

Using plant alkaloids in animal feed to improve gut health and FCR

Plant alkaloids prove to be beneficial for intestinal integrity and improve feed conversion rates in pigs. This is mainly due to the regulation of inflammatory processes in the intestinal mucosa through these substances.

Field trials from all over the world consistently show a positive effect of special plant alkaloids on meat production parameters.

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The largest cost in meat production comes from animal feed. The animal feed industry has been using different techniques to improve the digestibility of the feed ingredients

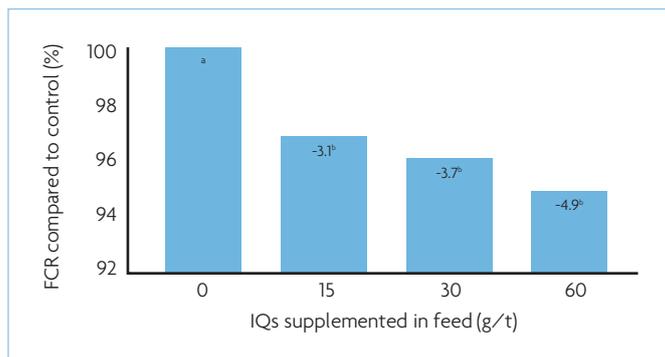


Fig. 1. Effect on FCR in nursery pigs (meta-analysis) (Hogeschool, Ghent, Belgium).

to maintain feed costs affordable for meat producers.

One of the most successful techniques to do so has been the use of so-called 'AGPs' (antibiotic growth promoters).

These antibiotics are mixed with the feed to reduce the (feed-induced) inflammatory response in the GI-tract and to limit microbial growth. As the dosage of these in-feed antibiotics is very low it is thought that the performance enhancing effect of AGPs is more a result of reducing the inflammatory response than of acting as an antimicrobial.

However, the use of AGPs brings the risk of antibiotic resistance in certain pathogen strains of bacteria, which reduces feed efficiency, but also poses a threat to consumers consuming meat from animals

treated with AGPs. Therefore, legislation has become more and more strict regarding the use of AGPs in meat production.

Over the past decade the animal feed industry has been looking for alternative additives to replace the AGPs. An alternative additive needs to have sufficient anti-inflammatory potential to improve intestinal health and therefore digestibility of the feed.

Inflammatory processes have an impact on animal production as they require considerable amounts of energy and nutrients. Up to 30% of the ingested energy can be lost through (inflammatory) immune responses in the GI-tract.

Logically this has a negative impact on growth rate and feed conversion. Thus active substances showing anti-inflammatory proper-

ties are a high point of interest for animal production.

Certain plant alkaloids, particularly Isoquinoline Alkaloids (IQs) were identified as possible alternatives to AGPs. The anti-inflammatory effects of IQs are well documented in cell cultures and physiological tests.

The first use of these substances dates from ancient medicine, but more recently IQs were produced from plants of the Papaveraceae family for specific use in oral anti-inflammatory products for humans.

Also for the animal feed industry it became clear that IQs could serve as successful alternatives to AGPs in animal feed.

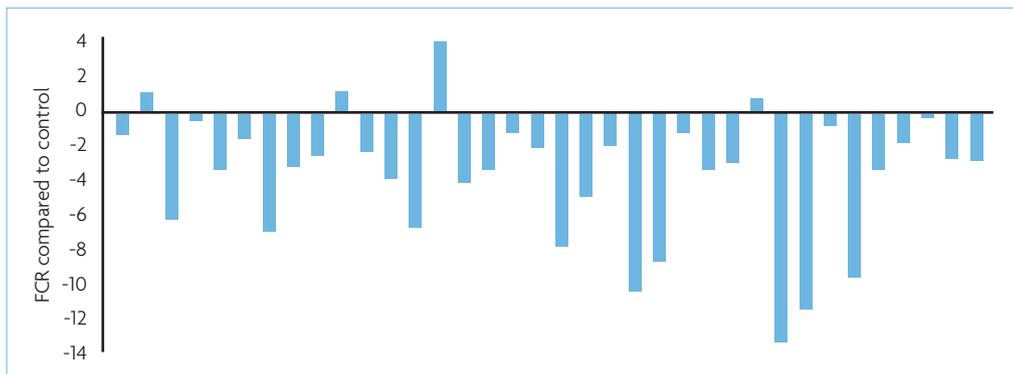
Effect of IQs in swine feed

Over the last decade a lot of experience has been gained regarding the effect of IQ in swine feed. IQs can be implemented in all stages of the swine production cycle (sows, piglets, weaners, finishers), but this article mainly focuses on the effect from weaning until finishing.

