

Fighting feed neophobia in the challenge to reduce weaning disorders

Weaning is the most stressful period in a piglet's life which makes this one of the most challenging phases for the farmer. As the industry faces continued pressure to reduce the use of antimicrobials, this is even more challenging. Weaning diarrhoea is a common threat, but luckily the cause is obvious.

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With the sow, piglets have an average feed intake of about 250g of dry matter per day (mainly from milk). In practice, the post-weaning feed intake in the first week is only 100g per day, and almost zero on the first day post-weaning.

Typically, the intestinal wall breaks down and renews completely every day, but without nutrition there is no energy for the build-up of enterocytes (gut cells), leading to erosion of digestive villi. The result is intestinal damage (Fig. 1).

Importance of the villi

As is known, the villi are needed to absorb all nutrients for growth. But there is another major function.

As 70% of immunity is located in the gut, the gut is by far the most important organ for an animal to remain healthy. It is the primary single-cell barrier between a bacterial environment and the body.

The enterocytes and the glue that holds them together (tight junctions) are like door keepers, they regulate the entry of nutrients while blocking the entry of microbes. When this line of defence is damaged, harmful pathogens have direct access to the bloodstream.

Health and performance of the animal are closely related to the proper functioning of this invisible world. Taking this into account, the primary cause of pre-weaning diarrhoea is obvious and so is the solution.

Maintaining a normal feed intake

level is an important key to prevent intestinal damage.

Of course, the effect of stress and diet composition should not be underestimated either, nevertheless there is a direct relation between feed intake and villi length (=gut health, Fig. 2).

Diet composition and taste

Nowadays, using a creep feed before weaning is well accepted practice. Feeding a creep feed is necessary for the development of the intestines and recognition of dry feed. We all know it should be fed from an early

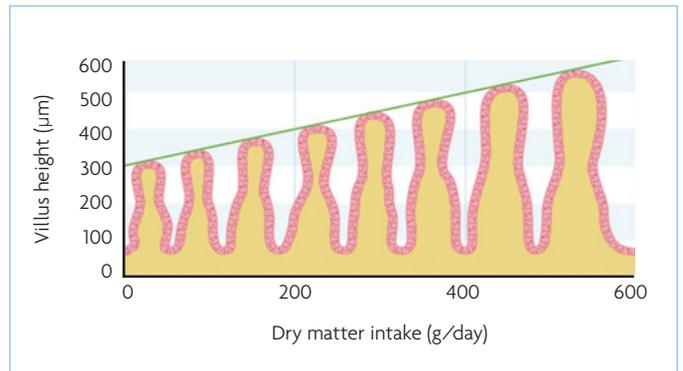
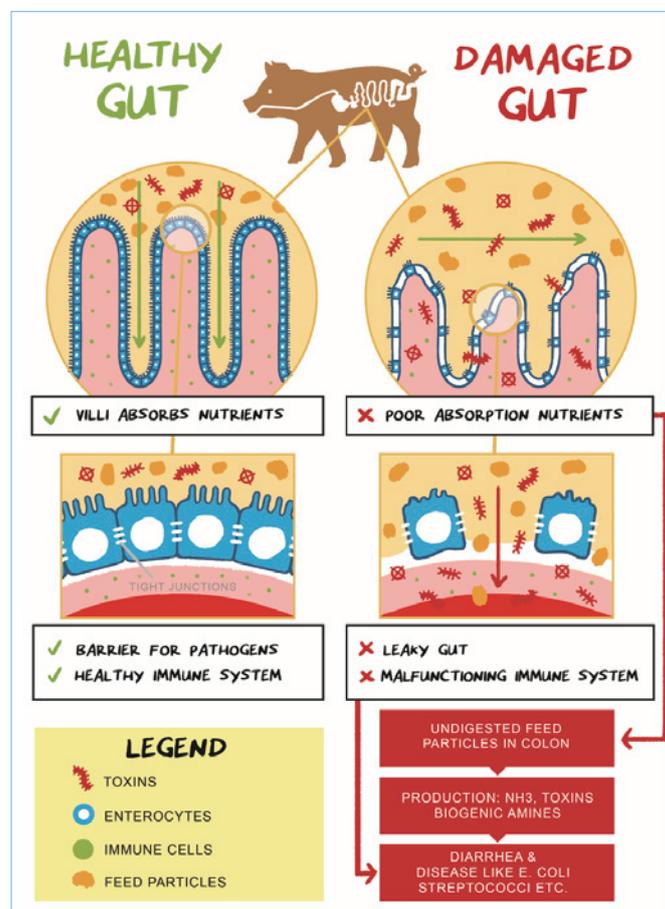


Fig. 2. A higher daily dry matter intake results in longer, more developed villi (derived from Pluske et al, 2011).

Fig. 1. A healthy gut results in good absorption of nutrients and a functional barrier function. Wider tight junctions (leaky gut) allow bacteria and toxins to translocate by entering into the bloodstream.



age, from five days, and provided in small and fresh amounts, several times a day in a clean and light bowl placed close to the sow's head. But what about the composition?

The new-born piglet is enzymatically equipped to digest milk and has to 'learn' how to digest plant starch and proteins. As amylase and pepsin are not expressed at birth and increase very slowly when a piglet gets older, the piglet feed offered should provide an optimal balance of lactose and plant material.

Moreover, the vegetable ingredients should be highly digestible. Since a piglet's ability to digest plant material is still underdeveloped, the risk of having undigested ingredients in the hind gut is even higher.

With an established and stable microflora in the large intestine of older animals, this can be controlled by the gut itself. But a young piglet is still struggling to find a balance and an influx of undigested nutrients will upset the balance and cause toxin producing bacteria to grow to the maximum.

