

Improving piglet performance through increased polyamine ingestion

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Background: Piglet growth during the immediate post-weaning period is often compromised as a result of their failure to adapt to the switch from a milk-dominated to a cereal-dominated diet. Commonly referred to as post-weaning growth check, this period of adaptation and resultant decline in growth exerts a significant impact on overall herd feed conversion efficiency, increasing the time taken to attain market weights, and in severe cases resulting in mortality. Structural and functional changes in the small intestine that cause a decrease in digestive and absorptive capacity in the weaned pig and are key contributors to the growth check in weaned piglets. Milk-borne polyamines (putrescine, spermidine and spermine) trigger a series of changes in the gastrointestinal tract of the suckling offspring that help it adapt to the progressive transition from a milk dietary regime to a solid dietary regime. However, early weaning programs designed to increase sow productivity have driven the average weaning age below 21 days, meaning piglets are likely to have insufficiently matured gastrointestinal tracts. The proposed project builds on our recent data demonstrating a positive effect of polyamine supplementation during lactation on piglet growth and intestinal function. Specifically, the objective of the proposed work is to manipulate maturation of the piglet gut during the peri-weaning period with the aim of improving pre-weaning survivability and dietary adaptation, leading to a subsequent increase in post-weaning performance. The hypothesis being that administration of polyamines to piglets will accelerate maturation of the gastrointestinal tract and increase availability of essential amino acids allowing for more effective diet transition post-weaning leading to greater post-weaning performance and subsequent grower/finisher performance.

Experimental Design and Methods: The experimental design will compare the effect of oral administration of polyamines to piglets suckling lactating gilts. The treatment groups proposed are: 1) polyamine supplementation pre-weaning; 2) polyamine supplementation post-weaning; 3) polyamine supplementation pre-and post-weaning; 4) no polyamine supplementation. Measures taken would include: milk samples for measurement of polyamine concentration; piglet weight at birth, at frequent intervals during treatment period weaning and 8 weeks of age; sacrifice of a subset of piglets at weaning for collection of tissue for measurement of intestinal polyamine concentration and histology for morphological assessment of gut maturation.

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