Enhancing performance and reducing medication costs

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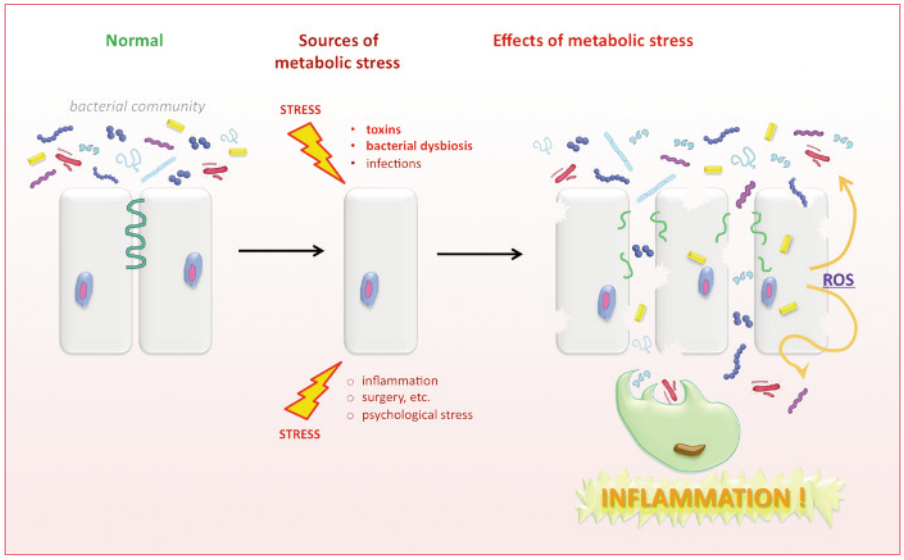

Modern animal production is known for its high genetic potential, which is often not able to be achieved due to different and complex challenges during their lifecycle. One of the critical points is situated at the border of the intestinal tube. This area carries an important responsibility in selecting what can be absorbed and what should remain outside the body of the animal.

To put this in the correct perspective, it needs to be stated that the surface of the intestinal tract is 300 times as big as the surface of the skin. At the same time, it should give the similar level of protection against invaders, while being highly permeable to absorb nutrients. Intestinal health pops up as a very popular term for one of the most important but one of the most complex actions related to animal nutrition.

When the use of Antibiotic Growth Promoters (AGP) gained in popularity in 1950, this was considered as a panacea, a universal remedy to improve (intestinal) health status, performance and economics on the farm. With increasing use of antibiotics in animal nutrition (of which 60-80% is used to treat intestinal disorders), in 1990, both scientist and public opinion opened the debate on increased bacterial resistance against antibiotics and its eventual transfer to humans. This milestone led to a full ban of AGPs from January 2006 and a significant reduction of antibiotic use in animal feed in many EU countries, followed by other countries in later years.

Intestinal microbiota

In order to obtain a high intestinal health status, in combination with a reduced use of antibiotics, it is first of all important to understand the intestinal system.

The intestinal barrier is composed of different types of cells of which the enterocytes are the most abundant ones. These enterocytes are cells which are 'bound' to each other by complex protein structures called 'tight junctions'.

The major task of this structure is to close the cell lines and to avoid paracellular passage of bacteria, toxins and other undesired substances from the lumen to the inside of the body.

Several stress factors will have a negative

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Fig. 1. Average daily gain (ADG) at 26-46 days.

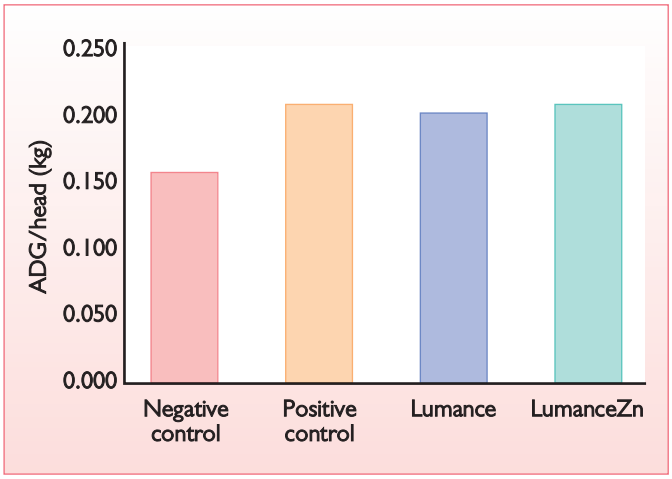
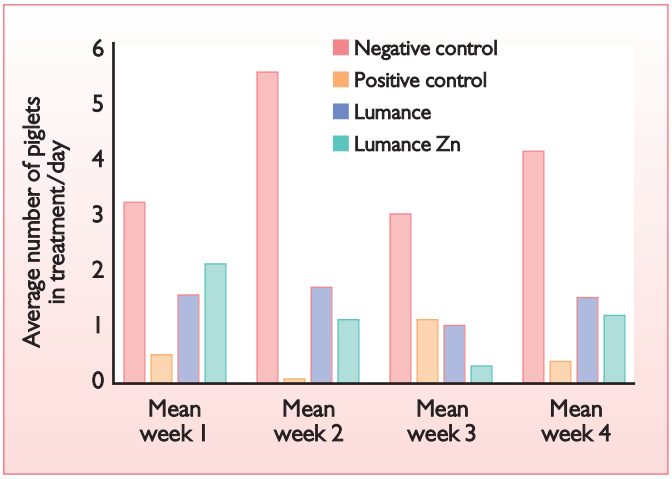


