



Feeding the piglets with best performances: Focus on “Healthy Growth”

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The post weaning phase is a critical period in the piglets' life as many changes are happening at that time. First the change from milk to solid feed requires optimum nutrition to enable acceptable growth. Second the management of the piglets has also to be fine tuned, especially today as the high prolificacy of the modern sow results in lower birth weight and weaning weight. Third the post weaning stage is the time of most intestinal disorders. The immunity of the piglet needs to develop as the passive protection from the sow's immunoglobulin is fading away and viral, bacterial and parasitic infections are at their highest risk.

Additionally external factors have to be considered to best formulate piglet diets. Antibiotic growth promoters cannot be used to cover up a slightly inadequate diet formulation. In many European countries there is a strong pressure on the reduction of antibiotic treatments via veterinary prescriptions. Non antibiotic solutions to prevent gut health issues – like high levels of zinc oxide - can no longer be used in most EU countries as ecological concerns on the residues of zinc and copper have lead to a drastic reduction of the authorized levels in feed. All these parameters need to be considered when formulating the most adequate diets for the 2 months following weaning, with the two following goals: ensure **growth** (and to lesser extend feed conversion rate) while securing **intestinal health**.

DSM Nutritional Products has developed VevoStart, a nutritional concept to best manage the weaning stage. This feed program has the following main characteristics and aims:

1. Maintain intestinal health
2. Ensure high nutrient digestibility
3. Promote the appetite of the piglet
4. Reach adequate growth

1. Maintain intestinal health

Gut Health is a prerequisite to ensure digestibility of the feed, achieve the optimal intake and realize good growth during the post weaning phase. Our VevoStart program relies on optimal feed formulation to reduce the amount of undigested nutrients which are reaching the large intestine and might trigger an uncontrollable development of pathogenic microorganisms. Further, the VevoStart concept includes the use of specific feed additives to reduce the presence of potentially harmful bacteria.

One of the cornerstones of the concept is called VevoVital (benzoic acid, EU 4d210), an organic acid which cannot be used as a direct energy source by the piglet, but has proven beneficial effects on protecting gut health. The major explanation for this specific impact on gut health is thought to be related to the molecular structure of benzoic acid, as well as to the fact that this organic acid is nearly water insoluble. VevoVital is the most effective organic acid in vitro against E. coli, a bacterium which is always involved in post weaning diarrhoea as primary or secondary causing agent. The use of VevoVital has been associated with a significant reduction of the E. coli population throughout the whole gastro-intestinal tract. In several scientific piglet trials it was shown that the number of antibiotic treatments dropped between 50 and 90 % when VevoVital is included in the feed.

The impact of VevoVital on intestinal health can be increased by adding a specific blend of essential oil compounds (CRINA) to the piglet feed. Phenolic compounds like thymol, eugenol and curcumin have shown beneficial effects on gut health as well as on performances. They are thought to increase the antimicrobial activity of benzoic acid by affecting specific cell wall compounds of several pathogenic bacteria in the gut.

In order to assure intestinal health, it is impossible to control the bad bacteria without stimulating the good ones. A protected formulation of lactic acid producing bacteria is added to the feed. CYLACTIN is a very effective Enterococcus faecium probiotic with a quick onset and a high reproduction rate; it ensures a more balanced micro flora with a reduction of the incidence of diarrhoea and piglet mortality. Furthermore it has as well a positive impact by stimulating the piglets' immunity. Both vitamin E (100 – 150 mg/kg feed) and vitamin C (100 mg/kg) are known to play a major role in the immunity system of the weaned piglet. All other vitamins are added according to DSM's OVN standards (Optimum Vitamin Nutrition).

2. Ensure a high nutrient digestibility

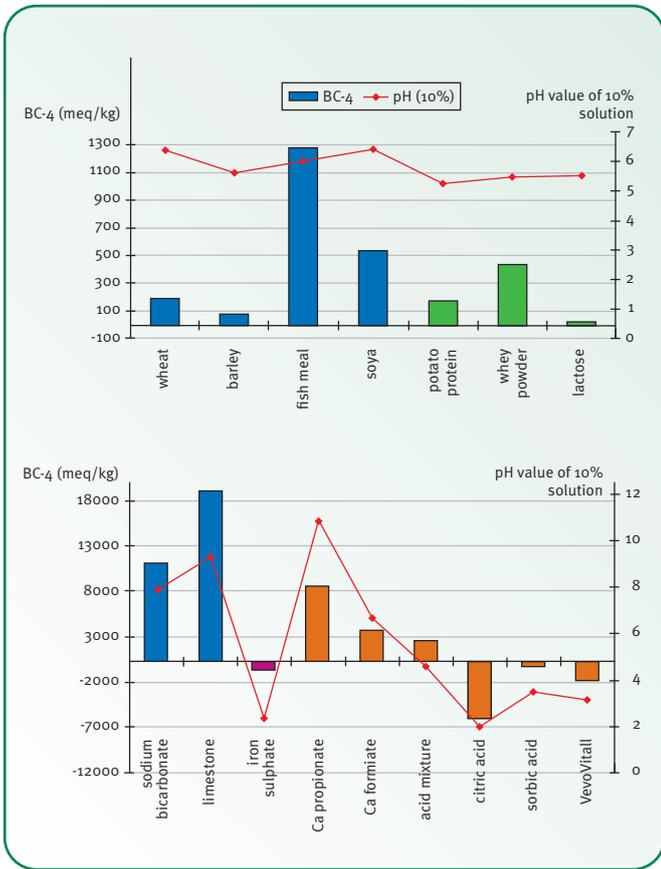
The impact of several feed additives - like VevoVital and other organic acids - not only depends on the level of inclusion, but also on the buffering capacity of the feed. This is also called the acid-binding-capacity of the feed.

