

## **The use of kefir to piglets to improve post-weaning health and productivity as alternative to antibiotic and zinc oxide use**

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### **Introduction**

Antimicrobial use in pig production is highest in the weaned piglets compared to the grower and finisher pigs, sows, and suckling piglets. Huge efforts have been made to reduce antimicrobial use in pig production, however, the use of metaphylactic and prophylactic antibiotics in this production group remains relatively high. Furthermore, the use of zinc oxide in pig feed is being phased out in the EU, a product used to promote growth and prevent diarrhoea in pigs. Producers and veterinarians are now trying to find solutions for healthy piglets in the post-weaning period without the use of antimicrobials and zinc oxide.

Post-weaning diarrhoea (PWD) usually associated with enterotoxigenic *Escherichia coli* (ETEC) is an economically important disease in pig production worldwide, affecting pigs during the first 2 weeks after weaning and characterized by sudden death or diarrhoea, dehydration, and growth retardation in surviving piglets. Colistin has been widely used for the control of PWD in pigs. This critically important antibiotic may no longer be used in many EU countries.

The post-weaning period is a critical phase in the pig's life when the intestinal immune system is immature, and the sow milk with protective IgA is removed prematurely. Feed intake is usually reduced after weaning and the piglets may develop anorexia. Underfeeding post-weaning reduces growth performance of piglets and contributes to intestinal inflammation and adversely affects villous height and crypt depth. This morphological disruption of the intestinal mucosa promotes the creation of an ideal environment for the multiplication of bacteria such as *E. coli* and allows toxins and bacteria to cross the epithelium resulting in illness and possible death.

Kefir is a fermented milk product that can be used as a multifunctional feed additive to reduce post-weaning diarrhoea. The potential to use kefir has not been fully evaluated and used in pig production. It is an acid fermented milk product containing numerous probiotic bacteria that has been shown to protect against enteric viral and bacterial pathogens, stimulate both the innate and the adaptive immunity, as well as providing a continued liquid feed to which the gut of piglets is enzymatically adapted.

### **Pilot study Proposal**

This small pilot study aims to evaluate if supplementing post-weaning piglets' feed with kefir can reduce the occurrence and severity of diarrhoea in piglets after weaning, and thereby reduce prophylactic and metaphylactic antimicrobial use for this indication. Diarrhoea is the primary outcome and secondary outcomes are average daily gains, feed conversion, antimicrobial use, zinc oxide use, and other variables suitable for evaluation based upon the farm records.

For this study, a commercial raw cow milk kefir produced in Lotte, the Netherlands, by the Raw Milk Company will be used. The kefir will be provided as an additional liquid feed in separate liquid feed troughs (such as turkey hoppers) for the piglets in the first 2 weeks post-weaning. The kefir will be diluted 1 to 4 with water. The study will take place at a commercial pig farm. In a farm using milk replacers for weaners, the control groups will be provided milk replacer, otherwise water will be

provided in the liquid feed troughs. The treatment and control will be assigned to batches of piglets weaned into the same weaner pen. Every group weaned will receive either kefir or control. There will be an equal amount of pens assigned to the treatment and control groups. Diarrhoea scores will be evaluated for the first 4 weeks post-weaning. Maria Vermeulen will perform scoring at weekly intervals, and the farm personnel will record scores daily. Average daily gain and feed conversion will be evaluated over the whole post-weaning period based upon the farm's weighing schedules. Antimicrobial use records will be evaluated for all pens included in the pilot study.