Overcome mycotoxins to improve sow productivity

by Sangita Jalukar, PhD, Technical Service Manager, Arm & Hammer Animal and Food Production

Almost all feed grains worldwide contain mycotoxins, produced by moulds in cereal grains, silage, forage and corn byproducts, such as distillers dried grains (DDGS). Researchers have identified more than 400 different mycotoxins. Most common in feeds are aflatoxin (AFLA), deoxynivalenol (DON), fumonisin (FUMO) and zearalenone (ZEA). Unfortunately, their impact is not as simple as 1+1=2. Mycotoxins can have a cumulative effect, creating an even greater risk of performance loss if your operation's diet contains more than one mycotoxin.

Although mycotoxins affect all species of livestock and poultry, pigs are particularly sensitive, especially to ZEA and DON. ZEA increases stillbirths and interferes with normal oestrus, reducing fertility and farrowing rate. DON, also known as vomitoxin, decreases feed intake and reproductive performance and suppresses immunity. A ripple effect opens the door for opportunistic diseases that hamper performance and cause higher mortality. Producers may find it difficult to correlate mycotoxin contamination in feed with poor animal productivity because symptoms are so wide-ranging and often seem unrelated. Furthermore, due to variability, predicting the mycotoxin load in a ration is very difficult. The best approach is to assume mycotoxins are present in feed and make plans to combat them.

MITIGATING MYCOTOXIN THREATS

Producers may rely on binders to counteract mycotoxins. However, these solutions are not always effective against all types of mycotoxins, especially ZEA. BG-MAX from Arm & Hammer Animal and Food Production combines mycotoxin binders with technologies that protect the gut from damage and make animals more resilient against harmful mycotoxin effects. BG-MAX features Refined Functional Carbohydrates (RFC) technologies, which work by preventing mycotoxins from being absorbed through the gut. By combining RFCs with a specially formulated bentonite binder, BG-MAX inactivates common mycotoxins while also protecting the gut. In addition, beta 1,3/1,6 glucans and mannans present in BG-MAX can reverse immune suppression caused by mycotoxins, allowing the animal to protect itself against secondary pathogens. In vitro tests demonstrate that BG-MAX is more effective in absorbing harmful feed compounds than activated charcoal, bentonite and another yeast-derived product. Cytotoxicity tests show that BG-MAX protects epithelial cells from damage caused by leading mycotoxins, including DON, ZEA and FUMO.

RESILIENCY AGAINST MYCOTOXINS

Field research shows BG-MAX enhances sow reproductive performance in the presence of mycotoxins. In a recent commercial trial, researchers fed 303 sows a ration contaminated with ZEN and DON at levels comparable to those seen in commercial herds globally. Treatment sows received BG-MAX in their diets, while control animals received no BG-MAX supplementation. Table 1 shows that sows fed BG-MAX recorded:

- Higher fertility
- Higher farrowing rate
- Lower mortality

Ultimately, the increased protection from BG-MAX helps mitigate mycotoxins in feed by building sow resiliency against their harmful effects.

Table 1. Reproductive performance of sows fed BG-MAX.

	Control	BG-MAX	P-value
Fertility (%)	87.5	93.4	0.082
Farrowing (%)	79.6	89.4	0.018
Mortality (%)	5.3	0.7	0.018

References for all research cited available on request

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Preparing pigs for a ZnO-free nursery with CELMANAX

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Due to environmental concerns with the use of zinc oxide (ZnO), swine producers around the world are seeking effective, sustainable solutions for maintaining piglet health. The search is increasingly urgent as European Union (EU) producers face a ban on therapeutic levels of ZnO in nursery rations in June 2022.

Diet supplementation with the Refined Functional Carbohydrates™ (RFCs™) in CELMANAX™ consistently shows benefits for piglets pre- and post-weaning. RFCs improve growth during pre-weaning and help build resiliency for a smoother transition post-weaning into the nursery. This could reduce reliance on antibiotics or ZnO in the nursery phase.

To study how RFCs could replace ZnO in nursery diets, piglet growth was measured when researchers fed CELMANAX in both sow lactation diets and piglet diets and compared it to piglets fed control or ZnO. The CELMANAX group recorded higher 10-day and weaning body weights when compared with the control or ZnO group (Table 1 and 2).

In the same study, CELMANAX supplementation in nursery rations improved feed intake, growth rate and body weight, but did not affect feed efficiency (Table 3). These results align with other trials showing reduced feed intake with high ZnO levels (3000 ppm). Overall, piglets fed RFCs performed better and required fewer treatments than piglets fed ZnO. Results from this research and other studies show that CELMANAX is a promising tool to maintain piglet performance in swine operations facing ZnO bans.

Table 1. Effect of sow treatments on piglet 10-day body weights.

Sow treatment	Control	CELMANAX	P-value
Sows (number)	29	30	–
Day 10 BW (kg)	2.412[b]	2.624[a]	0.025

[ab] Means within the same row with different superscripts differ

Table 2. Effect of sow and creep feed treatments on piglet body weights at weaning.

Sow/ Creep feed	Control/ control	CELMANAX/ CELMANAX	Control/ ZnO	CELMANAX/ CELMANAX+ZnO	P-value
Piglets (number)	192	181	165	180	–
Weaning BW (kg)	5.028[b]	5.28[a]	4.948[b]	5.12[ab]	0.025

[ab] Means within the same row with different superscripts differ

Table 3. Effect of treatments fed in the nursery phase on piglet performance.

Piglet treatment	Control	CELMANAX	ZnO	CELMANAX +ZnO	P-value
Pens (number)	11	11	10	10	–
BW start (kg**)	4.986	5.177	4.943	5.104	0.864
BW finish (kg)	13.132[ab]	13.554[a]	11.965[c]	12.816[b]	<0.001
ADG (g/d)	291[ab]	299[a]	251[c]	275[b]	<0.001
ADFI (g/d)	372[ab]	387[a]	318[c]	361[b]	<0.001
FCR (g/g)	1.296	1.305	1.305	1.329	0.521
Avg. mortality (%)	3.63	1.52	5.58	4.39	–
Treated piglets/ total piglets	0.278	0.295	0.446	0.35	–

[ab] Means within the same row with different superscripts differ.
**Model included a covariate to correct potential differences in BW at the start of the nursery period to evaluate pure effect during nursery phase.

References for all research cited available on request

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