P. guilliermondii-based feed product improves reproduction in sows

Optimising sow reproductive performance is an ongoing goal for swine producers. Genetics, animal management and diet all play important roles. Litter size and weaned pig output are economic parameters of critical importance. The search is on to achieve better reproductive performance by finding solutions that are practical, welfare-conscious, sustainable and cost effective.

by Sarah Cooper,
Product Manager,
ADM Animal Nutrition.
www.admanimalnutrition.com

Studies over the past several years in both research and commercial facilities demonstrates that supplementing the gestation and lactation diets of sows and gilts with a Pichia guilliermondii-based feed additive promotes improved sow reproduction-related parameters linked to fecundity and piglet vitality, and delivers profit to producers.

About Pichia guilliermondii

ADM has pioneered the development and commercialisation of a Pichia guilliermondii-based product for use in animal feeds, produced through specialised fermentation and processing.

In-vitro, ex-vivo and in-vivo peer-reviewed studies have examined its various properties, functions and associated influence on physiological and performance parameters across a variety of animal species.

This body of research proposes that the product may have synergy with the host's innate immune system to modulate immune responses, facilitate pathogen clearance and promote gastrointestinal health, especially during challenging situations often present in commercial operations.

Reproduction benefits for sows

The modes of action by which Pichia guilliermondii may impact sow fecundity and piglet vitality are yet to be elucidated. However, it has been well established that stress of various sources, commonplace in sow production, can seriously impact sow reproduction. It may therefore be the case that Pichia guilliermondii, through its modes of action, may promote resilience in the sow to overcome stressors, counteracting the negative effects of stress.

Pichia guilliermondii supplementation study

An initial study was set up by the University of Arkansas in their research facilities. It involved 98 gestating sows and gilts. Within 24 hours of breeding, the sows and gilts were assigned to one of three dietary treatment groups based on body weight and parity.

Continued on page 9

Fig. 1. The number of piglets born alive per litter for sows/gilts based on the Pichia guilliermondii supplementation received ([a, b,] P<0.05).

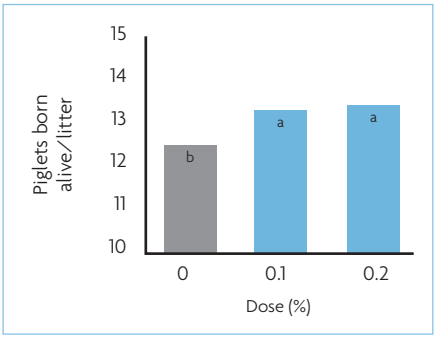


Fig. 2. The percentage of the litter born as lightweight pigs farrowed by sows/gilts based on Pichia guilliermondii supplementation received ([a, b,] P<0.05).

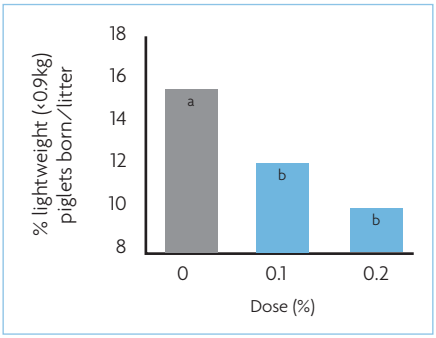
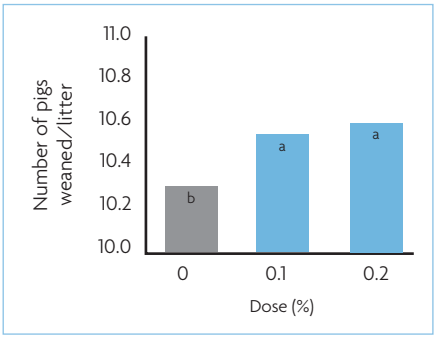


Fig. 3. The number of pigs weaned per litter to sows and gilts according to Pichia guilliermondii supplementation received ([a, b,] P<0.05).



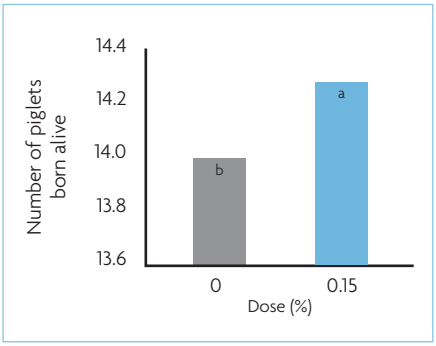


Fig. 4. The number of piglets born alive to sows and gilts receiving either 0% or 0.15% Pichia guilliermondii supplementation ([a, b,] P<0.05).

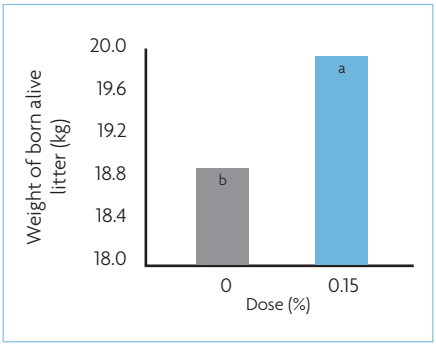


Fig. 5. The weight (kg) of born alive litter to sows supplemented with either no or 0.15% Pichia guilliermondii ([a, b,] P<0.01).

