

Optimising maternal transfer for robust piglet production

If recent disease and viral challenges seen on pig units globally have taught us anything of late, it is that tackling the source of challenge and supporting the immune system is paramount if we hope to finish pigs efficiently and cost effectively.

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Current economic climates do not provide us with the luxury to waste money, but we are also facing some of the hardest times in pig production specifically due to disease challenges, antimicrobial reduction strategies and cost of production. We must therefore ensure every penny we spend is best placed to affect the lifetime of the animal.

From my research, the best way to do this in pig rearing is to improve the health of the sow.

There is a vast wealth of research available in human health exploring the links between maternal and neonatal health. So why do we not apply the same learnings to our four-legged animal equivalent, the pig?

If we look globally, there are many examples of reducing medication use by focusing attention on health and stress in the breeding herd.

This is logical as inflammation is an energy cost and if we can minimise wasted energy then this can be partitioned to other biological processes, such as growth and immunity.

Early microbial colonisation in young pigs from the dam represents a window of opportunity to influence the early gut microbiome to achieve long term benefits in immune development, disease resistance and lifetime growth performance.

Optimising gut health to favour a microbiome which is best suited to your production system, through management of the sow microbiome, is perhaps the most cost-effective way to ensure we wean robust piglets.

This in turn will reduce the need for medicinal intervention around weaning and lower lifetime antimicrobial usage.

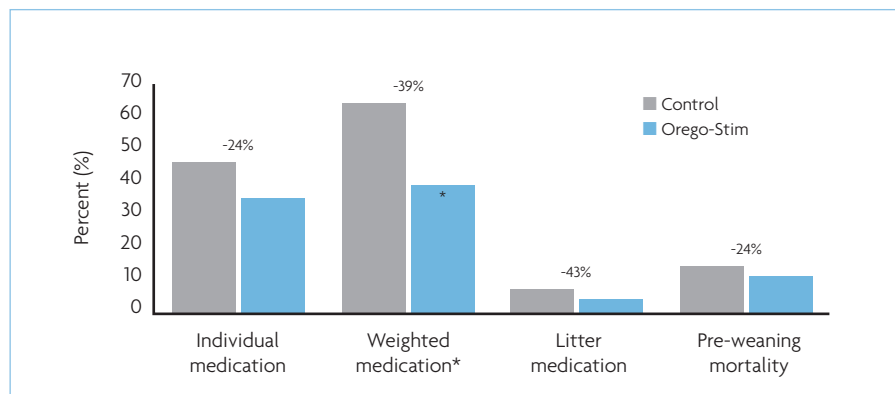


Fig. 1. Piglet medication and mortality in control or OEO (Orego-Stim, Anpario) fed piglets, through maternal supplementation. (NTU, 2018). *Denotes significant difference from control ($P<0.1$).

Supporting gut health to reduce antibiotic use

While antimicrobial resistance (AMR) is not a new challenge, it has been attracting more attention in recent years due to increasing evidence of the link between antimicrobial use and the presence of AMR. There is a wealth of evidence that supports the link between good gut health and overall pig health and performance.

With 'no antibiotic ever' (NAE) and 'antibiotic free' (ABF) systems growing in popularity over the last 10 years, alongside the ban on the use of therapeutics, such as zinc oxide in weaners, there is an increased need for focus on piglet health pre-weaning. Producer profitability is hugely dependent on piglet throughput and performance.

Recent research such as that from Hall et al. in 2020 has shown that maternal feeding with phytochemicals, such as oregano essential oil (OEO), can support the production of more robust, healthy, offspring, which in turn can help to reduce medication use and maximise profitability of the herd (Fig. 1).

The power of the microbiome

The sow plays a vital role in the development of the piglet gut microbiome. By optimising maternal transfer we can help to support piglet disease resistance and growth performance.

This in turn helps to reduce the need for antibiotics throughout the pig's lifetime and subsequently, helps to reduce AMR on the unit.

