

# INFOsource

## Soybean Meal- Dairy

An incomplete 8 x 8 Latin square trial (4-wk periods; 12 wk total) using 48 Holstein cows was conducted to assess the production response to crude protein (CP), digestible rumen-undegraded protein (RUP), and rumen-protected methionine (RPM). Diets contained 21% alfalfa silage, 34% corn silage, 22 to 26% high-moisture corn, 10 to 14% soybean meal, 4% soyhulls, 2% added fat, 1.3% minerals and vitamins, and 27 to 28% neutral detergent fiber on a dry matter (DM) basis. Treatments were a 2 x 2 x 2 factorial arrangement of the following main effects: 15.8 or 17.1% dietary CP, with or without supplemental rumen-undegraded protein (RUP) from expeller soybean meal, and 0 or 9 g of RPM/d. None of the 2- or 3-way interactions was significant. Higher dietary CP increased DM intake (1.1 kg/d), yield of 3.5% fat-corrected milk (2.2 kg/d), fat (0.10 kg/d), true protein (0.05 kg/d), improved apparent N balance and digestibility of DM and fiber. However, milk urea N and estimated urinary excretion of urea-N and total-N also increased, and apparent N efficiency (milk-N/N-intake) fell from 33 to 30% when cows consumed higher dietary CP. The positive effects of feeding more RUP were increased feed efficiency and milk fat content plus 1.8 kg/d greater fat-corrected milk and 0.08 kg/d greater fat, but milk protein content was lower and milk urea N and urinary urea excretion were elevated. Supplementation with RPM increased DM intake (0.7 kg/d), fat-corrected milk (1.4 kg/d), fat yield (0.06 kg/d) and tended to increase milk fat content and yield of milk and protein.

*Broderick GA, Stevenson MJ, Patton RA. 2009. Effect of dietary protein concentration and degradability on response to rumen-protected methionine in lactating dairy cows. J Dairy Sci. 92(6):2719-28.*

Twenty-eight (8 with ruminal cannulas) lactating Holstein cows were assigned to seven 4 x 4 Latin squares in a 16-wk trial to study the effects on production and ruminal metabolism of feeding differing proportions of rumen-degraded protein (RDP) from soybean meal and urea. Diets contained [dry matter (DM) basis] 40% corn silage, 15% alfalfa silage, 28 to 30% high-moisture corn, plus varying levels of ground dry shelled corn, solvent- and lignosulfonate-treated soybean meal, and urea. Proportions of the soybean meals, urea, and dry corn were adjusted such that all diets contained 16.1% crude protein and 10.5% RDP. Urea providing 0, 1.2, 2.4, and 3.7% RDP (DM basis). As urea supplied greater proportions of RDP, there were linear decreases in DM intake, yield of 3.5% fat-corrected milk, fat, protein, and solids-not-fat, and weight gain. Milk contents of fat, protein, and solids-not-fat were not affected by source of RDP. Replacing soybean meal RDP with urea RDP resulted in several linear responses: increased excretion of urinary urea-N and concentration of milk urea-N, blood urea-N, and ruminal ammonia-N and decreased excretion of fecal N; there was also a trend for increased excretion of total urinary N. A linear increase in neutral detergent fiber (NDF) digestibility, probably due to digestion of NDF-N from lignosulfonate-treated soybean meal, was observed with greater urea intake. Omasal sampling revealed small but significant effects of N source on measured RDP supply, which averaged 11.0% (DM basis) across diets. Increasing the proportion of RDP from urea resulted in linear decrease in omasal flow of dietary nonammonia N (NAN) and microbial NAN and in microbial growth efficiency (microbial NAN/unit of organic matter truly digested in the rumen). These changes were paralleled by large linear reductions in omasal flows of essential, nonessential, and total amino acids. Overall, these results indicated that replacing soybean meal RDP with urea reduced yield of milk and milk components, largely because of depressed microbial protein formation in the rumen and RDP from nonprotein-N sources was not as effective as RDP provided by true protein.

*Broderick, G.A, and S.M. Reyna. 2009. Effect of source of rumen-degraded protein on production and ruminal metabolism in lactating dairy cows. J. Dairy Sci. 92(6):2822-34.*

## Soybean Meal Analysis

Research conducted by engineers at the China Agricultural University in Beijing China investigated the feasibility of visible and a near infrared reflectance spectroscopy (NIRS) method for detecting vegetable meals in adulterated fish meal. Sources of fish meal and soybean meal (representative vegetable meal) which were commonly used in China were collected. Fish meal samples adulterated with different proportions of soybean meal were subjected to qualitative analysis and quantitative analysis. A series of studies was conducted to develop NIRS calibrations. Results indicated the coefficient of determination (R<sup>2</sup>) and the standard errors of calibration (SEC) were 0.989 and 1.539, respectively, between the predictive value and the actual value. To demonstrate the value of the calibration, sixty five fish meal samples adulterated with soybean meal were used as an independent validation set. The coefficient of determination (R<sup>2</sup>) and the standard errors of prediction (SEP) were 0.988 and 1.786, respectively, and the ratio of standard deviation of reference data in the prediction sample set to the standard errors of prediction (RPD) was 8.61. The researchers concluded that results of these studies demonstrate that the NIRS techniques can be used to detect the existence and the content of soybean meal in fish meal. (Comment: The relative high fish meal prices are encouraging its adulteration with other protein meal sources. This research will help reduce the practice).

*Shi G.T. and co-workers. 2009. Methods of analyzing soybean meal adulteration in fish meal based on visible and near infrared reflectance spectroscopy. Guang Pu Xue Yu Guang Pu Fen Xi.: 29(2):362-366.*