COMPARISON OF BIURET, COTTONSEED MEAL AND CORN GLUTEN MEAL BARLEY MIXTURES AS PROTEIN SUPPLEMENTS FOR PREPARTUM BEEF CATTLE CONSUMING TALL FESCUE STRAW

Tim DelCurto, Harley Turner, and Ronney Slater

SUMMARY

Ninety-six mature nonlacting, gestating beef cows were used in a study to evaluate supplements containing protein derived primarily from: 1) biuret (Kedlor 250), 2) cottonseed meal (46 percent crude protein (CP)), and 3) corn gluten meal (58 percent CP). Supplements were formulated with barley so that each supplement had a CP concentration of 30 percent. Supplements were fed daily with cows receiving 5 lbs of supplement per head. All cows had ad libitum access to trace mineral salt and tall fescue straw (3.6 percent CP). Supplementation of the straw continued for an 84-day period with treatments discontinued just prior to the onset of calving.

All cows gained weight during the 84-day winter feeding period. Although, cows receiving the cottonseed meal and corn gluten meal supplements gain more weight ($P < .10$) than cows provided the barley – biuret supplement during the first 42 days of the winter feeding period, no differences were detected in body condition change, subsequent calf birth rate, growth rate, pregnancy rate, or calving interval ($P > .10$). In addition, cows receiving bypass protein (corn gluten meal barley supplement) gained more weight during the 84-day feeding period than cows receiving the cottonseed meal supplement ($P < .10$), yet no differences were noted for body condition, calf growth, or subsequent cow reproductive efficiency. Thus, the physical form of supplemental protein does not appear to be a major factor when formulating supplements for mature, nonlactating cows consuming low-quality roughages.

INTRODUCTION

Utilizing low-quality hays and/or straws for beef cattle producers in the western United States may be important to the future of the industry. Oregon beef cattle producers devote large amounts of capital, as well as meadow acreage, to the production of hays for feeding cattle during the winter months. This is a competitive disadvantage relative to other areas in the United States in that many areas do not have to rely on hay feeding during the winter months. In addition, concern over the use of public rangelands may force the beef cattle industry to rely more solely on private rangelands and hay meadows in the near future. Therefore, finding alternative winter feeds will decrease the reliance on extensive hay production, free up meadows fore grazing livestock and may be a more energy efficient (sustainable) form of beef production.

Protein supplementation of low-quality roughages such a grass straws has been demonstrated to be an effective means of utilizing these feed resources. However, there is considerable debate in regard to the type of crude protein/nitrogen source that maximizes the intake and use of low-quality roughages. Therefore, the objective of this study is to evaluate three distinct types of supplemental crude protein with tall fescue grass straw and, corresponding effects on beef cattle during the preparum winter-feeding period. Specific types of supplements contrast natural protein versus non-protein nitrogen and rumen degradable versus rumen by pass sources.

MATERIALS & METHODS

Ninety-six head of mature Hereford x Simmental cows were stratified by age and body condition; and, within stratum, randomly assigned to two replication of the following three supplement treatments: 1) Barley – biuret , 2) barley – cottonseed meal, and 3) barley – corn gluten meal. Supplement formulations were designed so that each supplement would have identical CP concentrations of 30 percent. Supplement formulations also compared two general forms of supplemental CP. Specifically, nonprotein nitrogen (treatment 1) was contrasted to natural protein supplements (treatments 2 & 3), and rumen degradable protein supplementation was compared to supplementation with bypass protein (treatment 2 vs 3, respectively). Six pens of cows (two replications of the above three treatments) were bunk-fed supplements daily at a rate of 5 pounds per-cow per-day. Supplement feeding began in early November and continued until mid-January. At which time, all cows were combined with calving beginning in early February. Cow weights and body condition were monitored just prior to the start of feeding (day 0), at the middle (day 42), and end of the winter-feeding period (day 84). Subsequent weights were obtained just prior to breeding and at weaning. All weights were following an overnight shrink with no access to feed or water.

RESULTS & DISCUSSION

Over the 84-day winter feeding period, all cows gained weight with less than one-quarter unit of body condition loss (Table 1). During days 0 to 42, cows receiving the natural protein supplements (cottonseed and corn gluten supplements) gained more weight than cows receiving the biuret – barley supplement ($P < .10$). However, during the 84-day feeding period, cows receiving the corn gluten meal – barley supplement displayed 15 percent better gains than cows consuming biuret –barley or cottonseed meal –barley supplements ($P < .10$). In contrast, cow body condition, calf birth, weaning weight, and subsequent cow reproductive efficiency was not influenced by the dams' winter nutrition. Thus, while some subtle difference was detected in cow body weight change, these changes were not great enough to influence important economic traits of calf growth and cow reproductive efficiency.

Table1. COMPARISON OF BIURET, COTTONSEED MEAL (CSM) AND CORN GLUTEN MEAL (CGM) BARLEY MIXTURES AS PROTEIN SUPPLEMENTS FOR PREPARTUM BEEF CATTLE CONSUMING TALL FESCUE STRAW.

	Treatments				Contrasts	
	Biuret	CSM	CGM	SE[a]	NPN vs. Natural Protein	Rumen Degradable vs. Bypass
No. of cows	32	32	32			
Initial						
Body weight, lbs	1066	1070	1068	1.9	-	-
Condition score	5.28	5.50	5.55	.08	-	-
Days 0-42						
Weight change, lbs	133.7	148.6	149.9	6.0	.06	.56
C-score change	.00	.21	.28	.07	.46	.49
Days 0-84						
Weight change, lbs	108.4	110.7	126.5	6.1	.22	.08
C-score change	-.18	-.21	-.09	.08	.29	.52
Birth weight[b], lbs	83.4	85.0	86.2	1.25	.61	.46
Calf birth date[c]	69.3	71.4	73.2	2.8	.35	.73
Weaning weight, lbs	515.2	512.4	518.0	9.7	.50	.91
Cows cycling[e], %	48.3%	46.7%	58.6%	9.5%	-	-
Pregnancy rate[e] %	87.4%	85.3%	88.5%	6.3%	-	-
Calving interval, [d]	368.3	368.9	365.4	8.2	.54	.62

[a]SE = Standard error of the means
[b]Based on weight within 24h of birth.
[c]Julian days
[d]Calf weights correspond to avg. d postpartum
[e]CATMOD procedure, SAS (1991)