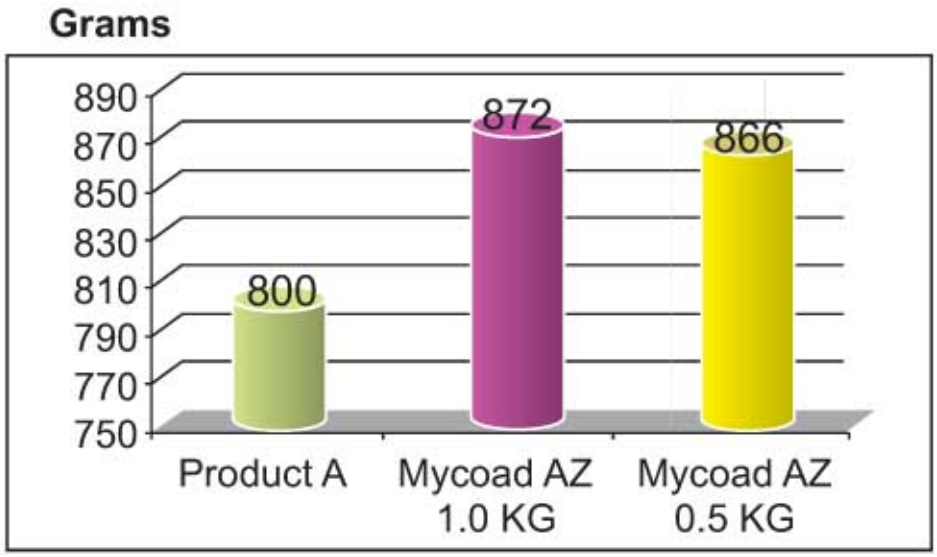

Figure 14. Average daily gain recorded in commercial sows exposed to a ration naturally contaminated with zearalenone, aflatoxin and T-2 toxin and treated with two mycotoxin binders.

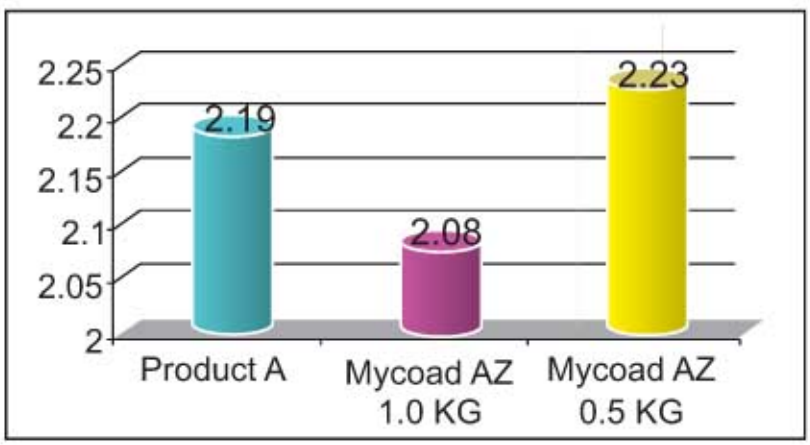

Figure 15. Average feed conversion rate recorded in commercial sows exposed to a ration naturally contaminated with zearalenone, aflatoxin and T-2 toxin and treated with two mycotoxin binders.

Conclusions

Mycoad AZ was able to avoid the deleterious effect on performance caused by the mycotoxins present in the feed of the sows evaluated in this study.