In general it can be said that when IQs are incorporated in the feed the feed intake increases, growth rate increases and feed conversion improves as well.

To evaluate the effectiveness of IQs in swine feed meta-analyses were performed (Hogeschool, Ghent, Belgium) combining trial results from different countries and in different stages of production.

Fig. 2. FCR field analysis – grower-finisher pigs fed a feed additive based on IQs (Sangrovit, Phytobiotics GmbH).



Nursery pigs

Pigs in the nursery phase on each site (Spain, Netherlands, Hungary and Poland) were assigned randomly to groups and fed test or matched control diets both based on a routine starter phase diet for five or six weeks, from four weeks of age until 9-10 weeks of age.

Three different levels of IQs were tested (15, 30 and 60mg/kg feed). The feed intake and weight gain of all pigs were measured in the same manner at the start and finish of each site.

Continued on page 21

Continued from page 19

The results of this meta-analysis on feed conversion rate (FCR) are shown in Fig. 1.

A total of 1,742 pigs were present in these studies. There was an overall significant reduction of the FCR of 3.1, 3.7 and 4.9% in the 15, 30 and 60mg/kg feed IQs groups, respectively.

Growing-finishing pigs

Pigs in the grower-finisher phase on 36 farms (Europe, Thailand, Mexico, Chile and Brazil) were assigned randomly to groups and fed test or matched control diets (supplemented and non-supplemented diets as representative in the tested regions) both based on a routine grower phase diet for 14 weeks, from 10 weeks of age until 24 weeks



of age. The feed intake and weight gain of all pigs were measured for each site.

The trials used a dosage range of IQs as recommended by the manufacturer (15-50mg/kg feed).

The individual farm results of this analysis for feed conversion ratio (FCR) are shown in Fig. 2.

Overall FCR improved with 3.4% for pigs fed IQs supplemented feed. In total 32 out of 36 farms showed an improved FCR in the grower-finisher phase for pigs fed with the IQs supplemented feed.

Commercial availability

Data from these meta-analyses show that IQs are a safe feed additive with consistent improvements in performance (feed intake, growth rate, FCR) in the swine meat production chain when the recommended doses (15-50mg/kg feed) are met.

For a few years the animal feed industry has the possibility to include standardised doses of IQs in the feed through the feed-additive 'Sangrovit' (Phytobiotics Feed Additives GmbH, Germany).

Sangrovit is produced with assays for the active ingredient and a traceable chain of production and formulation.

Sangrovit does not have a direct

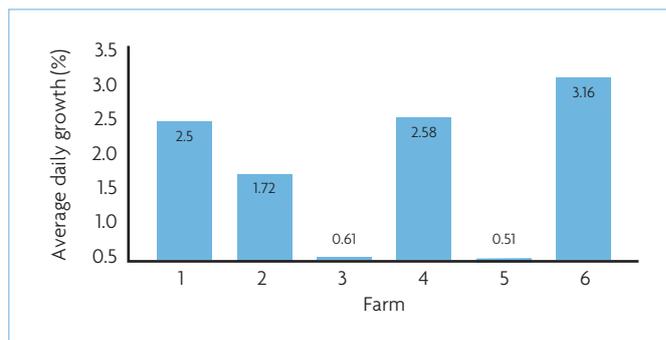


Fig. 3. Improvement in average daily growth in pigs fed with Sangrovit supplemented feed.

antimicrobial effect in the dosages as recommended by the manufacturer. It is confirmed that the mode of action of these plant alkaloids relies on anti-inflammatory activity on the gut mucosa.

Sangrovit is already implemented by various companies around the globe in multi-species feed production as part of an AGP replacer strategy or to improve feed efficiency, growth rates and feed conversion.

In Fig. 3 a comparison is made between average daily growth (ADG) of growing-finishing pigs for five different commercial farms using Sangrovit.

It can be seen that ADG was

improved with on average 2% for animals that were fed with Sangrovit supplemented feed compared to animals fed with non-Sangrovit supplemented feed.

Conclusion

Supplementation with IQs represents a tool to improve gut health in pigs resulting in improved feed conversion rates. It can therefore be used as an alternative to the common practice of AGPs. ■

References are available from the author on request