We must note that antibiotics and use of copper and zinc at high levels have a bacteriostatic effect in the environment, hence the increased risk of AMR development, but this can also reduce environmental challenge.

Many producers which have looked to become NAE or ABF have found disease outbreaks 6-12 months in, which is likely due to the removal of these control mechanisms on the environment in the farrowing or weaning rooms.

OEOs have been shown to help in these systems as a natural aid to support immunity due to their antibacterial and antiviral efficacy.

In recent Anpario work, conducted in conjunction with Nottingham Trent University, it was found that supplementing sow lactation diets with a natural OEO (1kg/t Orego-Stim, Anpario plc) produced a positive microbiome for both sows and their piglets.

Sows fed Orego-Stim at farrowing showed a relative increase in lactobacillaceae abundance, which includes lactic acid producing bacteria beneficial for balancing pH in the gut (Fig. 2a).

Piglets demonstrated a reduction in enterobacteriaceae, which includes

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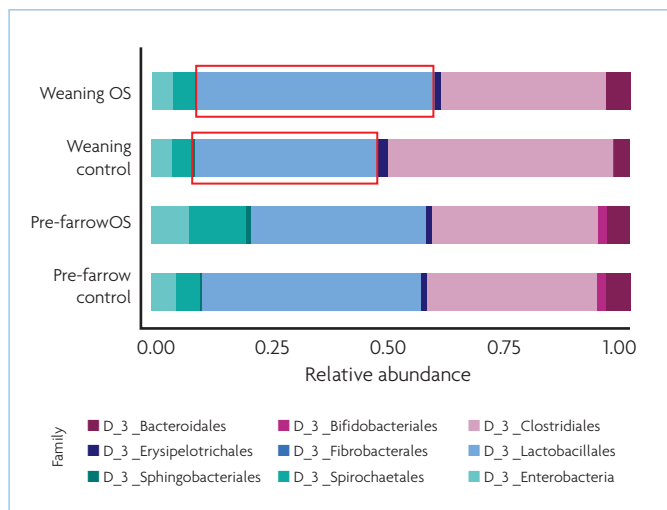


Fig. 2a. Sow faecal bacterial family analysis, demonstrating increased abundance of beneficial Lactobacillaceae when fed Orego-Stim compared to control diets (NTU, 2018).

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salmonella and E. coli (Fig. 2b) which may help reduce the risk of digestive upset following weaning and lower the need for medication.

How does stress impact the gut?

Stress has a major impact on gut health, so it is vital that we limit stress through management of feed, production and genetics to reduce unwanted stress and inflammation in the animal. The gut-brain-microbiome axis is gaining more acknowledgement and research to better understand how we can optimise this relationship for the benefit of the pig and the producer. The microbial population can impact how feed is digested and utilised by the animal and can be negatively affected by stress. Therefore, stress may be affecting pig

disease resistance and feed efficiency.

Conversely, certain bacteria such as *Helicobacter* spp. are known to increase stress response and so can have a major impact on gut health, animal health and production. Stress, in its basic form, is a major waste of an animal's energy that should instead be utilised for supporting reproductive performance, disease resilience and growth performance.

Managing stress

A diet best suited to the animal at each stage of production should look to suit their needs metabolically and reduce any stress on the animal in terms of feed antigens and support for gut health. OEO

Fig. 3. Sow serum levels of TBARS (Thiobarbituric acid reactive substances) in control or OEO (Orego-Stim) fed sows. TBARS are formed as a by-product of lipid peroxidation and high levels indicate elevated stress levels. *Indicates a significant difference to control ($p < 0.05$). (Tan et al., 2015).