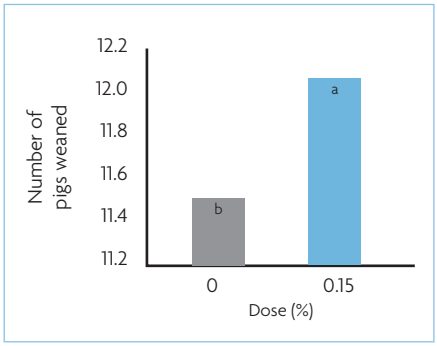


Fig. 6. Number of pigs weaned from sows and gilts based on their Pichia guilliermondii supplementation ([a, b,] P<0.01).

Continued from page 7

The dietary treatments included:

- A basal diet by itself (control).
- The basal control diet supplemented with 0.1% (1kg/t; 2lb/t) Pichia guilliermondii.
- The basal control diet supplemented with 0.2% (2kg/t; 4lb/t) Pichia guilliermondii.

These dietary treatments were fed consistently through gestation and lactation. The sows and gilts were housed in individual gestation stalls and provided approximately 2.3kg of food per day with ad libitum access to water. On day 110 of gestation the sows and gilts were moved to individual farrowing crates.

Following farrowing, the sows and gilts were started on a lactation diet as the basal diet, offered ad libitum, with the same supplementation as added previously.

Cross-fostering was performed within treatment groups and completed by 24 hours post-farrowing.

Various parameters were recorded until weaning. Notable results in this study were as follows: more pigs born, less lightweight pigs, and more pigs weaned.

Sows and gilts supplemented with Pichia guilliermondii farrowed 6.7-7.5% more live pigs compared to animals receiving no supplementation (P<0.01) (Fig. 1).

Furthermore, sows and gilts receiving Pichia guilliermondii supplementation farrowed significantly less, by 22-35%, lightweight (≤0.9kg; ≤2lb) piglets compared to controls (P<0.006) (Fig. 2).

In addition to this, significantly more pigs were weaned per litter amongst the sows and gilts that received Pichia guilliermondii supplementation, compared to those sows and gilts not receiving any Pichia guilliermondii supplementation (P<0.01) (Fig. 3).

Trial in a commercial facility

To validate these results with Pichia guilliermondii supplementation seen in the research facility at the University of Arkansas, a study involving Purdue University was performed several years later in a 10,000-sow breed-to-wean commercial facility. The study involved 606 PIC 1050 sows and gilts.

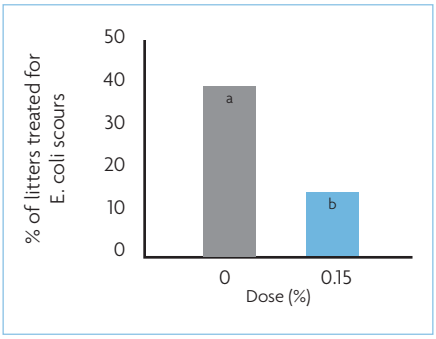


Fig. 7. Percentage of litters, from sows and gilts receiving 0% or 0.15% Pichia guilliermondii supplementation, treated for E. coli scours ([a, b,] P<0.01).

Once confirmed pregnant at day 35 post-breeding, animals were moved into a group-housing facility and allocated to one of two dietary treatment groups, receiving either a basal gestation diet with no Pichia guilliermondii supplementation (0%, control), or the basal diet with 0.15% Pichia guilliermondii supplementation. Animals were fed approximately 2.3kg of food per day.

On day 112 of gestation, sows and gilts were moved to individual farrowing crates. Upon farrowing, a lactation diet, fed ad libitum was started with the same supplementation previously received, either 0% or 0.15% Pichia guilliermondii, throughout the lactation period, until weaning.

Cross-fostering to equalise litter size was done within 24 hours of farrowing.

Similar results related to fecundity and piglet vitality, as seen in the research facility study, were also noted in this study: more piglets born, heavier and healthier litters, and more pigs weaned.

Sows and gilts supplemented with Pichia guilliermondii farrowed a greater number of live piglets, compared to those receiving no supplementation (P<0.04) (Fig. 4).

The weight of litters born alive to Pichia guilliermondii-supplemented sows and gilts was significantly higher than that of litters from control animals (P<0.001) (Fig. 5).

Moreover, the number of pigs weaned to Pichia guilliermondii-supplemented pigs was higher than the number weaned from control animals (P<0.001) (Fig. 6).

Additionally, related to piglet vitality and of economic consequence, litters nursing from sows who did not receive Pichia guilliermondii supplementation had a 24.1% higher incidence of treatment for scours (P<0.001) (Fig. 7).

Pichia guilliermondii supplementation for sows delivers value

Supplementing sows and gilts through gestation and lactation with Pichia guilliermondii, a unique whole cell immunosynergist, has been shown in these peer-reviewed studies to be associated with improved sow reproduction-related parameters, essentially resulting in 1.3 more pigs weaned per sow per year, if we consider an average of 2.4 farrowings year.

Additionally, due to litters of the supplemented sows requiring less treatment for scours, there may be less treatment costs and lower use of antibiotics. ■

References are available from the author on request