

Effects of Supplementation with Conjugated Linoleic Acid (CLA) and Altered Dietary Protein Level on the Performance of Dairy Ewes

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Supplementation of dairy ewes with a ruminally protected source of *trans*-10, *cis*-12 CLA has been shown to increase milk and milk protein yield whilst decreasing milk fat yield. The role of dietary protein level in determining this response, particularly when ewes are restricted in energy intake is, however, unclear. The objectives of this study were to evaluate the effects of *trans*-10, *cis*-12 CLA on milk synthesis in ewes fed at a restricted energy level and at two levels of metabolizable protein (MP). Twelve multiparous ewes that were 5 weeks into lactation were individually penned and machine milked twice a day. Ewes were fed a complete diet consisting of concentrate and hay (0.55: 0.45 ratio on a DM basis) to supply approximately 0.75 of metabolizable energy requirements (19 MJ/d). The MP levels of the high and low MP diets were formulated to be proportionally 1.1 and 0.9 of daily requirement, and either supplemented or unsupplemented with lipid encapsulated CLA (containing 10% *trans*-10, *cis*-12 CLA; BASF AG, Ludwigshafen, Germany) at the rate of 25 g/d in each 25 d period in a 4 X 4 Latin square design. During the final 5 d of each period, milk yield was recorded, and samples taken for analysis. Milk yield was 848 vs. 729 g/d and milk protein yield 41.4 vs. 36.7 g/d ($P < 0.001$) in CLA supplemented vs. unsupplemented ewes, respectively. Ewes fed the high compared to the low MP level had a milk yield of 852 vs. 725 g/d and milk protein yield of 42.4 vs. 35.6 g/d ($P < 0.001$), respectively. Milk fat content was 0.33 lower ($P < 0.001$) and fat yield 0.24 lower ($P < 0.001$) in ewes when supplemented with CLA but there was no effect ($P > 0.05$) of MP level on milk fat content. Milk fat content of *trans*-10, *cis*-12 CLA (g/100g total fatty acids) was 0.09 vs. <0.01 ($P < 0.001$) in ewes supplemented with CLA compared with unsupplemented, whilst there was no effect ($P > 0.05$) of dietary MP level. In conclusion, CLA supplementation of ewes when restricted in energy intake resulted in a repartitioning of nutrients from milk fat into milk and milk protein yield, whilst increasing metabolizable protein supply increased the yield of all milk components.