

## Effect of field pea replacement level on intake and digestion in beef steers fed by-product-based medium-concentrate diets<sup>1</sup>

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### Abstract

Four ruminally and duodenally cannulated steers (703.4 ± 41 kg initial BW) were used in a 4 x 4 Latin square to evaluate the effects of field pea inclusion level on intake and site of digestion in beef steers fed medium-concentrate diets. Steers were offered feed ad libitum at 0700 and 1900 daily and were allowed free access to water. Diets consisted of 45% grass hay and 55% by-products based concentrate mixture and were formulated to contain a minimum of 12% CP (DM basis). Treatments consisted of (DM basis) 1) control, no pea; 2) 15% pea; 3) 30% pea; and 4) 45% pea in the total diet, with pea replacing wheat middlings, soybean hulls, and barley malt sprouts in the concentrate mixture. Experimental periods consisted of a 9-d dietary adjustment period followed by a 5-d collection period. Grass hay was incubated in situ, beginning on d 10, for 0, 2, 5, 9, 14, 24, 36, 72, and 98 h; and field pea and soybean hulls for 0, 2, 5, 9, 14, 24, 36, 48, and 72 h. Total DMI (15.0, 13.5, 14.1, 13.5 ± 0.65 kg/d) and OM intake (13.4, 12.0, 12.6, 12.0 ± 0.58 kg/d) decreased linearly (P = 0.10) with field pea inclusion. Apparent ruminal (17.5, 12.0, 0.6, 6.5 ± 4.31%) and true ruminal CP digestibility (53.5, 48.7, 37.8, 46.2 ± 3.83) decreased linearly (P < 0.10) with increasing field pea. Neutral detergent fiber intake (8.9, 7.9, 7.8, 7.0 ± 0.3 kg/d) and fecal NDF output (3.1, 2.9, 2.6, 2.3 ± 0.2 k/d) decreased linearly (P < 0.03) with increasing field pea. No effects were observed for microbial efficiency or total-tract digestibility of OM, CP, NDF, and ADF (P 0.16). In situ DM and NDF disappearance rates of grass hay and soybean hulls decreased linearly (P < 0.05) with increasing field pea. Field pea in situ DM disappearance rate responded quadratically (P < 0.01; 5.9, 8.4, 5.5, and 4.9 ± 0.52 %/h, for 0, 15, 30, and 45% field pea level, respectively). Rate of in situ CP disappearance of grass hay decreased linearly (P < 0.01) with increasing field pea level. Field pea is a suitable ingredient for beef cattle consuming medium-concentrate diets, and the inclusion of up to 45% pea in by-products-based medium-concentrate growing diets decreased DMI, increased dietary UIP, and did not alter OM, NDF, or ADF digestibility.

Key Words: By-Product • Cattle • Digestibility • Field Pea • Intake

*The full paper was published in the Journal of Animal Science 2004. 82:1855-1862.*

*<http://jas.fass.org/cgi/content/abstract/82/6/1855>*