Fig. 2. Average number of piglets treated with enrofloxacin.



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impact on the quality of the tight junctions, leading to a 'leaking gut' syndrome by which large molecules, such as toxins and aggressive radicals, are able to pass in between, resulting in cell damage, production of 'Reactive Oxygen Species' (ROS) and activation of the immune system. The latter is automatically paired to the production of inflammatory cytokines.

The neutralisation of these inflammatory components will consume significant amounts of nutrients, which will be shown in reduced growth and increased feed conversion rates.

Although the mode of action of AGP has not yet been fully understood, there is evidence to believe that, besides regulation of the microflora, AGP also play an important role in reducing the level of inflammatory cytokines, which results in substantial energy saving and improved performance.

The intestinal microbiota is composed of more than 500 different species, which live in direct symbiosis with the host.

They provide energy to the intestinal wall, prevent colonisation by pathogenic bacteria and help to maintain the intestinal immune system. It has been demonstrated many times, that the status of the immune system is (partly) defined by the presence and the type of microbiota in the intestine.

Based on the above, we can conclude that a high status of intestinal health is based on a balanced microflora, strong tight junctions, healthy long and slender villi and low levels of ROS and inflammatory cytokines.

Synergistic approach

One can easily understand the complexity of the intestinal system. Many scientists and veterinarians agree that one single non-antibiotic molecule will have its limits in order to control the overall situation. Therefore Lumance proposes a concept and a synergistic approach to ensure a high intestinal health status.

Lumance is a complex combining slow release and protection technologies ensuring that acids, medium chain fatty acids, butyrate, essential oils, anti-inflammatory compounds and polyphenols are delivered in a gut active way for a powerful and effective antibacterial control, high quality tight junctions, neutralisation of the produced ROS and tempering of the inflammatory cytokine production.

In an Italian pig trial, a positive control (500ppm amoxicillin, 120ppm colistin and 3000ppm zinc oxide) was compared with a negative control (500ppm amoxicillin) and two treatments (500ppm amoxicillin + 1kg Lumance and 500ppm amoxicillin + 1kg Lumance Zn). Both treatments were more economical compared to the positive control. The negative control clearly demonstrated the challenge on the farm by reduced performance, high medication use and negative faecal scoring. Both Lumance and Lumance Zn were able to totally compensate for the loss in performance up to the same level as the positive control.

Antibiotic treatment was strongly reduced and faecal scoring was significantly improved compared to the negative control, for which Lumance Zn showed a slight advantage.

Lithuanian trials

On a university experimental farm in Lithuania, two groups of 200 piglets (Pietrain x Large White) were divided into two groups (Table 1). A control diet was compared to a treatment with 1.5kg/ton of Lumance from 30-60 days of age.

In a second trial, 300 finishing pigs (Pietrain x Large White) were divided into two groups following the same treatment from 70kg of live weight up to slaughter (Table 2).

In both the piglet and pig trial performance was improved in favour of the Lumance treatment, while a clear reduction was observed in gastro-intestinal disorders.

The high genetic potential of today's production animals, combined with a clear and inevitable tendency to reduce the use of antibiotics, resulting in an increased risk of enteric problems, is a complex situation to manage.

Obviously, a one single molecule approach is not dealing with all aspects of intestinal health management and will never be able to compete with conventional use of antibiotics. Lumance, being a synergistic concept, has been shown to be a valid alternative for reduced use of antibiotics. In addition, Lumance has proven to be a valid performance enhancer, even in the absence of an intestinal challenging situation. ■

Piglets	BW (kg) at start	BW (kg) at end	ADG (g)	Diagnosed cases of intestinal disorders
Control	10.4±1.35	18.4±0.86	266	18
Trial	10.5±1.58	19.2±0.97	290	6

Table 1. Above, piglet trial results.

Table 2. Below, the trial results for pigs.

Pigs	BW (kg) at start	BW (kg) at end	ADG (g)	Diagnosed cases of intestinal disorders
Control	70.9±4.89	116.3±6.35	857	16
Trial	71.7±5.23	120.8±4.26	926	6