

# Supplementation of Roasted Soybeans to Dairy Cows on Pasture

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## Introduction

The protein contained in most forages is rapidly degraded by rumen microbes. This could result in a reduced supply of amino acids getting to the intestine. The objective of this study was to determine if supplementing roasted soybeans as a source of undegraded or “by-pass” protein would improve milk production in grazing cows.

## Materials and Methods

Thirty-six lactating cows (primiparous and multiparous) between 21 and 109 days in milk and yielding between 29.5 to 45.4 kg of milk daily were randomly assigned to three treatments. Cows in all treatments were grazed as a single group under an intensive rotational grazing system. The experiment lasted 11 weeks. The pasture contained primarily bluegrass, quackgrass, bromegrass, and white clover. In addition to the pasture, cows were offered a concentrate mix containing 3.4% minerals and vitamins plus either 96.6% high moisture ear corn (HMEC) (Corn) or 78.4% HMEC and 18.2% roasted soybeans (RSB1), or 60.2% HMEC and 36.4% roasted soybeans (RSB2) on a DM basis. Concentrate mixes (DM basis) had CP: 7.6%, 13.7% and 19.9%; undegraded intake protein: 3.9%, 7.0% and 10.0% in the corn, RSB1 and RSB2 treatments, respectively. During the grazing season pasture contained an average of 19.9% CP, 46.7% NDF, and 29.5% ADF (DM basis).

## Results and Discussion

The amount of concentrate offered was similar for the three treatments, but there was a small difference in the actual amount consumed. The two supplements containing roasted soybeans were consumed in slightly

larger amounts than the corn supplement. Milk yield was not different between treatments. Milk fat percent was increased with the addition of roasted soybeans, and milk protein percent was decreased ( $P < .1$ ). Addition of full-fat soybeans to dairy diets has often resulted in a slight increase in milk fat and decrease in milk protein. The differences in body weight change during the experiment were not different between treatments.

The lack of a milk production response to feeding of a high quality source of rumen undegraded protein (roasted soybeans) was surprising. Feeding of ensiled alfalfa as the sole forage source results in significant increases in milk production when roasted soybeans substitute for high moisture ear corn in the grain mix. Unlike the protein in grazed grass, 50% or more of the protein in alfalfa silage is typically in the form of non-protein nitrogen. More than 80% of the crude protein in grazed grass would be in the form of true protein. Even though this protein can be rapidly degraded in the rumen, it may be that rapid turnover of liquid digesta in the rumen under grazing conditions results in some “flushing” of grass protein from the rumen before it can be degraded.

## Conclusions

Addition of roasted soybeans to a high corn supplement for lactating dairy cows grazing a mixed grass native pasture did not increase milk production. This suggests that grazed grass is a more effective source of protein than ensiled grass or legume forages which contain 50% or more of their crude protein in non-protein nitrogen form.

Table 1. Feed intake, milk production and body weight change in cows fed supplements differing in protein content.

Parameter	Corn	RSB1	RSB2	SD	$P =$
Concentrate intake, kg/d	8.0 <sup>b</sup>	8.5 <sup>a</sup>	8.3 <sup>a</sup>	0.04	0.006
Milk yield, kg/d	28.1	28.7	27.8	0.3	0.6
3.5% FCM, kg/d	25.0	26.8	26.0	0.5	0.4
Milk fat, %	2.96	3.18	3.20	0.06	0.1
Milk protein, %	3.06	2.90	2.85	0.02	0.1
BW gain (start-end BW), kg	-5.2	-5.2	4.8	4.9	0.5