Improving feed efficiency and cutting medication costs in grow-finish pigs

Feed costs represent between 60-70% of the total cost of pork production. Therefore, improving feed efficiency is the ultimate goal in grow-finish swine operations as it markedly impacts profitability and financial returns.

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Feed efficiency is affected by several factors, including the particle size, nutrient digestibility, energy content, feed management, and the feeder design and space. Moreover, feed efficiency is influenced by non-dietary factors that determine how much energy is used to respond to environmental and health conditions.

Environmental or health challenges such as high stocking density, heat or cold stress, infections, and poor barn air quality, ultimately influence production efficiency as they are costly to the immune system and may increase the need for medical interventions.

Efficacy of feed additives

In past decades, numerous dietary feed additives and supplements have been developed with the aim to support intestinal health and growth, minimising the cost of maintenance, and improving feed efficiency in pigs.

Plant-based feed additives have become particularly popular in the last decade as a good strategy to support growth and improve feed efficiency in pigs.

Moreover, a vast number of research studies has been published regarding their efficacy and mechanisms of action. Such additives have been reported to exert various effects including flavouring, anti-oxidative and anti-inflammatory effects among others.

In general, scientific studies are usually conducted in research farms, under optimum conditions of husbandry, hygiene, and health, which do not always reflect real world conditions of swine farms, where a large number of pigs are exposed to a high level of environmental and health challenges.

On the other hand, evaluating the efficacy of feed additives in purely commercial farms has the advantage of testing the product under real conditions, but there is very little or no control on the variability of many factors that may influence the outcome, such as health status, diets, genetics, and farm management, affecting the external validity of the study.

A controlled field study

For these reasons, a large-scale study was carried out using the Statistical Process Control (SPC) method. SPC is a powerful analysis tool to monitor and detect changes in all kinds of processes, including production parameters in commercial animal production systems.

It is a method that can be used to evaluate the effect of a single intervention on growth performance, including a large dataset and using the historical data as control. In swine operations production parameters vary over time within certain limits. This variation is caused by several factors including differences in diet, health, or genetic progress, for instance.

The SPC analysis reduces such variation and, therefore, it detects if changes in production parameters are due to a specific intervention or simply part of the normal variation within the limits of that process. As such SPC can reveal if, for example, the introduction of a feed additive into the feed formulas, is truly influencing production results or not. In the present study the impact of dietary supplementation with natural, plant-based isoquinoline alkaloids (IQ) on production performance and medication cost was evaluated in a large swine integration in Southern Europe.

- A total of 139,000 grow-finish pigs from 52 batches of different defined farms were supplemented with 1kg IQ/ton feed from day 70 of life until slaughter. The aimed sample size was achieved by supplementing all animals during an eight month period.

- Pigs were a (Large White x Landrace) x Piétrain breed, raised to approximately 120kg body weight.

- Feed based on barley, wheat, corn, and soybean meal was manufactured in one feed mill and used on all farms included in the study.

- No changes were made during the study period in standard farm procedures and/or veterinary interventions.

- Differences in feed and health status were accounted for in the statistical analysis by defining specific clusters.

- Historical data from 2017-2021 was used as control, representing 2.4 million pigs in total.

- All performance parameters were carefully monitored over time, including FCR, weight gain, feed intake, mortality, and cost of medications.

Variable	Control	With IQ supplementation*	Difference (%)	p-value
ADFI (kg/pig)	2.12	2.10	-0.8	0.615
ADG (kg/pig)	0.83	0.87	+4.3	0.001
FCR	2.62	2.48	-5.3	‹0.0005
Mortality (%)	4.19	4.16	-0.7	0.946
Cost of medication (€/pig)	1.43	0.99	-30.5	‹0.0005

*Sangrovit (Phytobiotics Futterzusatzstoffe GmbH, Germany)

Table 1. Production results of pigs fed with or without IQ supplementation (SPC analysis).

The overall results of the study are shown in Table 1. Analysis of the large dataset detected effects of the dietary intervention with IQ supplementation on various parameters.

While feed intake and mortality did not differ between control and test batches, a 4% increase in weight gain and a 5% reduction in FCR were detected with a high level of significance. Furthermore, there was a significant reduction in medication cost. This is the first study evaluating the effects of IQ supplementation on a commercial scale with sophisticated statistical analysis.

Based on this data the production process was improved through significantly increased weight gain, lower FCR and €0.44 per pig less in medication cost to treat digestive or respiratory diseases.

Overall IQ supplementation resulted in a net saving of €3.39 per finishing pig, hence representing a powerful tool to improve process efficiency in commercial pork production. Moreover, a reduction in medication cost may reflect an improved overall health condition and adds to animal welfare.

Conclusions

Evaluating the impact of dietary interventions requires sophisticated statistical analysis tools to detect true effects of that intervention.

In the present study, improved production parameters and a reduction in medication expenses were detected when plant-based IQ supplementation was introduced into the diets. ■

References are available from the authors upon request