Intestinal health, environmental protection and lowering feed cost

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The global pig industry is under extreme and growing pressure caused by price increases in raw materials for feed. At the same time, increasing demands in the area of environmental protection and clean air are threatening the sustainability of high welfare production and processing.

Even temporary relief in the market due to declining feed prices after a good grain harvest or higher payout rates for slaughtered pigs for a limited duration, should not lead pig producers to a wrong assessment of the situation.

Feed price increases are a global phenomenon driven by global factors. Feed cost represents the biggest single cost in pig production.

Currently, it amounts to more than 45% – costs that are unsustainable to pig producers. Therefore, the aim is to decrease feed cost while increasing efficiencies. This improvement can be attained in different ways. Of course feed and farm management are at the top of the list.

During times of high feed costs the savings potential by the improvement of feed utilisation is even more important. For example, optimising feed conversion by 0.1 with feed cost of €300/t will yield a benefit of 3.0 Eurocents per kg weight gain.

With rising raw material expenses, it is understandable that in order to save costs the rations are divested of 'unnecessary extras'. Naturally, it is important to reconsider inputs but these must be reviewed in terms of their efficiency. The question is: Are the additives currently used cost effective?

To demonstrate, 1% less protein and a reduction of lysine by 0.05% in the diet will yield a saving of between €6.0-7.5 per tonne of feed but in the worse case scenario this translates into a reduction of daily gain of approximately 12g and therefore €1/pig.

Otherwise, it is well known that reduction of 2% crude protein by fattening will reduce nitrogen excretion by 20%.

One may ask if such a reduction (or perhaps even greater reductions) in crude protein can be achieved without decreasing performance? Indisputably the key lies in optimising the digestive process.

Numerous research results are available for phytase, enzyme preparations and probiotic feed additives.

Occasionally it makes absolute sense to reflect on what has been done for centuries in human nutrition to make food more digestible – use spices! Would it be possible to ascribe this activity to animal nutrition and would it be possible to standardise such spice mixtures?

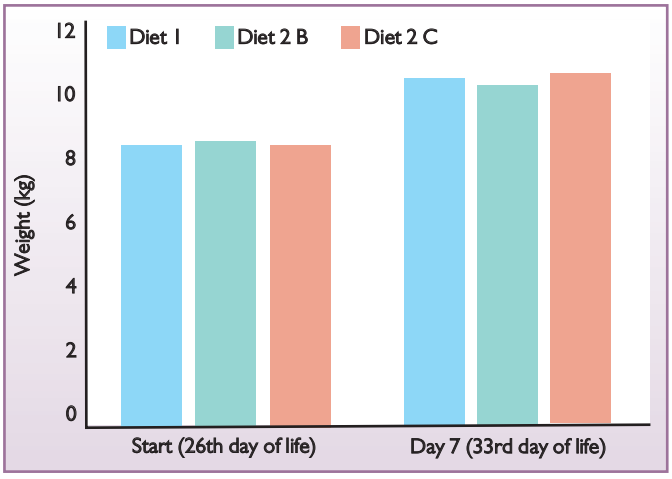

Fig. 1. The influence of digestarom on the development of live weight.

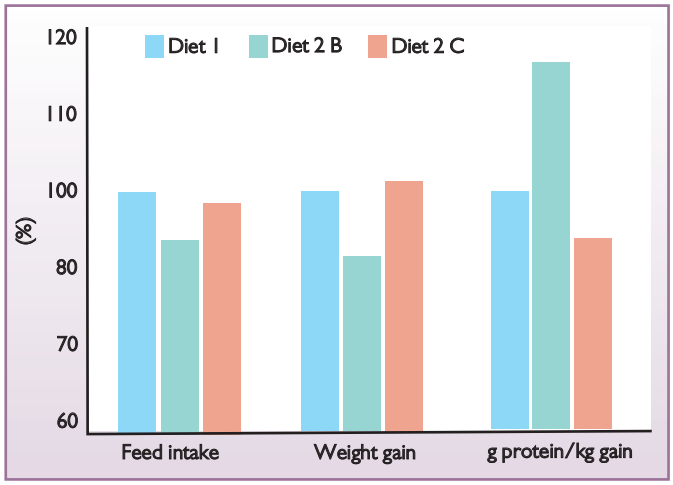

Fig. 2. The influence of digestarom on feed intake, weight gain and protein utilisation.

Both questions have been answered, The most efficient feed additives today are the so called phytogenic (plant based) feed additives. One of the leading producers of phytogenic feed additives is Micro-Plus in Germany. With its background in the field of sensorial additives and its capacity to create original and effective formulations, the company has conducted more than 290 scientific trials with the product range digestarom.

The main objectives of these trials included zoo-technical parameters (growth and feed conversion), animal health (reduction of mortality), use of less digestible feed components, research in the area of immune response and extensive metabolism studies (ileal digestibility of nutrients and amino acids) with supplemental microbiological research on different sections of the intestine.

