Managing the digestive welfare of piglets thanks to algae

Digestive troubles represent the main cause of piglet mortality and an almost systematic use of antibiotics. However, more and more countries have been in the process of reducing antibiotic use in animal production for several years.

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To accomplish this objective, the pig sector is implementing management, biosecurity and immunity support measures. Moreover, farms and veterinarians are relying on the use of natural products to help the management of some pathologies, leaving the use of antimicrobials in a preventive way in the past.

Global approach

In pig production, one of the most important challenges is the control of digestive troubles, both in maternity units and in weaned piglets. It is common for piglets to suffer from these problems given their physiological and immunological fragility, which is associated with stress and changes in diet and environment.

Consequently, these processes can cause a strong economic impact (reduction of growth, rise in mortalities and bad image). In fact, diarrhoea is a multifactorial syndrome. Factors such as temperature, humidity, air quality, ventilation and stress increase the risk and gravity of diarrhoea.

In addition to these parameters, pathogens are sometime the key factors. The ethology of the digestive troubles is very variable. In fact, when it appears, it is often associated with complex enteric problems where bacteria, virus, parasites and even toxins can be involved.

E. coli is the most well-known agent for causing diarrhoea, but it is finally occurring in only a few cases.

Several studies have demonstrated that enterococcus and clostridium are the most responsible. It is known that each farm has its own sanitary status, including different pathogens and this can change within a short time due to a lot of factors. For example, the piglet microbiota changes every six hours in neonatal piglets (one week of age).

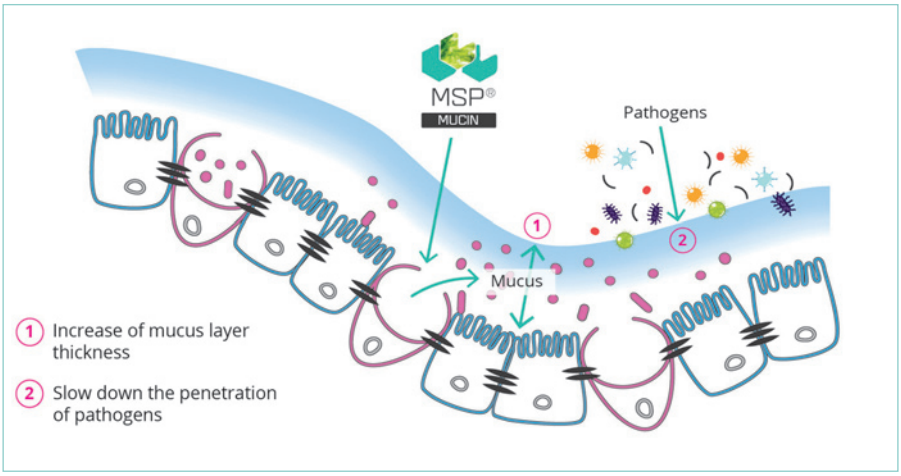


Fig. 1. Mucin restores epithelium integrity and improves the protection against pathogens.

The farm is a living entity, subject to changes at any moment. Consequently, antibiotic treatments are not always totally efficient. Moreover, vaccines can not cover all the pathogens. This means that the biosecurity measures take on special importance and products with a large spectrum of action are essential.

In this context, Olmix has developed a piglet digestive welfare range (SeaGut Paste, SeaGut Powder and SeaBiota), at the heart of the global 'Antibiotic Free Thanks to Algae Program' for pigs.

This programme is adapted to each farm, in order to achieve an effective reduction in the use of antibiotics, but also zinc oxide, both in maternity and at post-weaning.

In fact, the use of zinc oxide in feed at therapeutic doses (high doses) is ending in a lot of countries, for example it is scheduled to end in France in January 2021.

The range combines several innovative technologies developed by Olmix. First, all products are based on MSPMUCIN, an ingredient based on the green marine algae Ulva.sp and developed by Olmix through its algae biorefinery patented process to improve gut health. The other components result from the capacity of Olmix to specifically process clays to improve their physical properties or zinc to potentiate its efficacy. Both also improve gut health.

