

Seasonal effects and husbandry practices on fat-soluble vitamin status of beef and dairy cows and their offspring.

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The objective was to determine the impact of feeding and husbandry practices on fat-soluble vitamin status of beef and dairy cows and their offspring during the spring and fall seasons. To determine effects of breed and season of the year on vitamin status, six Holstein and six Angus cows and their respective female calves were enrolled in the study. Blood samples were collected in May, 2014 from Angus cows and their calves (avg. 57 days of age) and Holstein cows and their calves (avg. 16 days of age). All animals were bled again approximately 140 days later. All serum samples were analyzed for retinol, 25-OH-D₃, and alpha-tocopherol (vit E) and the fall samples also were analyzed for beta-carotene. Spring serum retinol concentrations were not different between breed of cow or breed of calf. In the fall, serum retinol was higher in Holstein cows than Angus cows (0.40 vs 0.24 ppm, respectively); however, serum retinol was higher in Angus calves compared with Holstein calves (0.31 vs 0.29 ppm). Serum 25-OH-D₃ concentrations were similar in Angus and Holstein cows. However, in the spring, Angus calves had dramatically greater concentrations of 25-OH-D₃ than did Holstein calves (27.4 vs 12.3 ng/mL, respectively). Compared with spring values, fall concentrations of 25-OH-D₃ were greater in Angus cows and calves and Holstein calves, but not Holstein cows. Concentrations of serum 25-OH-D₃ were not correlated ($P < 0.05$) among the dams and their offspring of either breed in either spring or fall, but tended to be higher in the fall. Serum vit E was higher in the fall compared with spring for all animals. In spring, all cows averaged 2.0 ppm and the calves averaged 0.6 ppm. Compared to spring, fall serum vit E increased in Angus cows (5.3 vs 1.9 ppm), Angus calves (1.6 vs 0.7 ppm), and Holstein cows (7.2 vs 2.0). Because of consumption of green grass, serum beta-carotene was dramatically higher for Angus cows (8.20 ppm) and their calves (2.47 ppm) compared with that of Holstein cows (0.63 ppm) and their calves (0.08 ppm). Season and husbandry practices do alter fat-soluble vitamin status in beef and dairy animals, especially calves. There were no correlations observed between the vitamin status of the dam and their offspring indicating that vitamin supplementation of dams may not be effective in improving the fat-soluble vitamin status of the calf.

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