Additional studies included the impact on meat quality and reduction of NH3 emissions. The following is a brief synopsis of selected research results. The influence of the phytogenic feed additive digestarom on the digestibility of the raw materials used was observed in a trial with modified diets for weaning piglets (see Table 1). The difference between both base diets was in the choice of protein sources.

Therefore, diet 1 contained high-digestible components (soya, fish meal and blood meal), whereas diet 2 was based on low digestible components (lupines and oilseed rape).

In the version C digestarom was applied. The resulting differences in energy and nutrients between diet 1 and diet 2 were not balanced.

Result

To illustrate the effect, a specific period was chosen between the 26th and 33rd day of life, during which time the body's own enzyme production is not yet fully developed. Fig. 1 shows the development of live weight for the piglets within the different groups.

The effects are clear when comparing feed intake, growth, and protein expenditure per kg growth during the trial period in relative numbers (Control group A = 100%), as is represented by Fig. 2.

In comparing Group B to Group A, a significant dietary effect is observed in reference to growth and feed intake. The lower growth is in essence as a result of lower feed

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intake. Feed intake is readjusted by gastrointestinal and metabolic satiation signals in conjunction with the quality of available digestive enzymes. In direct comparison to Group B, Group C has a higher feed intake, thus better development of body mass. This indicates that hindrance of the gastrointestinal and metabolic satiation signals, which led to regression of feed intake in Group B, was suspended by the use of 300g per t digestarom Piglet, Premium in Group C.

This effect is clearly in evidence when comparing the feed conversion ratios (FCR). Group B showed a FCR of 1:1.60, while Group C demonstrated a FCR of 1:1.19.

Of particular interest is how digestarom effects the utilisation of nutrients, especially of proteins. The digestarom groups clearly showed a tendency towards better utilisation of proteins in the feedstuff. The higher growth in group C, with lower protein consumption is a clear indication of stronger enzyme activity. As indicated by the trial, using digestarom Piglet, Premium has, amongst other things, improved growth rate and optimised FCR as a result of higher metabolic protein transfer. In the meantime, reproducing these effects is the theme for further examinations. There are still unpublished results from university trials on the effect of digestarom Piglet, Premium and the significant increase in ileal digestibility of crude protein and all essential amino acids with 66 day old piglets. This effect was also observed for other crude nutrients and minerals. The conclusion can be drawn that with the beneficial aspects of digestarom Piglet, Premium less expensive components with low protein content (i.e. less digestible components) can be used in the diets. The results yield better profit and ecological balance.

In a trial with fattening pigs a 6.7% increase in growth performance and concurrently better protein utilisation was noted (see Fig. 3).

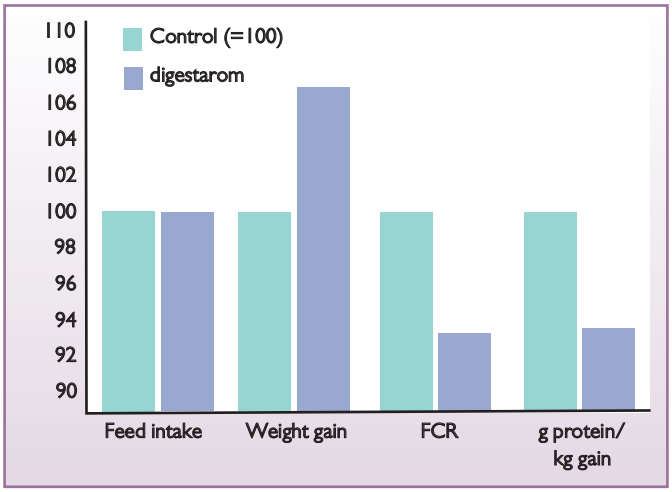

Fig. 3. Relation feed intake/growth/protein utilisation.

Table 1. Analyses of diets.

	ME (kcal/kg)	Crude protein (%)	Crude fat (%)	Lysine (%)	Methionine (%)	MEQ/kg
Diet 1	3597	23.10	6.66	1.52	0.46	606.51
Diet 2 (version B+C)	3406	20.65	3.80	1.03	0.39	653.77
Difference diet 2 – 1 (%)	-5.3	-10.6	-42.9	-14.5	-15.2	+7.8

Important highlights

- Nutrient digestibility of the diet is improved by 5%.
- Concurrent improvement in feed efficiency of approximately 5%.
- By optimisation of the digestion process the energy content (ME) of the feed can be lowered by about 0.2 MJ/48 kcal without performance losses.
- Concurrent reduction of diarrhoea problems is observed with piglets (less undigested food in the intestines equals less 'feed' for harmful bacteria).
- Reduction of manure production through better utilisation and consequently lower emissions.
- A return on investment of 1:10 is a very good cost benefit ratio for the use of digestarom for piglets and fattening pigs. ■