



# Milk fractions to improve pig health

Researchers at **TEAGASC** and the University of León, Spain, are looking at the potential of milk bioactive fractions for gut health and development in pigs.

To maximise production and economic efficiency, piglets are usually weaned and transitioned to independence at 21 to 28 days when they should actually be feeding on sow milk for at least 70 days post parturition and have a smooth transition to solid feed. At the same time, efforts to introduce piglets to creep feed during lactation yield low results, as there is variation in feed intake. These stressors – introduction of new feed, change in environment, maternal separation, mixing with other piglets – lead to feed refusal and/or reduced feed intake post weaning. Consequently, gastrointestinal tract inflammation and dysfunction and gut microbiota imbalance occur, usually resulting in diseases causing some mortality or growth reduction in piglets. Specifically, stress from maternal separation of neonates in mammals affects the transfer of passive immunity by antibodies in milk, which provide local immunity in the gut. Apart from this clear effect, *Lactobacilli* from milk may disappear or reduce in the gut. Furthermore, the gut microbiota is significantly involved in the modulation of intestinal mucosal immune response, especially at early stages of life; hence, the need to ensure a balanced gut microbiota community if piglets are to maintain a healthy life. Currently, to ensure the health and welfare of piglets in such conditions, farmers use antimicrobials and zinc oxide supplemented in pig feed. However, the use of these substances will be limited across the European Union from 2022 due to antimicrobial resistance risks. On the other hand, there is no concrete agreement on the efficacy of probiotics, prebiotics and plant extracts as alternative approaches to managing the effects of the identified stressors on gut health and microbiota development. There is a need

to apply nutritional approaches, and changes in environment, management practices and in human behaviour, to reduce the impacts of stress from early maternal weaning and transition to solid feed on piglets post weaning. A nutritional approach that needs more investigation is the use of milk bioactive fractions (MBFs).

Researchers at Teagasc and the University of León in Spain are collaborating on a project – **Milkobiome** – to explore how milk and microbiota affect intestinal health in pigs.

## Milk bioactive fractions

Introducing MBFs (e.g., lactoferrin, oligosaccharide and milk fat globule membrane) in pigs' diet could potentially reduce gut microbiota imbalance and increase immune development, while effecting improved growth performance as well. They may potentially replace the use of antimicrobials and zinc oxide. Recent studies involving other mammalian species have shown many and diverse bioactivities by MBFs. Generally,



The Milkobiome project will explore how milk and microbiota affect intestinal health in pigs.

piglet diet is similar to infant milk, and in many cases, piglets are used as animal models for human nutrition. Hence, several studies have attempted to validate the efficacies of human or bovine MBFs using a pig model.

### Porcine milk lactoferrin

Most studies on MBFs are related to the use of MBFs from other mammalian species, especially human and bovine. With the observed impacts of MBFs from other species, using a pig model, the question is: can porcine MBFs potentiate the same effects on pigs, and hence improve gut microbiota balance, gut health and development? While porcine milk contains MBFs, little is known about their potential to exert positive effects on gut health and microbiota.

### Milkobiome project

Researchers at Teagasc and the University of León in Spain are collaborating on a project – Milkobiome – to explore how milk and microbiota affect intestinal health in pigs. The project aims to develop novel feeding and management strategies to improve gut development (microbiota balance and intestinal integrity), immune development and overall growth performance in piglets post weaning using MBFs in comparison to zinc oxide and antimicrobials. Initial studies at the University of León will identify and quantify MBFs in porcine milk; following this, proof of concepts using identified MBFs will be carried out at Teagasc.

### Benefits to pig industry

The estimated production of pig meat will increase to 23.34 million tonnes in 2026 in the European Union. It is therefore hoped that this research will contribute to the success of this increase in the pig meat industry. Findings from the research will potentially support pig farmers in transiting from antimicrobials and in dealing with the challenges of post-weaning diarrhoea on farms.

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