Algae extract: MSPMUCIN

The protection of the intestinal mucosa is a key point for piglet digestive welfare. Intestinal mucins are large glycoproteins secreted by goblet cells in the intestine. They constitute the mucus gel that coats the intestinal epithelium and protects it.

The mucus layer prevents the attachment and colonisation of bacteria on the mucosa and limits the intestinal absorption of toxins.

Therefore, stimulating the production of mucin in order to protect the intestine turns out to be a relevant strategy to support the intestinal development of young piglets and to reduce digestive troubles. Algae extract (MSPMUCIN) has demonstrated its capacity to increase mucin secretion by goblet cells through the stimulation of several mucin producing genes in intestinal cells. Mucin restores epithelium integrity and improves the protection against pathogens (Fig. 1).

Micronised montmorillonite

Micronised montmorillonite clay is issued from Olmix soft grinding technology preserving the layered structure of

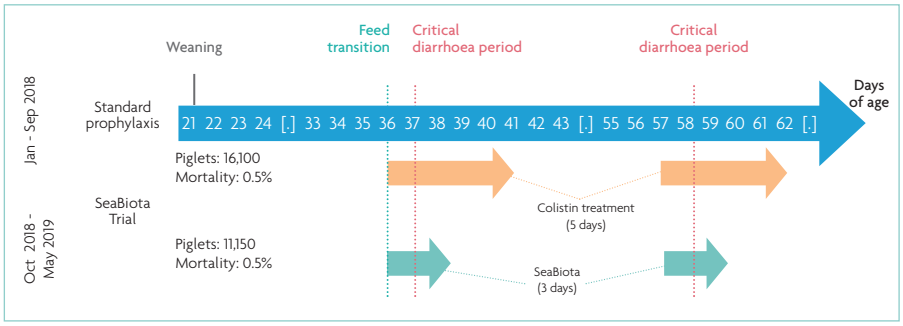


Fig. 2. SeaBiota optimises intestinal welfare and thus the management of digestive troubles while decreasing the supply of antibiotics. Substitution of two antibiotic treatment periods of five days (colistin) at two crucial periods, first age to second age and during transfer in fattening by two treatments of three days with SeaBiota (1ml/10kg LW). The ADG and FCR were not impacted by this substitution.

montmorillonite and increasing its contact surface and thus its adsorption and swelling properties.

Micronised montmorillonite clay can adhere to the intestinal epithelium, physically strengthening the mucus layer protection.

It also increases the water holding capacity which reduces dehydration of the piglets and helps them to recover.

Montmorillonite also has the capacity to adsorb toxins as endotoxins, exotoxins or mycotoxins. The presence of MSPMUCIN, with micronised montmorillonite reinforces the mucosa barrier effect in a synergistic way.

Specific Zn technology

The effectiveness of zinc oxide is recognised to manage digestive disorders. However, to be efficient the inclusion level is generally very high and often above the limit of 150ppm authorised by European legislation. In addition, standard zinc oxide is insoluble in water.

That is why Olmix has developed a potentiated zinc, thanks to a dedicated technological micronisation process enabling the potential contact area to be increased. This technology makes it dispersible in the water and optimises its efficacy (the MIC towards E. coli is 75 times lower than the standard ZnO). Consequently, it can be incorporated at levels that remain below the regulatory threshold.

Those ingredients can act in synergy for optimum efficacy to manage digestive troubles throughout the life of the pigs, from birth until the growing phase. They compose Seagut Paste, Seagut Powder and SeaBiota that can be implemented in farms through strategic and integral plans to handle the most critical moments of the pig's cycle.

Optimise digestive welfare

● **SeaGut Paste** has been developed to protect the digestive tract of piglets so they have fewer digestive troubles in the farrowing unit. It can be administered to the whole litter as soon as early digestive troubles appear or systematically with neonatal care in farms with recurrent problems.

