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Introduction

Field peas are usually grown for human consumption. However, quality problems can make them available at times for feeding to livestock. Field peas contain a moderate amount of protein (20–29%) which is highly rumen degradable. They are high in starch (41– 54%) and low in fiber (<9%) suggesting fairly high energy content. The few cattle feeding studies conducted to date have focused on their use in dairy cows and growing calves. No feeding trials have apparently been conducted with finishing cattle fed high-energy diets.

The objectives of this study were 1) to evaluate yellow field peas as a replacement for soybean meal and corn grain in a high energy finishing diet and 2) to determine whether or not rolling altered their feeding value.

Materials and Methods

One hundred seventy nine yearling steers of mixed breeding were purchased from local sale barns. Upon arrival at the feedlot, they were vaccinated (IBR, BRSV, BVD, PI_3, and Blackleg), treated for internal and external parasites, implanted with revalor-S, individually ear tagged and weighed. From these, 154 steers (average weight 914 lb) were randomly allotted to 18 pens. Eight pens were 16' x 50' with a cement floor and partially covered by a roof. Ten were conventional dirt pens measuring 48' x 112' with mounds and wind breaks. They housed 8 and 9 steers per pen, respectively. Weights on and off test were taken after overnight removal of feed and water. The interim weight was taken after overnight removal of water only. Data were subjected to analysis of variance with diet, housing and diet and housing included in the model. Pen was the experimental unit for feedlot, performance variables. Individual animal was the experimental unit for carcass variables.

Finishing diets fed during the study are presented in Table 1. The control diet was predominantly whole corn, corn silage and soybean meal. The test diets contained either whole or rolled field peas in place of corn and soybean meal. All three diets contained 12.8% crude protein from day 1-56 and 12.2% from day 57-105. The field peas were grown at the Dakota Lakes Research Farm near Pierre, SD, half were dry rolled at the SDSU feedmill in Brookings, and shipped to the Southeast South Dakota Research Farm where the feeding trial was conducted.

Results and Discussion

Feedlot performance data are presented in Table 2. There were no differences between whole and rolled pea treatments for any of the variables measured (P>.10). Dry matter intake did not differ between control and pea treatments from day 1-56, day 57-105 or overall (P>.10). Treatment (control vs. pea diets) effects on daily gain and feed efficiency, although present, were mixed. Steers consuming the pea diets grew faster than controls through 56 days on feed but slower from 57-105 days (P<.10). As a result, overall daily gain did not differ among treatments (P>.10). Feed efficiency was 6% better for steers fed the pea diets than controls (P<.10) through 56 days on feed. However, there were no differences in the latter half of the trial or overall (P>.10).

Why treatment differences present in the first half of the study were either not present, or were reversed, in the latter half is not clear.

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However, it is noteworthy that intakes were greater from day 57-105 than from day 1-56. As intake increases, so does the rate at which feed passes through the digestive tract. Slowly digested feeds are usually utilized to a lesser extent as a result, and dry rolling could reduce this effect. Because of their very hard, dry physical form and slow rate of starch digestion, field peas may be particularly susceptible to digestibility depression with increasing intake. Although not statistically significant, performance on the whole pea diet declined in the latter half of the study more than on the rolled pea diet. This would be consistent with the scenario just described.

Carcass characteristics are presented in Table 3. Dietary treatment had no effect on carcass characteristics (P>.10) with the exception of dressing percent. Dressing percent for cattle consuming the rolled pea diet was one percentage point lower than that of the other treatments (P<.10). The reason for this difference is not clear and seems inconsistent with the balance of the data, which suggest no difference in degree of carcass fat content. Likewise, gut fill does not likely explain this difference, either, since the steers had similar intakes at the end of the trial and were removed from feed and water before weighing.

In conclusion, the replacement of corn and soybean meal with yellow field peas resulted in comparable feedlot performance and carcass quality and yield grades. From a nutritional standpoint, field peas are an effective source of protein and energy in cattle finishing diets. It appears that dry rolling is not necessary when peas are fed as part of a whole corn/corn silage diet. This may not be the case, however, with other types of diets.

Table 1. Finishing Diet Compositions (dry matter basis).

		Finishing Diet	
Item	Control	Whole Pea	Rolled Pea
Ingredient			
Whole corn	72.8	64.1	64.1
Corn silage	20.0	20.0	20.0
Yellow field peas		10.0	10.0
Soybean meal	4.0		
Ground corn		2.5	2.5
Limestone	1.2	1.2	1.2
Urea	.9	.9	.9
Trace mineral salt[a]	.5	.5	.5
Dicalcium phosphate	.3	.3	.3
Potassium chloride	.3	.5	.5
Premix[b]	.1	.1	.1
Chemical Analysis			
Dry matter	65.6	65.6	65.6
Crude protein[c]	12.5	12.5	12.6

[a]Contained 97% Na Cl, .007% I, .24% Mn, .24% Fe, .05% Mg, .032% Cu, .11% Co, .032% Zn and .5% Ca
[b]Provided 28 g of Monensin and 4.5 million IU Vitamin A per ton of diet DM.
[c]Weighted average crude protein content for the entire trial.

Table 2. Feedlot Performance of Yearling Steers Fed Finishing Diets With or Without Field Peas. (least squares means).

		Finishing Diet	
Item	Control	Whole Peas	Rolled Peas
Initial weight, lb	917	912	914
Final weight, lb	1333	1322	1332
Daily DM Intake, lb/hd			
1-56 d	22.70	22.65	22.72
57-105 d	26.10	25.02	25.22
1-105 d	24.27	23.75	23.89
Daily gain			
1-56 d[a]	3.94	4.20	4.21
57-105 d[b]	3.94	3.57	3.73
1-105 d	3.94	3.90	3.98
Feed: gain			
1-56 d[a]	5.78	5.42	5.42
57-105 d	6.65	7.06	6.80
1-105 d	6.17	6.11	6.01

[a]Control vs. others P=.07.
[b]Control vs. others P=.10.

Table 3. Carcass Characteristics of Yearling Steers Fed Finishing Diets With or Without Field Peas (least squares means).

		Finishing Diet	
Item	Control	Whole Peas	Rolled Peas
Hot carcass wt., lb.	787	782	775
Dress, %[a]	59.0	59.1	58.1
Prime/Choice, %	76.5	82.4	84.3
Yield grade	2.6	2.5	2.6

[a]Control vs. other P=.09; whole vs. rolled P=.001.