Evaluation of Micro Plus, a Fermentation Product in Diets of Growing-Finishing Pigs

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Summary and Implications

Under the nutritional and environmental conditions encountered in this experiment, the fermentation product (Micro Plus) did not modify the performance of growing-finishing pigs.

Introduction

The purpose of this research project was to evaluate the efficacy of a fermentation product (Micro Plus) to improve the performance of growing-finishing pigs fed simple corn-soybean meal diets.

Materials and Methods

The fermentation product was evaluated at concentrations of 0, .1, and .15% in corn-soybean meal diets (Table 1) fed to pigs from 62.2 to 240.2 lb. body weight. These corn-soybean meal diets previously have been demonstrated to allow rapid rates of body weight gain in pigs of the breeding (Yorkshire x Landrace and Hampshire x Duroc used in this research. The diets contained .85, .78, and .70% lysine for pigs in body weight ranges from 60 to 120, 120 to 180, and 180 to 240 lb., respectively.

Each treatment was fed to six pens of pigs and each pen contained six pigs. Within a block of three pens, the sex ratio was constant. Pigs were randomly allotted on the basis of initial weight and sex to pens within blocks, with a restriction that littermates not appear in the same pen. Treatments were randomly allotted to contiguous pens within blocks. A pen of pigs was the experimental unit for statistical analysis as a randomized block design.

Pigs were housed in partially slotted, concrete floor pens containing a nipple drinker and a stainless steel self-feeder. Up to 120 lb. body weight, pigs were housed in pens that allowed 5 $ft.^2$/pig and subsequently were housed in pens that allowed 8 $ft.^2$/pig. The experiment was conducted from November 15, 1994, to February 28, 1995. A minimum temperature of 55ºF was maintained in the environmentally controlled rooms.

Pigs were weighed individually and pen feed intake data were collected first at two-week intervals, then at one-week intervals when approaching body weights for designated diet changes, and upon reaching a final weight of 240 lb. Pigs were individually removed from the experiment the week they reached a minimum of 233 lb. body weight. After 50% of the pigs (three pigs) were removed, the remaining pigs were terminated on the weekly weigh day that their average body weight reached a minimum of 233 lb. Backfat depth off-center at the tenth rib was measured by ultrasound on each pig at its termination day. Backfat (BF) was then adjusted to a constant body weight of 240 lb. using a formula from *Guidelines for Uniform Swine Improvement Programs*, (1987) NSIF: Adjusted BF = actual BF, in + (240 - actual weight, lb.) * actual BF/(actual weight - 25).

Five pigs were removed from the experiment as a result of an outbreak of pneumonia. Growth data for pigs removed were included in the data set up to the weight day in which their growth rate was obviously affected by disease. Likewise, feed intake data for pens from which pigs were removed were adjusted by removing a feed charge for the removed animals. Feed charges were based on body weight and a calculation of maintenance energy requirement of 110 kcal./day x body $weight^{.75}$ kg.

Results and Discussion

Growth and feed intake data are reported for three periods and the entire growing-finishing period. Periods 1 and 2 were 35 and 28 days in length, respectively, and represented periods in which diets were fed that contained .85 and .78% lysine, respectively. In period 3, diets containing .70% lysine were fed and represented the growth period from approximately 180 to 240 lb. body weight.

Feed intake, body weight gain, feed:gain ratio, and backfat data are presented in Table 2. Average performance was excellent during the experiment. Except for feed:gain ratio data for period 3, there were no treatment effects. In period 3, the feed:gain ratios were improved ($P<.05$) for pigs fed the diets containing Micro Plus. Feed:gain ratio was improved by the 0.1% addition, with no further improvement obtained with the .15% addition of Micro Plus. This difference represents a 3.5% improvement in feed efficiency from 180 to 240 lb. body weight by pigs fed Micro Plus. For the entire feeding period, however, the improvement in feed efficiency of pigs fed Micro Plus was less than 1%. Therefore, the growth rate and feed efficiency data suggest that, with the nutritional and environmental conditions encountered in this experiment, Micro Plus was not effective in modifying growing-finishing pig performance. Furthermore, feeding Micro Plus had no measurable effect on depth of backfat in pigs when adjusted to body weights of 240 lb.

Table 1. Experimental control diets.

Ingredient	Body weight range, lb. 50 to 120	120 to 180	180 to 240
Corn	77.375	80.215	83.315
Soybean meal	20.00	17.25	14.34
Dicalcium phosphate	1.16	1.20	1.00
Calcium carbonate	.84	.83	.84
Sodium chloride	.25	.25	.25
Trace mineral[a]	.05	.025	.025
Vitamin premix[b]	.20	.10	.10
Lysine · HCl	.10	.10	.10
BMD-60	.025	.025	.025
	100.00	100.00	100.00
Calculated analysis:			
ME, kcal./lb.	1507	1510	1513
Lysine, %	.86	.78	.70
Calcium, %	.65	.65	.60
Phosphorus, %	.55	.55	.50

[a]Contributes at .05% of diet in ppm: 75 Zn, 87.5 Fe, 30 Mn, 8.75 Cu, .1 I.
[b]Contributes at .20% of diet per pound of diet: 2,000 IU vit A; 500 IU vit D_3; 3.0 mg. riboflavin; 8.0 mg. pantothenic acid; 15.0 mg. niacin; and 10.0 μg. vit B_{12}.

Table 2. Effect of Micro Plus in diets of growing-finishing pigs on growth performance and backfat depth.

Item	Dietary concentration, % 0	.1	.15	Trt. effect, P<	CV, %
Daily feed, lb.					
Period 1[a]	4.31	4.20	4.22	.57	4.6
Period 2[a]	6.19	5.97	6.06	.20	3.2
Period 3[a]	6.96	6.99	6.85	.67	4.3
Entire	5.73	5.67	5.61	.35	2.5
Daily gain, lb.					
Period 1[a]	1.67	1.62	1.65	.49	4.5
Period 2[a]	2.06	1.97	2.02	.27	4.6
Period 3[a]	1.94	2.03	1.96	.28	5.1
Entire	1.87	1.86	1.86	.88	2.8
Feed/gain					
Period 1[a]	2.58	2.59	2.55	.60	2.6
Period 2[a]	3.01	3.04	3.00	.76	3.3
Period 3[a]	3.60	3.45	3.50	.05	2.6
Entire	3.06	3.05	3.02	.45	1.9
Backfat, in	.65	.67	.69	.50	9.1

[a]Periods 1 and 2 were five weeks and four weeks in length and diets contained .85 and .78% lysine, respectively. Period 3 was from the ninth week of the experiment to 240 lb. body weight, and diets contained .70% lysine.