Additionally to MSPMUCIN and micronised montmorillonite, it provides in a single and easy to use paste, selected essential oils (clove and oregano) and yeast extracts that favour the balance of the intestinal microflora and highly assimilated necessary elements for good protein, energy and physiological balance (dextrose and spirulina) and electrolytes to maintain homeostasis. A study done in Denmark on 115 litters showed the efficacy of SeaGut Paste to manage the neonatal diarrhoea in 88% of cases without use of antibiotics. Of the 88% cases, 60% received only one dose of SeaGut Paste and 40% received two doses (with one dose per day). The paste is easy to use and can be put directly in the mouth of the piglet thanks to its packaging: a pre-dosed airless tube or a cartridge with a dosing gun. Early identification of digestive troubles is essential.

● **SeaGut Powder** is a unique combination of three synergistic ingredients (MSPMUCIN, micronised montmorillonite and clinoptilolite). It is available in powder form and can be used to protect the intestinal tract and support development from the first week of life to weaning. SeaGut Powder helps to achieve a better intestinal maturation (especially in litters of gilts, which are more susceptible).

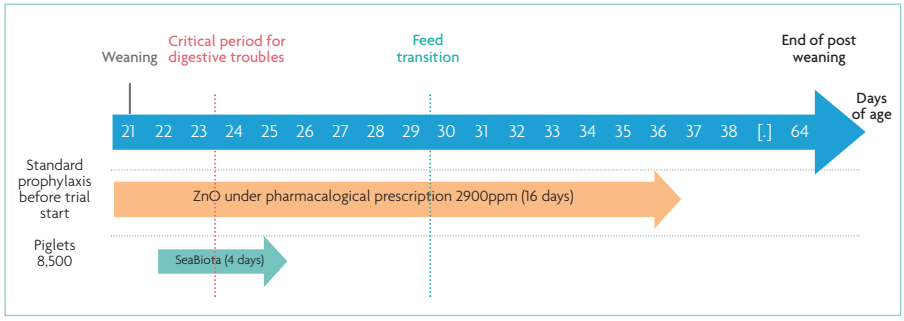
SeaGut Powder has been shown to improve intestine development (+9% of the villi surface) particularly in low daily weight gain piglets. Moreover, it reduces the occurrence of diarrhoea, as well as the use of medication (-56%). Piglets are healthier and get a higher weight at weaning (+200g).

● **SeaBiota**, for the control of digestive troubles in weaning and fattening, can be used easily in drinking water via a dosing pump. SeaBiota enables the digestive tract to be protected and favours a balanced gut flora. These actions are due to the MSPMUCIN, Olmix specific zinc and a blend of essentials oils (eugenol, carvacrol and thymol) selected for their synergistic effects on the promotion of intestinal well-being.

The results of a field study carried out in 13 French farms selected for their recurrent digestive troubles, and including more than 75 batches of piglets, showed that using SeaBiota optimises intestinal welfare and thus the management of digestive troubles, while decreasing the supply of antibiotics in 75% of the cases (Fig. 2).

In addition, a second study demonstrated that SeaBiota can represent a substitute for the classical use of a high level of zinc oxide when taking into account the critical periods of a piglet's life (Fig. 3). SeaBiota can be used in farms that have regular digestive problems at weaning and/or around critical periods, or occasional digestive problems.

Fig. 3. SeaBiota can represent a substitute to the classical use of high level of zinc oxide when taking into account the critical periods of a piglet's life. 8,500 piglets (21 batches), systematically received SeaBiota for four days at weaning. No digestive troubles were observed. A safe suppression of ZnO at pharmacological level can be applied by using SeaBiota.



In conclusion

The management of digestive troubles throughout the pig cycle, while reducing antibiotic usage is possible provided an integral program based on a global approach that relies on strong technical management support is implemented, together with the use of unique natural products based on innovative technologies, such as those developed by Olmix. ■