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The Effect of Encapsulated Butyric Acid in Nursery Pigs Performance

Abstract

A trial was conducted to determine the effects of an encapsulated butyric acid (Material B) in the nursery phase of pig production in a large scale wean to finish barn setting. The trial was conducted in conjunction with a large Midwestern U.S. feed supplier who routinely utilizes KemTRACE® brand Chromium Propionate in the basal diet at 200 ppb. Material B was supplemented at either 1 lb/ton or 2 lbs/ton in a complete feed and was compared to a control diet with no added Material B. The pigs fed Material B at 1 lb/ton were 2.64 lbs. heavier. This difference was not able to be statistically separated from the other treatments. There were however trends (P=0.10) for improved feed to gain when Material B was included in the diets (1.37 control vs. 1.30 for 1 lb/ton Material B, and 1.31 for 2 lbs/ton Material B). The results indicate that Material B is effective as a means of improving efficiency of pigs in the nursery phase when reared in a wean to finish barn.

KEYWORDS: butyric acid, wean to finish, pig

Introduction

Short chain fatty acids such as butyric acid are energy sources that support the growth and development of the intestinal epithelium as shown by increasing crypt depth[1]. When fed in an unprotected form, butyric acid is quickly absorbed or dissociated, and it is not delivered throughout the gastrointestinal tract. Material B is an encapsulated source of butyric acid. This encapsulation protects the source of butyric acid and allows for the release of the product in the gastrointestinal tract making it available throughout the intestine[2]. Material B supplementation can lead to an improvement in the production performance of swine when fed for the first 42 days postweaning[3]. The purpose of this trial was to determine the effect of adding Material B, at the rate of 1 or 2lbs/ton of finished feed, on swine growth and production in a large scale wean to finish barn setting.

Materials and Methods

A randomized complete block design was utilized with pig weight as the basis for the blocks to determine the effects of Material B growth and efficiency of nursery pigs reared in a commercial wean to finish barn fitted for research. A total of 594, 21 day old pigs averaging approximately 14 lbs., were assigned to pens with 22 pigs in each pen. There were then 9 pens assigned to each of 3 different dietary treatments as follows:

Treatments description:

- Negative Control
- Negative Control + 1 lb./ton Material B
- Negative Control + 2 lbs./ton Material B

All diets were manufactured by the commercial feed division of a Midwestern U.S. feed supplier. The researcher asked not to share the diet since they were fed a commercial proprietary formula. The control diet was a standard diet used in their system where KemTRACE® brand Chromium Propionate was added to the diet at an inclusion rate of 200 ppb. The feed was also formulated with a proprietary feed acidifier. The following measurements and observations were recorded:

- Pig body weights:
  - Day 0 (at weaning)
  - Days 7, 14, 21, 28, and 42 days post weaning (or end of trial)
  - Pigs to be weighed by pen

- Feed:
  - Feed disappearance by pen at the same time as pig weights

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All feed was weighed and recorded. Feed weigh-backs were recorded on weigh days. Feed consumption was calculated by pen. The data were analyzed as a randomized complete block utilizing the GLM of SAS (Cary, North Carolina).

Results and Discussion

The pig weights in the Material B 1 lb/ton treatment though numerically greater were not statistically different than the two other treatments. These results are different from a previous trial reported by Cook et al. (2011). The pigs in this trial were of a 2 day difference in weaning age. Therefore, the pigs were on test for either 41 or 43 days (42 day average). A covariate of beginning pig weight was used to reduce this effect. However, there was 2.5 lbs difference in weight based on weaning day. This variation caused the variation within the data to be higher than normal for the facility. In this trial the variation was very high with a standard error of the mean of 1.23 lbs. This resulted in not being able to differentiate the numbers even though the pigs fed Material B at a 1 lb/ton feed rate ended the trial 2.64 lbs. heavier (Table 1). This is the largest actual number observed in total pig weight when fed Material B and is even greater than the trial conducted by Cook et al. (2011).

Pigs fed Material B were more efficient than the pigs fed control diets (Table 2). The feed to gain ratio was 7 points lower when pigs consumed feed containing 1 lb/ton Material B in the first 42 after weaning. Though the difference was numerically different it was not statistically significant (P=0.10). Feed efficiency was not altered statistically in other trials, although there were numerical improvements (Cook et al., 2011). However, in research settings butyrate was shown to improve the efficiency as a feed additive (Manzanilla et al., 2006).

This trial supports the previous work accomplished utilizing Material B in the nursery phase of production to improve efficiency while optimizing pig gain during the period. While high variation resulted in no statistical difference in body weights, the actual number is significant for producers as the magnitude is high.

Table 1. Pig Weights (lbs)

Days Post Weaning	Control	Material B (1lb/ton)	Material B (2lb/ton)	P=
0	12.40	12.56	12.67	0.73
7	15.41	15.51	15.20	0.74
14	21.27	21.49	20.66	0.50
21	27.38	28.21	27.38	0.63
28	34.56	35.66	35.03	0.67
42	52.25	54.89	54.24	0.57

Table 2. Feed to Gain (Specified Intervals)

Days Post Weaning	Control	Material B (1lb/ton)	Material B (2lb/ton)	P=
0-7	1.03	1.06	1.09	0.71
0-14	1.07	1.04	1.09	0.95
0-21	1.19	1.14	1.17	0.09
0-28	1.27	1.24	1.23	0.10
0-42	1.37	1.30	1.31	0.10

References

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