

INCREASING GLUCOSE PRECURSORS IN RANGE SUPPLEMENTS ALTERS NUTRIENT PARTITIONING IN YOUNG POSTPARTUM RANGE COWS

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ABSTRACT: Altering nutrient partitioning in young postpartum beef cows from milk production to body weight gain has potential to improve reproductive performance. A 2-year study conducted at the Corona Range and Livestock Research Center, Corona, NM, from February to July in 2003 (n = 51) and 2004 (n = 40) evaluated responses of 2- and 3-year-old postpartum beef cows grazing dormant native range to three protein supplements with increasing concentrations of glucose precursors (propionate salt, NutroCAL™, Kemin Industries, Inc.). Supplements were fed twice weekly at a rate of 2.5 lb/cow/day for approximately 69 d postpartum. All supplements (30% CP) were based on wheat middlings, cottonseed meal, and feather meal, with increasing proportions (0, 80, or 160 g/d) of propionate salt (UIP0, UIP80, and UIP160, respectively). Supplements were formulated so that the CP supplied was approximately 50% degradable intake protein and 50% undegradable intake protein and were fortified with minerals and vitamin A. A supplement × year × age interaction was observed for days to first estrus ($P = 0.04$, Table 1). Cows fed UIP0 took longer to cycle in 2004 than in 2003, with 2-year-old cows requiring more days than 3-year-old cows in 2004. The year difference may be due to pastures receiving less precipitation during the previous growing season in 2004 than 2003, differences in diet quality and/or diet species composition between the two years (15.4% CP in 2003, 11.3% CP in 2004, organic matter basis), or some combination of these factors. Weight loss was greater from start of supplementation to lowest body weight postpartum in 2004 ($P < 0.01$; -26 vs -108 ± 6 lb for 2003 and 2004, respectively). Milk production exhibited a quadratic ($P < 0.01$) response to increasing glucose precursor content in the supplement, with cows fed UIP80 producing the least amount of milk (18.2, 16.0, and 19.1 ± 0.8 lb/d for UIP0, UIP80, and UIP160, respectively). Feed costs for the supplementation period of this study were \$21.09, \$30.27, and \$39.89/cow for UIP0, UIP80, and UIP160, respectively. To compare benefits of supplementation strategies, results of a previous 2-year study where similar supplements were fed and the current study were combined (experiments conducted in 2000, 2001, 2003 and 2004). Averaged across all 4 years, UIP80-fed cows produced less milk (14.6 vs 16.3 lb/d for UIP80 and UIP0, respectively) and cycled earlier (89 vs 98 days postpartum for UIP80 and UIP0, respectively). Both groups of cows had equivalent calf growth (2.3 lb/day of age) and estrous cycle fertility. Pregnancy rates across the 4 years averaged 91.4% for cows fed UIP0 and 93.1% for cows fed UIP80. An economic comparison (Table 2) was calculated to predict hypothetical results of two 100-cow herds fed either UIP0 or UIP80 for 69 days postpartum. Additional feed inputs for the year included free-choice mineral (\$7.96) and prepartum supplement (\$3.36). The UIP0 calves were assumed to be 205 days old at weaning; all calves were valued at \$1/lb at weaning. Even though feed costs for the year were higher for cows in the UIP80 group, their calves had potential to be heavier at weaning because cows fed UIP80 bred back sooner than cows fed UIP0. This resulted in an increase in income of

\$19.82/cow when UIP80 was compared to UIP0. Implications of this study suggest that cows fed the moderate level of glucose precursors partitioned nutrients away from milk production and towards reproduction.

Key Words: Propionate, Protein Supplements, Reproduction

Table 1. Days to first estrus for 2- and 3-year-old postpartum range cows fed supplements containing increasing amounts of glucose precursors (0, 80, 160 g/d propionate salt) in 2003 and 2004.

Response	Supplement	Year							
		2003				2004			
		2		3		2		3	
Days to first estrus	UIP0	56	8	59	5	97	6	72	7
supp × yr × age <i>P</i> =	UIP80	73	8	58	5	66	8	62	7
0.04	UIP160	68	6	53	5	67	8	72	6

^aStandard error.

Table 2. Hypothetical economic comparison of two 100-cow herds fed either UIP0 or UIP80 supplements. Results of 4 years of experiments were combined (2000, 2001, 2003, and 2004). Assumptions are defined in text.

Supplement	Pregnancy rate (%)	d to first estrus	Predicted lb calf weaned/cow exposed	Yearly feed cost (\$/cow)	Predicted income difference, (\$)
UIP0	91.4	98	429	32.41	-----
UIP80	93.1	89	458	41.59	19.82