

The Effect of Dietary Crude Protein as Protected Soybean Meal on Mammary Metabolism in the Lactating Dairy Cow

J. A. Metcalf¹, D. Wray-Cahen¹, E. E. Chettle¹,
J. D. Sutton¹, D. E. Beever¹, L. A. Crompton²,
J. C. Macrae³, B. J. Bequette³, and F.R.C. Backwell³

¹ Agricultural and Food Research Council Institute of Grassland and Environmental Research, Hurley, Maidenhead, Berkshire, SL6 5LR, England

² Department of Biochemistry and Physiology, University of Reading, Whiteknights, PO Box 228, Reading RG6 2AJ, England

³ Rowett Research Institute, Greenburn Road, Bucksburn, Aberdeen, AB2 9SB, Scotland

Metabolism in the mammary gland was related to changes in milk output in response to changes in dietary protein intake. Three diets of grass silage and concentrate were fed to four lactating dairy cows equipped with intravascular catheters across the mammary gland. Concentrates differed in the inclusion of protected soybean meal and provided 11.3, 15.4, and 20.1% CP, respectively. Blood samples were taken to assess the effect of protein percentage on the nutrient fluxes across the gland and their relationship to milk production. Milk production, milk protein yield, and milk protein concentration were all increased as CP intake increased, although these responses were not linear. Concentrations of urea in milk reflected those in plasma and increased as dietary protein intake increased. Uptake of glucose and BHBA by the mammary gland tended to increase as milk production increased. Arterial supply of essential AA increased as the dietary protein increased. Supply and uptake of nonessential AA were unchanged by dietary treatment, and uptake was insufficient to account for output of nonessential AA residues in milk protein. The supply of essential AA was not limiting for milk protein synthesis, and some alternative mechanism must have existed for the control of milk protein yield.

Key Words: protein • mammary gland • metabolism • lactation

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