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Field peas can be included in the phase 2 diet for nursery pigs without adverse effects on pig performance

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Introduction

Field peas are usually not included in diets for nursery pigs in the US. However, European and Canadian data suggest that field peas may be included in diets for nursery pigs without compromising pig performance (Stefanyshyn et al., 1999). So far, only little research has been conducted in the US to evaluate the effect of including field peas in diets for nursery pigs. Landblom and Poland (1996) reported decreased pig performance if 30 or 50% field peas were included in phase 1 diets for nursery pigs. However, working with extruded peas, they reported no detrimental effects of feeding 20% peas if the inclusion was restricted to the second phase of the nursery period. Due to the relatively low cost of field peas, any inclusion of field peas will result in a decrease in the overall diet cost. Therefore, the current experiment was conducted to determine if field peas might be included in the phase 2 diets for nursery pigs.

Materials and methods

Animals, experimental design, and housing

A total of 144 pigs arising from the matings of Duroc males to Landrace-Large White-Duroc females were weaned at 21(\pm 2) days of age. During the initial 14 days post-weaning, pigs were fed a standard 22% CP phase 1 diet. Two weeks after weaning all pigs were weighed and allotted to one of four experimental groups based on ancestry, sex, and body weight and used in a four-week nursery experiment. The experiment was arranged as a randomized complete block design with 6 replicate pens per treatment group and 6 pigs per pen.

Pigs were housed in the nursery at the Swine Research Farm in an environmentally controlled room. The initial temperature was set at 28°C and reduced by 1°C for each week. A feeder was suspended at the front gate of each pen and a nipple drinker was suspended at one

of the sidewalls. An expanded-metal plastic-coated floor was provided in each pen.

Diets and feeding

Four experimental phase 2 diets were formulated (Table 1). Diet 1 was a corn-soybean meal based control diet without any field peas included. In diets 2, 3, and 4, field peas (variety *Carnival*) were included at levels of 6, 12, and 18%, respectively. For each 6% peas that were included in the diets, 2% soybean meal and 4% corn was removed. There were 5% fishmeal and 3% soybean oil included in all diets. Synthetic amino acids were included as needed to balance the amino acid content of the diets to current NRC recommendations (NRC, 1998). Likewise, minerals and vitamins were also included at levels to meet or exceed current NRC recommendations (NRC, 1998).

Data collection and statistical analysis

Individual pig weights were recorded at the beginning and at the end of the 4-week experimental period. The amount of feed provided in each feeder was recorded on a daily basis and leftover feed in each feeder was estimated at the end of the experiment and subtracted from the total amount of feed supplied in the feeder to calculate total feed disappearance. Average daily weight gains for each pen and average daily feed disappearance were summarized at the end of the experiment and used to calculate gain to feed ratios.

Data were subjected to analysis of variance using the Proc. GLM Procedure of SAS (SAS Stat Inc., Cary, NC). Treatment means were separated using the LSMmeans statement and the Diff option of Proc.GLM.

Results and discussion

Results from the experiment are summarized in Table 2. There were no

significant differences between treatment groups in any of the response criteria measured, and daily gain, daily feed intake, and gain to feed ratios were not influenced by the inclusion of peas in the diet. Therefore, it can be concluded from this experiment that field peas can be included in the phase 2 diet for nursery pigs at a level of up to 18% without affecting pig performance. The above results are in agreement with Canadian and European results showing that field peas can be included in the phase 2 diets for nursery pigs at levels of 20 or 30% (Grosjean and Gatel., 1986; Stefanyshyn et al.,1999). However, Landblom and Poland (1996) reported decreased performance for pigs fed diets containing 30 or 50% field peas compared to control pigs fed a corn-soybean meal-based diet containing no field peas. Similar results were obtained in a second experiment by the same researchers in which 20 or 40% field peas were included in the diets for weanling pigs. However, in both these experiments, field peas were included in the phase 1 diet as well as in later diets. In the current experiment, field peas were not fed until 2 weeks after weaning when pigs were weighing

approximately 10 kg. This may be the reason why we obtained a different response in our experiment.

It is important to note that field peas have a relatively low content of the sulfur containing amino acids (methionine and cysteine). To compensate for this, the level of synthetic methionine was increased in the diets containing field peas in the current experiment. By doing so, the levels of the sulfur containing amino acids were similar between the control diet and the experimental diets. This may be one of the reasons why pigs in the current experiment performed well on the pea containing diets.

In conclusion, the current experiment demonstrated that field peas may be included in the phase 2 diet for weanling pigs at levels of up to 18% without detrimental effects on pig performance provided that the content of the indispensable amino acids are carefully balanced. Further research is needed to determine if inclusion levels higher than 18% can be used.

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TABLE 1. EXPERIMENTAL DIETS

Diet #	1	2	3	4
<u>Ingredient composition</u>				
Corn, %	64.92	60.92	56.92	52.91
Field peas, %	0	6.0	12.0	18.0
Soybean meal, 44%, %	25.0	23.0	21.0	19.0
Fishmeal, %	5.0	5.0	5.0	5.0
Soybean Oil, %	3.0	3.0	3.0	3.0
Limestone, %	0.65	0.65	0.65	0.65
Dicalciumphosphat, %	0.85	0.85	0.85	0.85
Lysine, HCL, %	0.05	0.03	0.01	0.0
DL-Methionine, %	0.03	0.04	0.05	0.07
L-Threonine, %	0	0.01	0.01	0.01
L-Tryptophan, %	0	0	0.01	0.01
Salt, %	0.3	0.3	0.3	0.3
Vit-mix, %	0.1	0.1	0.1	0.1
Mineral mix, %	0.1	0.1	0.1	0.1
<u>Nutrient Composition</u>				
Mcal ME/kg	3435	3427	3419	3411
Crude Protein, %	19.5	19.5	19.5	19.6
Lysine, %	1.16	1.15	1.15	1.16
Calcium, %	0.79	0.79	0.79	0.79
Phosphorus, %	0.65	0.65	0.65	0.65

TABLE 2. RESULTS FROM THE EXPERIMENT

Diet	1	2	3	4	SEM ^a
Field peas, %	0	6	12	18	-
n	36	36	36	36	-
Average initial weight, kg	8.14	7.81	7.79	7.79	0.72
Average end weight, kg	20.27	20.02	19.90	19.17	1.39
Average daily gain, g	433	436	433	407	25.56
Average daily feed intake, g	685	681	696	641	42.71
Average gain:feed ratio, kg/kg	631	644	622	637	13.50

^a Standard error of the mean