NOTES

NOTES

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Introduction

Mycotoxins are secondary metabolites of various fungi that cause a wide variety of adverse clinical signs in swine. Zearalenone, fumonisin, ochratoxin, vomitoxin, aflatoxin, and the tricothecenes group represent very important mycotoxins affecting swine performance. Zearalenone, one of the most important mycotoxins affecting reproduction in swine, primarily affects weaned and prepubertal gilts causing vulvovaginitis, hypertrophy of the mammary glands and uterus, with occasional prolapse of the uterus in severe cases. Piglets born to sows ingesting feed contaminated with zearalenone may present enlarged vulvas and uterus. A perinatal hyper-estrogenic syndrome that includes lower conception rate, decreased litter size and increased number of stillbirths, has been reported in commercial herds and reproduced experimentally, by feeding zearalenone. On the other hand, fumonisin has been associated with pulmonary edema and immunosuppression, increasing the susceptibility to respiratory diseases such as APP (*Actinobacillus pleuropneumoniae*), PRRS (Porcine Reproductive and Respiratory Syndrome), and circovirus. It is important to take into consideration that the clinical pictures described above are easily observed by the naked eye but do not necessarily give us an exact indication that a more important system, the one responsible for the immune response, is affected. Through the years veterinarians have recognized that mycotoxins can cause immunosuppression in many different species, including swine. For example, the ingestion of feed contaminated with aflatoxin increases the severity of the infections caused *Erysipelothrix rhusiopathiae*. In the case of infections with *Salmonella choleraesuis* and *Campylobacter coli*, feeding a diet contaminated with ochratoxin A caused more damage in piglets. By affecting the immune system of the adult animals, mycotoxins will compromise the health status of the progeny, as reported in the case of aflatoxin B1 that interferes with the development of passively-acquired immunity in swine after vaccination against erysipelas. Just to mention another mycotoxin that also affects the immune system, fumonisin B1 is capable of decreasing the antibody response after vaccination by affecting the lymphocyte proliferation and cytokine production. That means that low levels of these mycotoxins in the feed can cause a failure in the vaccination response and the presence of disease outbreaks in animals that have been properly vaccinated. To make matters even worse, mycotoxins mixtures are a common finding under natural conditions, and in the case of aflatoxin and T-2 toxin, it has been demonstrated that both can alter the immune system in an additive or synergistic manner.

Symptoms	Aflatoxin	Ochratoxin	DON	T-2 toxin	Fumonisin	Zearalenone
Sudden death	+	+			+++	
Anorexia	+	+	+++	+++	+	
Growth depression	+++	+	+	+	+	
Liver damage	+++	+			++	
Kidney damage		+++			+	
Vomit		+	+++	+++	+	
Abortion						++
Infertility						+++
Vulvovaginitis						+++
Pulmonary edema					+++	
Immunosuppression	+++	+	++	++	+++	+

Table 1. Damage caused by the most important mycotoxins affecting swine.

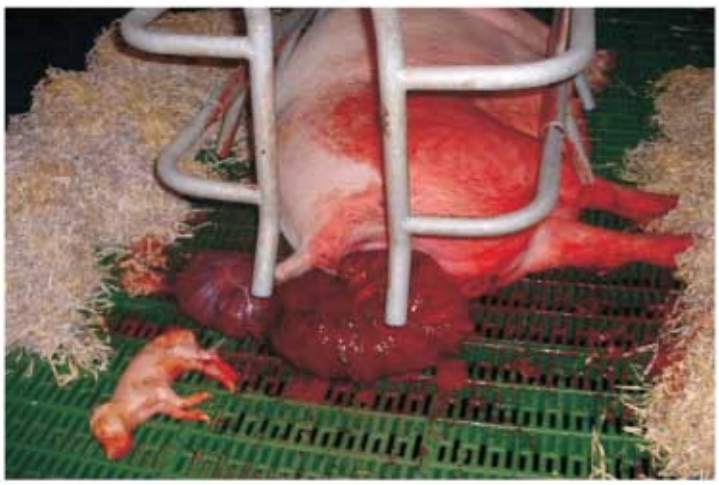

Figure 1. Abortion caused by zearalenone in a sow.

