

Phytogenics: how to improve pig production efficiency with plants

A modern swine production unit aims to optimise animal performance and generate income and profitability as any other economic activity. In recent months, practically all feed ingredients have suffered a massive increase in their prices, causing economic issues to the short and long term of pig production. As feed represents between 60-70% of the total cost to produce a pig, producers need to review what can be done to control costs and mitigate losses.

by **Sandra Chamusco,**
Global Technical Manager Swine,
Delacon, Austria.
www.delacon.com

Several management decisions can be immediately undertaken to reduce feed costs, like lowering the slaughter weight, implementing multi-phase feeding programmes, and changing to pelleted feed. These are good examples of what can be done to positively impact feed efficiency and save feed costs. Looking at the feed conversion ratio (FCR) as the kilogram of feed consumed to produce one kilogram of body gain, we can see how it is directly linked to the feed costs per kg of body weight gain or raised pig. From a practical perspective, there are two possible ways to improve the FCR:

- **Less feed for the same weight gain**
 The first approach is to provide less feed to

the animals. However, this alternative can be somewhat risky as it may damage performance, impairing animal growth. To be effective, it is suggested that the nutritional content of the diet is changed. Pig feed intake is related to the energy level of the diet. By increasing the energy level per kg of feed, the animal's energy requirement will be fulfilled with less ingested feed.

This seems simple and effective, but, as the nutritionist increases the dietary energy concentration, all other nutrients will have to grow too, lysine and all amino acids in ratio with lysine, minerals, etc.

Care should be taken to ensure that a reduced feed intake is still sufficient to meet all the nutritional needs of the animals for maintenance and growth based on their potential (the needs of the animals are expressed as quantities of each nutrient per day according to genetics, sex and production phase/weight).

The hard reality is that a dietary nutritional concentration is expensive, the cost per kg of feed increases, and most of the time, even if a reduced FCR is achieved, the feed costs per pig stay the same or are even higher.

- **Same feed and more weight gain**
 The second option assumes that for the same feed intake, more body weight gain can be generated. It is doubtful that animals enhance body weight gain just because it is needed. Sometimes, the animals' growth potential is limited by compromising factors, like sanitary conditions, environment, density, or other constraints.

So special attention should be given to



those factors to provide the pigs with the best conditions to perform. When those limitations are already removed and are non-existent, the growth potential of pigs can be better exploited. Still, producers can use available scientifically proven solutions to improve pig growth, optimise feed efficiency and reduce feeding costs.

Make the change happen

Phytogenic feed additives are well known for their beneficial effects on animals, from flavouring and sensorial stimulation, antioxidant, anti-inflammatory, and antimicrobial properties. Also, specific natural plant bio-actives can exert a 'growth-promoting' effect by positively influencing the gastrointestinal tract morphology and physiology and, most likely, stimulating or inhibiting particular metabolic pathways.

This last effect is under the scope of recent and future scientific research. Phytogenic compounds can positively impact how the feed ingredients are digested to nutrients, absorbed, and used by animal metabolism.

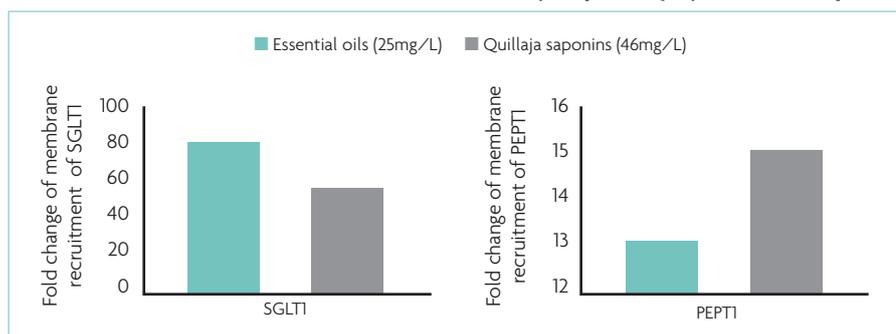
Feed efficiency is no more than the expression of the capacity of the animal to transform the ingested ingredients into body mass gain. In the pathway, some processes like ingestion, digestion, and absorption affect the efficiency rate.

