

374 Effect of abomasal amino acid infusions on metabolism in postpartum dairy cows.

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Our objective was to investigate the effect of continuous abomasal infusion of total AA (TAAi) or only essential AA (EAAi) in early postpartum dairy cows on metabolism. Nine multiparous Holstein cows were used in a randomized block design with repeated measurements at 5, 15, 29, and 50 d in milk (DIM). At the day of calving, TAAi (n = 4; casein profile) or only EAAi (n = 5; EAA portion of TAAi) was initiated. The TAAi was graduated with half of full dose at 1 d in milk (DIM), full dose (805 g/d) at 2 to 5 DIM, and followed by daily reductions until 0 g/d at 35 DIM. Cows received the same TMR (NE: 6.85 MJ/kg DM, MP: 102 g/kg DM). Feed intake and milk yield were recorded daily. Milk samples and 6 sets of tail and mammary venous plasma samples were obtained at sampling days. The coccygeal vessel was considered equivalent to an artery due to limited metabolism in the tail. Data were analyzed using the MIXED procedure of SAS for repeated data. The DMI did not differ between treatments (P = 0.55). Overall, with no treatment × DIM interaction (Trt × d), milk yield was greater with TAAi compared with EAAi (P < 0.01; 47.9 vs 39.3 kg/d, SEM = 1.4) as was milk protein yield (P = 0.01; 1,635 vs. 1,393 g/d, SEM = 50). Milk fat content was lower with TAAi compared with EAAi (P = 0.02; 41 vs. 47 g/kg, SEM = 1.5), but treatments did not affect milk fat yield (P = 0.20). The arterial total EAA concentration was lower with TAAi compared with EAAi at 5 (0.97 vs. 1.24 mM) and 15 DIM (0.97 vs 1.13 mM), but did not differ afterward (Trt × d, P = 0.01; SEM = 0.07). The arterial total non-EAA concentration was higher with TAAi compared with EAAi at 5 DIM (1.35 vs. 1.17mM), but did not differ afterward (Trt × d, P < 0.01; SEM = 0.04). Yet, plasma concentration differences across the udder of EAA and non-EAA did not differ between treatments (P > 0.88), indicating that the intramammary utilization of both EAA and non-EAA was changed. Arterial urea concentration was greater with TAAi compared with EAAi at 5 (2.87 vs. 1.75 mM) and 15 DIM (3.06 vs. 1.90 mM), but did not differ afterward (Trt × d, P = 0.01; SEM = 0.21) indicating catabolism of some of the AA supplied with TAAi in early but not later lactation. These results indicate that in early postpartum cows, EAAi could not be utilized for milk protein synthesis without non-EAA.

Key Words: amino acid, early lactation, cow