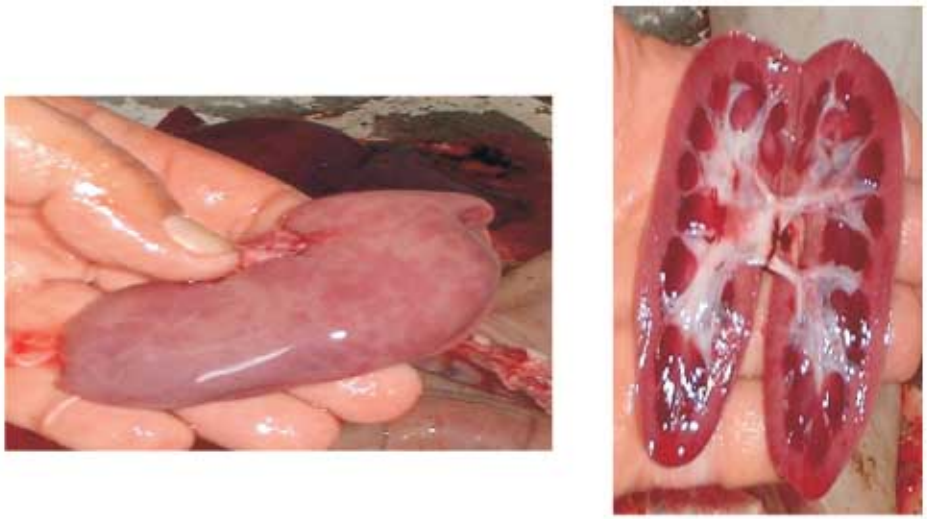

Figure 2. Effect of natural feed contamination with ochratoxin in the kidney of a commercial pig.

Figure 3. Oral lesions caused by T-2 toxin in a sow.

Figure 4. Pulmonary edema in a piglet caused by feeding 30 ppm of fumonisin under experimental conditions.

Figure 5. Commercial pig showing vulvovaginitis caused by zearalenone.

Figure 6. Piglet showing vulvovaginitis caused by zearalenone.

IN VIVO RESULTS

Macroscopic evaluation of the effect of Mycoad AZ on the internal organs of pigs that consumed fumonisin and zearalenone in the ration (experimental conditions)

Facilities: Federal University of Santa Maria, Brazil. Department of Veterinary Medicine and Laboratory of Mycotoxicologic Analyses (LAMIC). Brazil.

Type of animals: Commercial pigs.

Mycoad AZ inclusion rate: 2 and 5 kg/MT of feed.

Concentration of mycotoxins tested.
Zearalenone = 2 ppm (2,000 ppb)
Fumonisin = 30 ppm (30,000 ppb)

Reference: Personal communication. Evaluation of Mycoad AZ against feed artificially contaminated with fumonisin and zearalenone. Brazil. 2007.

Results

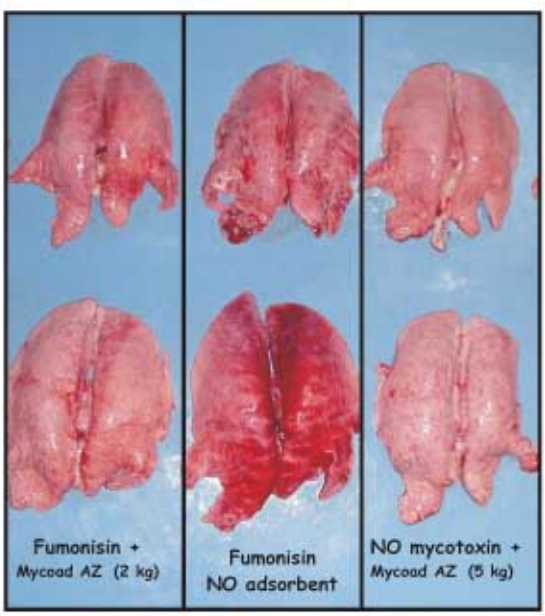

Figure 7. Fumonisin and Mycoad AZ effect on the lungs of experimental pigs fed 30 ppm of fumonisin. The presence of pulmonary congestion and edema is observed in the lungs of pigs consuming feed contaminated with fumonisin. The pigs consuming Mycoad AZ (2 and 5 kg/MT) did not show the deleterious effect caused by the administration of fumonisin. The picture shows the results obtained in two replicas.