Effects of Feeding Xylose-treated Soybean Meal and Parity on Performance of Dairy Cows in Early Lactation

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Introduction

Dairy cows require sufficient protein in the diet to optimize microbial growth and adequate amounts of essential AA to be available in the small intestine to provide for their increased metabolic and lactation demands. Soybean meal (SBM) is the most commonly used protein supplement and is an excellent supplemental protein in dairy diets because of good palatability, as well as high availability and similar AA balance relative to the composition of milk protein. However, relative to other protein sources, SBM has a low AA efficiency because of extensive ruminal degradation. The objective of this experiment was to determine the effectiveness of xylose-treated of soybean meal (XSBM) on the productive performance of lactating cows fed XSBM as the major source of rumen undegradable protein (RUP).

Materials and Methods

Eight tie-stall-housed Holstein dairy cows (four primiparous (40 ± 6 days-in-milk) and four multiparous (43 ± 5 days-in-milk)) were used in a replicated 4×4 Latin square design with four 21-d periods. Crude protein (CP) percentage and net energy for lactation averaged 16.7% and 0.71 Mcal/lb (1.57 Mcal/kg), respectively. As follows: (A) 31% of dietary CP, (B) 37% of dietary CP, (C) 43% of dietary CP and (D) 49% of dietary CP. Dietary RUP was increased by reducing the concentration of SBM and increasing the XSBM concentration.

Results

Milk (71 vs. 64 lb/d (32 vs 29 kg/d)), 4% fat-corrected milk (FCM) (73 vs 66 lb/d (33 vs. 30 kg/d)), milk energy (24 vs. 21 Mcal/d), milk protein, lactose, solids-non-fat (SNF), and total solids (TS) yield were increased by feeding XSBM. Milk fat, protein, lactose, SNF, and TS percent were not different among treatments. Intake of dry mater, CP and energy, blood glucose, albumin and total protein, rumen, fecal and urine pH, and changes in body weight were not affected by treatments. Feed (3.64 vs 3.31 lb/lb (1.65 vs 1.50 kg/kg)), crude protein (21.83 vs 19.6 (9.9 vs 8.9 kg/kg)), and energy (2.32 vs. 2.09 lb/MCal (1.05 vs 0.95 kg/Mcal)) efficiency for 4% FCM yield were improved by substitution XSBM for soybean meal but not by parity. Milk SNF and TS percent, blood urea N (19.8 vs 17.5 mg/dL), and urine pH (8.2 vs 8.3) were affected by parity. Increasing dietary XSBM in the ration reduced blood urea nitrogen (22.5 vs 18.4, 17.6, 16.7 mg/dL).

Significance

Results of this study showed that increasing dietary XSBM ratio improved milk production in early lactation cows.