

Effects Of Dietary Betaine On Milk Yield And Milk Composition Of Mid- Lactating Dairy Cows

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Betaine, naturally found in plants and an oxidative product of choline, is converted to acetate in the rumen, and transferred to the mammary gland where it may be used for milk fat synthesis. The objective of this study was to determine the effect of supplemental dietary betaine on milk yield and milk composition. Eighteen Holstein dairy cows (126 ± 5 DIM) were randomly assigned to a sequence of treatments in a 4x4 Latin square design with four treatments of rumen unprotected betaine at 0, 25, 50, and 100 g/d added to a standard lactation ration. Animals were fed individually using Calan gates, and feed intake and milk yield recorded daily. Each period lasted 16 d with milk sampled on the last 2 days of each period. Milk composition was determined by a DHIA laboratory and milk fatty acids were determined by gas chromatography. Data were analyzed using the MIXED procedure in SAS. Dry matter intake was altered (quadratic effect $P = 0.024$) by dietary betaine ($18.8, 18.6, 18.4, 19.4 \pm 0.98$ kg/d for 0, 25, 50, and 100 g betaine/d, respectively). Milk yield was increased (quadratic effect $P < 0.001$) by betaine ($22.6, 22.9, 22.4, 24.0 \pm 0.89$ kg/d for 0, 25, 50, and 100 g betaine /d, respectively). No significant effect of dietary betaine was detected on body weight or condition score ($P > 0.08$ for both). Percentages of milk fat, lactose, SNF, and SCC were not altered ($P > 0.29$ for all) but protein content was decreased (quadratic effect $P = 0.025$) by betaine supplementation ($3.35, 3.27, 3.27, \text{ and } 3.28 \pm 0.07\%$ for 0, 25, 50, and 100 g betaine/d, respectively). Daily yields of milk protein, fat, or lactose did not differ with betaine supplementation ($P > 0.13$ for all). The sum of polyunsaturated fatty acids decreased (quadratic $P = 0.04$) by betaine supplementation ($4.89, 4.51, 4.53, \text{ and } 4.55 \pm 0.13\%$ for 0, 25, 50, and 100 g betaine/d respectively). Overall, inclusion of dietary betaine at 100 g/d increased dry matter intake and milk yield but decreased milk protein percent, whereas milk fatty acid profile was slightly altered. Further studies are needed to determine the optimum rate of supplemental betaine for dairy cows.