

COMPARISON OF METHIONINE CHELATED vs. SULFATE FORM OF TRACE MINERALS ON RATE AND EFFICIENCY OF GAIN AND PREGNANCY RATES IN BEEF HEIFERS

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Table 1. Rate and efficiency of gain by heifers fed CTM¹ or SO₄ forms of Cu, Zn and Mn prior to breeding

Treatment	Ranch A		Ranch B		Ranch C		SE	Trt	P-value	
	SO ₄	CTM	SO ₄	CTM	SO ₄	CTM			Ranch	R x Trt
No. heifers	251	246	120	119	870	872				
Gain,kg	92	89	121	121	59	55	2.77	0.60	<0.001	0.88
ADG,kg	0.50	0.49	0.81	0.81	0.76	0.70	0.03	0.57	<0.001	0.76
G:F,kg	0.16	0.16	0.26	0.26	0.23	0.25	0.04	0.91	<0.001	0.85

¹CTM= Methionine chelated forms of Cu, Zn and Mn

Table 2. Differences in pregnancy rates of heifers fed CTM¹ or SO₄ forms of Cu, Zn and Mn prior to breeding

Treatment	Ranch A		Ranch B		Ranch C		SE	P-value		
	SO ₄	CTM	SO ₄	CTM	SO ₄	CTM		Trt ²	Ranch	R ³ x Trt
% Pregnant	85 ^a	86 ^a	92 ^b	91 ^b	59 ^c	66 ^d	0.02	0.05	<0.001	0.47
% Preg ⁴ 1 st 21d	58	57	54	51	59	66	0.02	0.12	0.10	0.54

¹ CTM = Cu, Zn and Mn as methionine chelated trace mineral (MINTREX®)

²Trt = treatment

³R=Ranch

⁴Preg = pregnant



ABSTRACT: Objectives of this experiment were to compare rate and efficiency of gain, and conception rates of yearling heifers supplemented with Cu, