

Impact of 24-h feed or water, or both, deprivation on feed intake, metabolic, and inflammatory response in beef heifers

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ABSTRACT: This experiment evaluated the effects of 24-h feed or water, or both, restriction on hay intake, metabolic, and inflammatory response in growing beef heifers. Forty Angus × Hereford heifers were ranked by initial body weight (BW) (275 ± 6 kg) and age (278 ± 6 d) and randomly allocated to 20 drylot pens (two heifers per pen) in 5, consecutively run, 4×4 Latin squares containing four periods of 17 d each. From days 5 to 0 of each period, all pens were offered alfalfa-grass hay ad libitum plus 454 g of dried distillers' grains with solubles (as-fed basis) per heifer/d. On day 0 of each period, pens received one of the four treatments: 1) feed and water restriction for 24 h (**FWR**), 2) feed restriction for 24 h (**FR**), 3) water restriction for 24 h (**WR**), or 4) full access to feed and water (**CON**). Treatments were concurrently applied from days 0 to 1. Heifer full BW was collected for two consecutive days (days 6 and 5), before (day 0) and after (day 1) treatment application, and on days 3, 6, and 10 of each period. Hay dry matter intake

was recorded daily from days 5 to 10. Blood was collected on days 5, 0, 1, 3, 6, and 10 of each experimental period. Following treatment on day 1, BW loss was greater, and heifer BW was less ($P < 0.01$), for WR, FWR, and FR compared with CON, whereas similar ($P > 0.13$) for BW loss and heifer BW among heifers that received nutrient restriction. No treatment effects were detected ($P = 0.88$) for overall ADG. Plasma cortisol concentration was greater ($P < 0.01$) in FR and FWR vs. WR and CON on day 1, and similar ($P = 0.46$) between CON and WR. Serum NEFA concentration was greater ($P < 0.01$) in FR and FWR vs. WR and CON on day 1, and also greater ($P < 0.01$) in WR vs. CON heifers on day 1. No treatment effects were detected ($P = 0.53$) for plasma haptoglobin concentration. Hence, feed or water, or both, restriction for 24 h did not affect hay intake and ADG, whereas metabolic results suggest that nutrient deprivation is the major contributor to the increased cortisol and NEFA response of growing beef heifers.

Key words: beef heifers, cortisol, feed and water restriction, hay intake, metabolic response

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