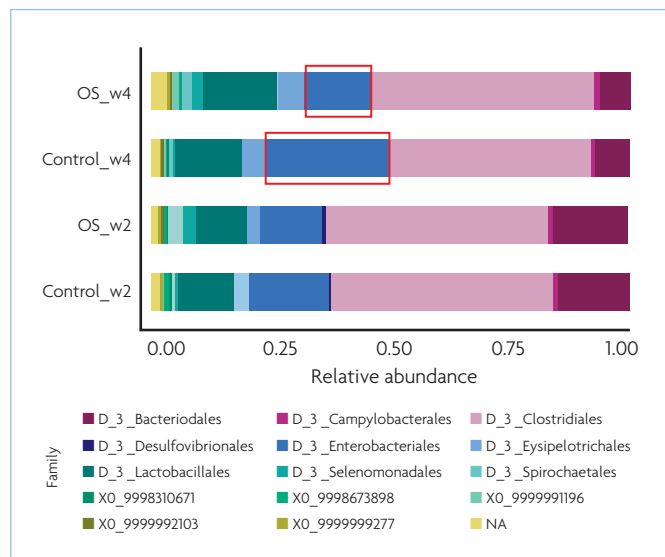
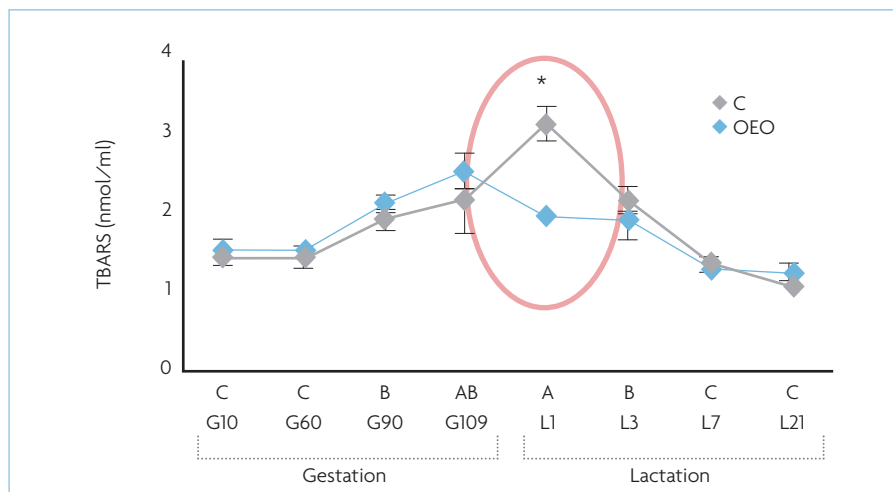


Fig. 2b. Piglet faecal bacterial family analysis, demonstrating a lower population of potentially pathogenic Enterobacteriaceae at four weeks of age when fed Orego-Stim compared to control diets (NTU, 2018).

supplementation has been shown to reduce stress in sows and the growing herd.

A 2015 study conducted by Tan et al. reported that 500g/t OEO (Orego-Stim, Anpario plc) could help to alleviate the increase in oxidative stress seen in farrowing sows. This in turn supported improved milk production, reproductive performance, and piglet performance.

Lipid peroxidation and antioxidant status are changed during farrowing, and these changes affect the neonatal piglets by increasing oxidative stress. The study indicated that managing stress during this time can have profound effects on maternal and offspring performance.

The study concluded that supplementation of sow diets with OEO resulted in a decreased level of oxidative stress markers at time of farrowing (Fig. 3), helping to improve sow voluntary intakes and support piglet growth performance.

Empowering the microbiome to produce happy healthy pigs

As we continue to strive towards a future where we reduce the reliance on antimicrobials, we must look for cost-effective, alternative ways to support the production of healthy, robust, profitable pigs.

Improving sow gut health using natural supplements can have a significant effect on lifetime performance and medication requirements within the whole herd.

The benefits of Orego-Stim as a natural and sustainable solution, can be seen in both sows and piglets. Maternal feeding also provides a great tool for optimising early microbial colonisation, reducing stress and supporting lifetime health and performance.