Needless to say, creep feed should be attractive to boost feed intake. The pig has an extremely complex and developed sense of taste.

Both tongue and nose, which are essential to determine the taste of feed. Among mammals, pigs have some of the highest number of taste

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buds on their tongue (3-4 times more than humans), and an exceptional sense of smell, resulting in an extreme sensitivity for taste preference. But there is more: in recent years the field of taste has experienced a sudden twist due to the presence of taste receptors not only in the oral cavity but also in the gastro-intestinal tract.

Feed intake is also regulated in the gut, via enter-endocrine cells that recognise sweeteners and carbohydrates.

These receptors detect and control the release of hormones which regulate, among others, digestion of nutrients, but also feed intake via glucose absorption through the lingual-pancreatic loop.

So nutrient sensing and the cross-talk between tongue, nose, gut and brain play significant roles in how much the piglet eats.

Looking at nature, some plants have defence mechanisms to prevent them from being eaten. One of the preferred strategies across plant species is related to a bitter taste.

This so-called chemosensory system has not yet been widely implemented in farming, assuming animals eat whatever is in front of them. Knowing this, is it not strange that we formulate the smallest nutrients with three decimals, but do not consider whether or not the feed is attractive for the animal?

Start in the uterus

Young animals can learn to eat when they are still in their mother's uterus. A foetus exposed to an odorant or aroma in the uterus via maternal ingestion affects later infantile responses to the same stimuli.

In other words, when feeding a specific flavour to the mother, the offspring will be more attracted by this flavour and also eat more feed with this flavour postnatal.

This concept of vertical imprinting can be used in swine production, in order to reduce feed neophobia in

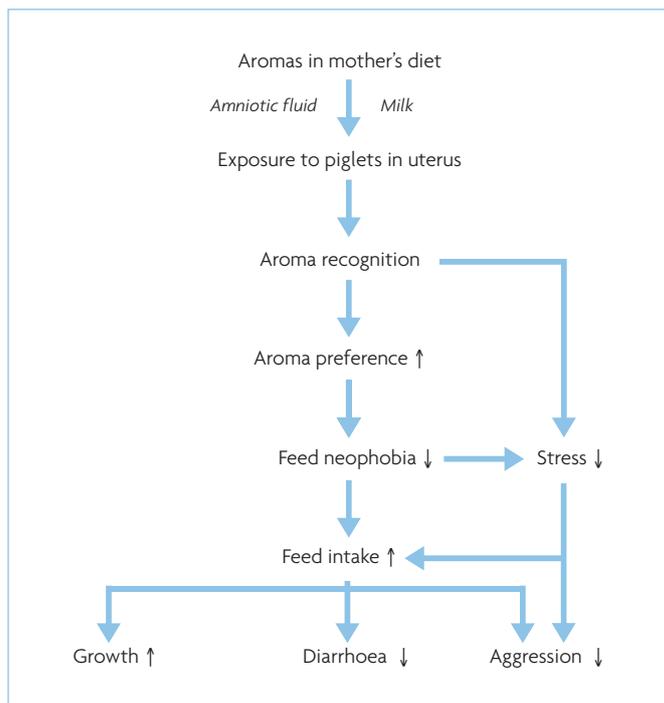
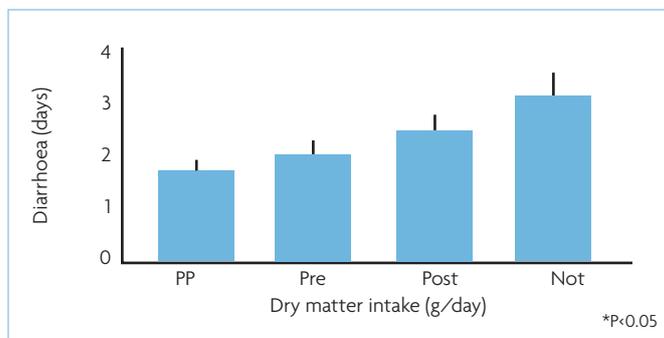


Fig. 3. Flow chart showing the effect of aroma in a sow diet on piglet performance (Oostindjer et al, 2010).

piglets. For the greatest effect, a flavour should be combined with an aroma.

When feeding a flavour-aroma combination to sows in (pre)lactation, the aromas are

Fig. 4. Number of days with diarrhoea during the first 14 days post-weaning for piglets that were exposed to the flavour both pre- and post-farrowing (PP), pre-farrowing (pre), post-farrowing (post) or never (not) (Oostindjer et al, 2010).



transmitted to the piglets via the amniotic fluid (pre-lactation) and the milk (lactation).

These are recognised by the piglets when offering them creep or weaning feed with the same combination. Piglets that were exposed to the flavour-aroma combination before birth showed a higher feed intake and growth in the first days after weaning, a lower diarrhoea occurrence and less aggressive behaviour (Fig. 3).

A combined pre- and post-farrowing exposure to the sows has a synergistic positive effect on diarrhoea incidence after weaning (Fig. 4).

Improved product

Joosten has applied this science in the improved Delac Dulce. New formula Delac Dulce – The Next Generation has been updated based on new research and animal trials, but also the latest input from nutrition experts and customer feedback.

Delac Dulce boosts feed intake in both piglets and sows. This results in sows producing more milk for their piglets. Moreover, the aroma is transferred through the uterus and the milk to the piglets. This makes Delac Dulce a familiar and stable factor in the dramatically changing environment from uterus to weaning section.

Delac Dulce creates a complete sensory experience by stimulation of olfactory receptors in the nose, gustatory receptors in the mouth, and activation of receptors in the gut.

The unique aroma, improved formula and the extended application of the product give the ultimate taste experience and provide recognition throughout the piglet's life, for an optimal weaning process. ■

References are available from the author on request