The newly weaned piglet produces insufficient HCl in order to maintain a low pH level in the stomach and to ensure an optimal activation of the pepsin activity (the enzyme digesting proteins) while ensuring a control of the pathogenic bacteria. A low buffering capacity of the piglet feed is key to increase protein digestion.

The buffering capacity (BC-4) of feed ingredients and complete feeds can be analyzed in the lab (at pH = 4) and is known for all ingredients of the VevoStart concept. This parameter is used as a nutrient in feed formulation. Too high as well as too low BC-4 values need to be prevented as they might result in adverse zootechnical effects.

It was found out that selected feed ingredients play an important role (Graph 1):

- ✓ Organic acids decrease the BC-4 value of the feed.
- ✓ Some mineral products are key contributors, especially limestone (calcium carbonate) and dicalcium phosphate. This is why we are formulating weaner diet to low calcium content. Decreasing the limestone content of the feed has a huge impact on the buffering capacity of the feed without negatively impacting zoo-technical performances. This is only possible when using the right combination of organic acids, minerals and microbial phytase.
- ✓ Most protein sources increase the buffering capacity of the feed: fishmeal, soybean meal. More digestible proteins (like potato protein, wheat gluten, corn gluten...) have a low buffering capacity and therefore are highly recommended in weaner piglet feeds



Graph 1: Buffering capacity (BC-4) of feed ingredients and feed additives

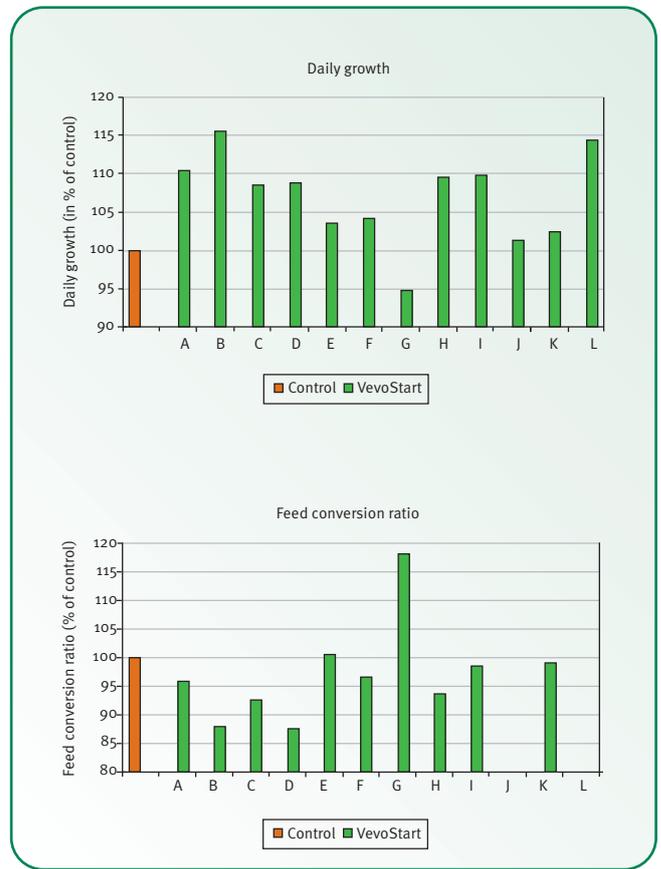
Further, a high nutrient digestibility is not only affected by the right choice of raw materials, but also by enzyme supplementation. Both microbial phytase (Ronozyme NP) and NSP-enzymes (Ronozyme WX) contribute to a high nutrient digestibility.

3. Promote feed intake

Feed intake around weaning ensures the success of weaning healthy piglets. Special care is therefore taken in the selection of raw materials to ensure that the piglet ration is highly palatable. A minimum level of lactose and other palatable feed ingredients and additives are included to enhance feed intake. For instance we are using organic acids (like citric acid...) and a formulation of essential oil compounds (CRINA) to promote intake. The use of heat treated cereals is also recommended in case of weaning very young piglets.

4. Reach adequate growth

In order to reach good performances of the piglets, the digestible amino acid profile should be optimized as we strongly limit the total protein level in order to limit the presence of undigested nutrients in the large intestine. We are therefore formulating not only on digestible lysine, but as well on sulphur amino acids (methionine and cystin), tryptophane, threonine and more recently also on valine.



Graph 2: Performance trials with VevoStart

These formulation techniques (buffering capacity, low protein, selected raw materials) as well as the use of effective zootechanical additives contribute to an improvement of the piglet growth and health in controlled trials carried out in partnership with eg. the University of Leuven, but as well in most of the test that our customers are conducting (Graph 2).

Conclusion:

VevoStart is the modern concept to optimise weaning nutrition and ensure growth while securing intestinal health ...
With DSM Quality Standards!