Public Abstract

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Title:Effects of reduced protein and diet complexity on performance and cost of nursery pigs

The nursery phase is a stressful phase in swine production due to environmental and nutritional factors. During the transition phase, which occurs approximately 21 days post-birth, piglets are segregated from the sows, leading to environmental and nutritional challenges. Post-weaning diarrhea and reduced animal performance are major problems in the nursery phase and is mainly caused by enterotoxigenic *Escherichia coli* strains. In order to maintain healthy animals and increase production, in-feed antibiotics have been used in swine diets. However, there is a concern that antibiotic resistance selected in animals might be transmitted to humans. Nursery pigs have limited ability to digest protein fraction due to the lack of enzyme protease, resulting in incomplete digestion and absorption of amino acids, the product of protein break down. Commercial pig diets contain high crude protein concentrations, leading to a higher protein flow in the gastrointestinal tract of pigs which lead to higher pathogenic bacteria proliferation and production of harmful substances. To determine the effects of reducing crude protein concentration by 2.5% and specialty protein ingredient sources inclusion, two experiments were conducted. Results indicate that a reduction of 2.5% in crude protein decreases the growth performance of nursery pigs as a consequence of amino acid imbalance in diets without supplementation with synthetic sources valine and isoleucine, amino acids which still have a limited production and consequently a high cost feed-grade ingredient. The inclusion of the amino acids valine and isoleucine confirmed this hypothesis, increasing the growth performance to similar levels of pigs fed high crude protein diets. However, the feed cost calculated showed a higher feed cost relative to animal growth when diets included valine and isoleucine. In addition, the inclusion of specialty ingredients with highly digestible protein did not improve performance of piglets. The inclusion of valine and isoleucine increase the efficiency of protein utilization, with environmental and health benefits. The inclusion of these amino acids will be determined by the cost of ingredients, mostly the amino acids valine and isoleucine will determine the inclusion rates in the diets and decrease of crude protein level.