Effects of vitamin D supplementation at weaning on an Ontario swine farm

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Introduction

Piglets may be born with low serum concentrations of the vitamin D which may result in a predisposition to vitamin D deficiency (Horst and Littledike, 1982). Indoor rearing of sows and their piglets, coupled with the fact that sow milk contains very low levels of vitamin D, makes it necessary to supply vitamin D via the diet (Littledike and Goff, 1987). Creep feed is a common way to supplement vitamin D to the nursing piglet. However, the timing and amount of feed ingested is highly variable among individual piglets resulting in variable vitamin D levels in weaned pigs (Witschi et al., 2011).

It has been anecdotally suggested that low levels of serum (blood) vitamin D may predispose piglets to suboptimal post-weaning performance such as a decreased average daily gain (ADG) and increased risk of morbidity (sickness). This has resulted in the adoption of routine supplementation of piglets with oral vitamin D at weaning. However, there is limited scientific evidence to support the practice of supplementing piglets with vitamin D to improve overall health and growth in the post-weaning period.

The purpose of this study was to explore the relationship between serum vitamin D concentrations, average daily gain (ADG), and morbidity in weaned piglets during the first 28 days post-weaning on an Ontario commercial swine farm.

Methodology

One hundred and eighteen piglets, from one week's weaning on a farm experiencing high levels of post weaning morbidity, were individually identified and randomly assigned at weaning (ranging from 21-24 days of age) to 1 of 2 groups (Day 1 of trial).

Group #1 (60 piglets) was the control group and they were administered 1 ml strawberry syrup orally.

Group #2 (58 piglets) was the treatment group and they were administered 1 ml (1.042 g/ml) of commercial vitamin D syrup orally.

Piglets were weighed, and blood samples were taken for vitamin D concentration analysis, on Day 1 and 28 of the trial. The piglets were observed daily for the 28 days after weaning and all piglet morbidity and treatments were recorded. The ADG of each piglet was calculated on day 28 of the trial. Investigators were blinded to the treatment groups.

Results

Group #2 had a higher average vitamin D serum level when compared to Group #1 at Day 28 ($P<0.05$). However, there was no significant difference (multilevel linear regression) in ADG in the first 28 days after weaning between the two groups. There was also no significant difference in piglet morbidity (multilevel logistic regression) between the two groups. All analyses used statistical techniques to account for repeated measures, sex, parity, and weaning weight.

Take home message

Supplementation of piglets with oral vitamin D at weaning resulted in higher average serum vitamin D concentrations when compared to non-supplemented piglets. However, the piglets with a higher serum level of vitamin D did not demonstrate any biological or performance advantage over the non-supplemented piglets in this study.

The results of this small study contribute to our present knowledge of the benefits of vitamin D supplementation in piglets. The results, however, do not support the management recommendation of routine supplementation of piglets with oral vitamin D at weaning in order to improve overall health or ADG in the first 28 days post weaning.

Continued research involving randomized and controlled clinical trials, utilizing large numbers of piglets, is needed in order to demonstrate consistency of these findings. Continued work in this area will further clarify any health and performance benefits associated with vitamin D supplementation at weaning.

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