Specific and chosen phytogenic compounds exert a stimulatory action on the secretion of the animal's digestive endogenous enzymes and, at the same time, slightly reduce the digesta transit time. Both effects allow more enzymatic action on the ingredients, breaking them down to nutrients and a little more time is available for the enzymatic processes to be more effective.

The intestinal cell layer is guarded in its

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Fig. 1. Fold change of membrane recruitment of SGLT1 and PEPT1 due to the incubation of Caco-2 cells with an essential oil blend and Quillaja saponins (Reyer et al., 2017).



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morphology and physiology by the antioxidant and anti-inflammatory properties of the plant compounds, reflected in preserved and functional absorptive enterocytes.

In addition, and highly relevant, a study with in vitro cell models using Caco-2 cells has demonstrated the effect of essential oils and saponins on the recruitment of nutrient transporters like the peptide transporter 1 (PEPT1) and the sodium-glucose transporter (SGLT1).

In summary, more nutrients in the intestinal lumen can be absorbed by functional enterocytes, which express more nutrient transporters, allowing extra nutrient uptake and further metabolisation.

It is clear that the improved feed efficiency induced by the phytogenic actives, with the same amount of feed/ingredients ingested, will generate a different outcome.

Firstly, more nutrients are available, uptaken and metabolised, and then improved body mass accretion (growth) in the case of growing/finishing pigs, improved body mass accretion (growth).

Use nature to save on feed costs

Adding Delacon's selected plant bio-actives to growing/finishing pigs' existing diet improves feed efficiency and FCR, hence the

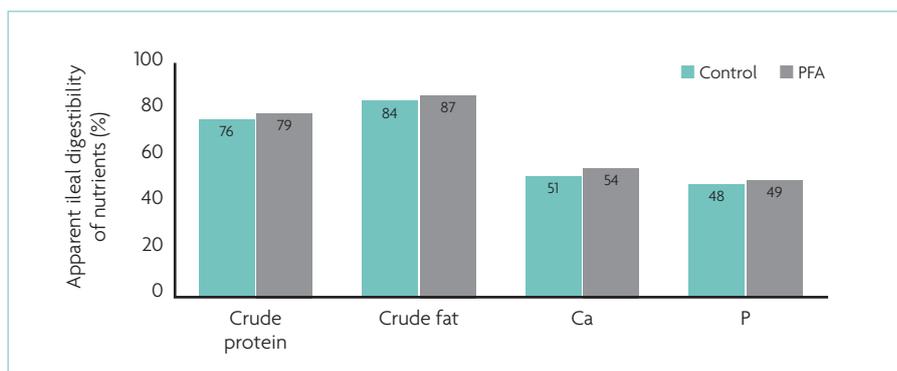


Fig. 2. The phytogenic feed additive (PFA) effect on the apparent ileal digestibility of nutrients, measured in pigs of 50kg (Delacon trial).

animals respond with higher performance. Consequently, the feed costs per kg body weight gain are reduced.

In specific scenarios, for example when diet ingredient prices are high, impacting feed price directly, causing cash flow and even profitability losses to producers, vital measures should be taken.

For all situations where feed price reduction is the target, Delacon developed the Performizer solution by which feeding costs are immediately reduced, maintaining the same animal performance.

The Performizer solution is based on the results of ileal nutrient digestibility studies. In these studies, the diet's nutrient

digestibility is measured and compared, allowing a quantification of the feed efficiency generated when the phytogenic solution is added to a diet.

Those nutrient digestibility enhancements are transposed to nutrient matrix values and applied on least-cost feed optimisation (formulation). The Performizer solution is a safe and very convenient tool that, when applied to least-cost feed formulation/optimisation, can produce an immediate saving on feed costs. ■

References are available
from the author on request