The impact of dietary fibre supplementation in piglets

The potential of dietary fibre in swine nutrition has previously been misunderstood and often overlooked. This complex compound has mainly been seen as a dilution factor or binder for other nutrients and is perceived to have antinutrient effects.

by Gustavo Cordero, AB Vista
www.abvista.com



However, more recent advancements in research, improvements in analytical capabilities, and our growing expertise in fibre nutrition, both in swine and in humans, have highlighted the significance of dietary fibre in animal diets, allowing for a greater understanding of its benefits, namely, improved swine productivity and performance and supporting good gastrointestinal health.

With this rapid evolution in our understanding, there is high interest in how to optimise fibre in feed formulation

However, the practical application of dietary fibre supplementation in swine diets has been limited in certain countries, such as the US, because of a lack of variety of fibre sources used for the feed.

Here, we look at advancements in fibre measurement of feedstuff ingredients and the impact stimbiotic supplementation can have in terms of maximising the benefits of fibre in piglets specifically.

FROM CRUDE FIBRE TO TOTAL DIETARY FIBRE

Historically, there have been insufficient methodologies available to measure the indigestible fraction of the diet, determined as crude fibre.
This consists of lignin, cellulose, hemicellulose, and pectin. However, the crude fibre methodology has been found to underestimate fibre levels by 70-80%, resulting in an incomplete and inaccurate representation of the fibrous component in pig feed.

Other traditional classifications of dietary fibre include detergent procedures, neutral detergent fibre (NDF), and acid detergent fibre (ADF). Although these parameters represent an improvement over crude fibre, both have their limitations.

NDF recovers the insoluble components of dietary fibre, such as cellulose, hemicellulose and lignin, while ADF recovers mainly cellulose and lignin; however, both cannot capture the soluble fibre component. Additionally, these methods have the potential to overestimate fibre by measuring other insoluble non-fibre fractions, underestimating the total dietary fibre, particularly in starchy feeds/ingredient samples.

Although NDF is still a standard measurement in the US swine industry, the total dietary fibre (TDF) method was introduced to overcome some pitfalls of the detergent procedure and provide a more

Continued on page 20



Continued from page 19
complete measurement of fibre.

It is determined as the sum of lignin and non-starch polysaccharides and can separate dietary fibre into soluble and insoluble fractions.

TDF is important in feed formulation for monogastrics, including swine, to improve feed efficiency and animal performance and support good gastrointestinal health through better hindgut fermentation.

THE EFFECT OF FIBRE IN SOW NUTRITION ON PIGLET PERFORMANCE

Piglet litter sizes have been noticeably increasing over recent years. According to the Agriculture and Horticulture Development Board, the size of an average pig litter in the UK was 15.48 in 2023; in 2010, it was less than 12.5.

With a growing number of pigs born alive per litter, there is also an increasing number of piglets weaned per sow per year.

Thus, the sow is required to allocate more resources to farrow additional piglets and provide nutrients for the growing litter size.

Dietary fibre supplementation in gestation, peripartum and lactation periods can provide a host of benefits to piglets.

In gestation diets, it has been linked to heavier piglet weights at birth, increased lactation feed intake, and reduced pre-wean mortality. In the peripartum phase, it has been shown to reduce the farrowing duration.

Turning to the peripartum and lactation periods, fibre supplementation is increasingly recognised for its potential to improve sow and litter performance.

In a recent trial involving 567 gilts, researchers evaluated fibre supplementation and its combination with yucca and vitamin C on the periparturient period of gilts, on constipation status, body condition score and farrowing performance.



The experimental diets consisted of three dietary treatments:

- The control top dress targeted a daily intake of 277g of TDF using ground corn (CON diet).
- A top dress targeting a daily intake of 440g of TDF (with 40g being soluble fibre), using wheat midds, beet pulp, soy hulls, rice hulls, ground corn and a stimbiotic (Signis, AB Vista) (FIB diet); and,
- A replication of the top dress diet (FIB), with an addition of 680mg of vitamin C and 2,500mg of yucca (PLUS diet).

The trial found that gilts receiving FIB or PLUS diets, those supplemented with soluble fibre, tended to wean more pigs per sow and were associated with a lower stillborn rate and pre-weaning mortality, equating to improved litter performance.

MAXIMISING FIBRE BENEFITS WITH STIMBIOTICS

Stimbiotics, a non-digestible but fermentable additive, help stimulate fibre fermentability in the hindgut, thus increasing the output from dietary fibre.

They can be implemented as a tool to maximise fibre benefits, including improved gut health, better animal productivity and performance, and reduced reliance on growth-promoting antibiotics (AGPs) and medications.

In a trial that looked at the effects of stimbiotic supplementation (Signis, AB Vista) on the growth performance of weanling pigs, it was found that those on the supplemented diets had greater nutrient digestibility, digestible energy and apparent total tract digestibility of TDF than those on the control diet. Pigs whose diets were supplemented with stimbiotics show a greater overall average daily gain, gain:feed, and final body weight on day 42 post-weaning.

A separate study evaluated the potential benefit of a stimbiotic on porcine ear necrosis in nursery pigs. Newly weaned and nursery barn pigs were randomly assigned a standard diet (CON) or CON with stimbiotics (Signis, AB Vista, 100g/ton of feed).

It was found that pigs fed the stimbiotic required 15% fewer injectable treatments than pigs fed the control, and there was also a lower incidence of ear necrosis.

Researchers concluded this was potentially driven by the beneficial shift in the pig's microbiome that a stimbiotic provides.



CONCLUSION

As our knowledge of fibre continues to evolve, particularly due to analytical methods such as TDF, we can equip producers with the tools they need to incorporate dietary fibre into swine diets and reap the multitude of production benefits, as demonstrated in the trials here.

To better optimise feed formulation, technology such as NIR (Near Infra-Red) spectroscopy allows for the quick and robust assessment of the characteristics of TDF in feed ingredients.

Additionally, stimbiotic supplementation can work in shifting the intestinal microbiome to favour fibre fermentation.

Unlocking the potential of fibre in the diet can improve the gut resilience of swine in commercial conditions, for better feed efficiency and performance – and ROI. ■