Nutrient Analysis of Iowa Grown Field Peas for Swine Feed

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Introduction

Field peas are a cool season legume crop. Temperate climatic conditions are the most suitable for pea growing. Higher altitudes and cool seasons can provide excellent yields in warmer climates. Most cultivated field peas belong to the same species (*Pisum sativum L.*), but several subspecies have been developed to meet specific agronomic, pathological, and nutritional needs of different regions.

Field peas are relatively high in crude protein 22.8%, intermediate between corn and soybeans. Starch content is slightly less than corn depending on the variety. Peas are often used as protein supplements with monogastric diets in areas where soybean meal is not readily available or costly.

Peas are a new crop in Iowa where the corn-soybean rotation is predominant. In an integrated crop and livestock system, peas may be a third crop to the traditional corn-soybean rotation. Swine feeding in Iowa would provide a robust use for peas, if the crop is adapted. Other benefits to the producers include, decreased pest prevalence, improved equipment utilization and labor distribution, additional nutrient recycling, and a possible double crop because peas are a short season crop. Pea seeds after drying and harvesting can be ground with a common hammer mill and then incorporated in the pig's diet directly on the farm without further processing.

It is essential to understand the nutrient levels before incorporating peas in swine diets. Researchers continue to report a range of nutrient levels in various field pea varieties. The growing season, seed characteristics and other agronomic factors influence the nutrient content of peas. Round seeds have been reported to be nutritionally better that wrinkled seeds. White flowered peas are superior in energy and amino acid availability for swine than varieties with colored flowers.

Materials and Methods

Field peas (winter, spring, and summer types) grown in southeast Iowa during 2005 and 2006 were sampled. Samples were sent for nutrient analysis to Experiment Station Chemical Laboratories at the University of Missouri-Columbia. Crude protein was done by Kjeldahl laboratory procedure. Results are provided in Table 1.

Results and Discussion

The Iowa peas were about 86% dry matter or 14% moisture, which is a level that will store well. Crude fat averaged about 2%, although the 2005 spring varieties were low, less than 1%. The NRC tables report a crude fat of 1.2% for field peas. Crude fiber was 5 to 6%. Ash was about 3%. Crude protein averaged 20% compared with 22.8% reported in the NRC tables. Values reported are as fed.

Field peas are a good source of lysine (about 1.54%, Table 1), which is commonly the first limiting amino acid in pig diets. According to the NRC, lysine in peas is highly digestible (84%). This enhances the economic value of peas in the swine diet.

Unfortunately, peas are low in methionine and tryptophan (0.20%, Table 1). Digestibility of these amino acids is lower in peas than in soybean meal. It may be advisable to add synthetic methionine and tryptophan to swine diets containing high levels of peas. Threonine in winter, summer, and spring peas averaged about

0.74% (Table 1). The amino acid levels in the Iowa-grown peas were similar to NRC table values.

Field peas are low in fat compared with corn and contain twice as much fiber as corn. Therefore, peas are lower in energy than corn.

Field peas contain low concentration levels of several anti-nutritional factors such as protease, lectins inhibitors, and tannins. These concentration levels are less than in raw soybeans and are not known to cause palatability problems.

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Table 1. Analysis of field peas grown in SE Iowa[1,2]

Year	2006	2005	2006	2005	2005	
Season	Winter	Summer	Spring	Spring	Spring	
Color	Yellow	Yellow	Yellow/green	Yellow	Yellow	
Variety	Specter	Mixed[3]	Mixed[4]	Eclipse	WFP0097	Average
Dry matter, %	86.29	84.71	85.77	85.45	87.77	86.00
Crude fat, %	2.96	3.50	2.04	0.76	0.62	1.98
Crude fiber, %	5.98	5.94	5.20	5.64	5.36	5.62
Ash, %	2.73	3.71	2.89	3.10	3.02	3.09
Crude protein,[5] %	20.15	17.94	19.68	22.12	21.49	20.28
Lysine, %	1.51	1.43	1.54	1.60	1.62	1.54
Threonine, %	0.74	0.70	0.74	0.74	0.76	0.74
Tryptophan, %	0.18	0.18	0.19	0.21	0.23	0.20
Methionine, %	0.20	0.20	0.21	0.20	0.21	0.20

[1]Analyzed by Experimental Station Chemical Laboratories, University of Missouri, Columbia, MO.
[2]As-fed values.
[3]This sample was a mixture of WFP0097 and Eclipse yellow pea varieties.
[4]This sample was a mixture of Admiral and Midas yellow pea varieties and Striker green pea variety.
[5]Crude Protein by Kjeldahl method.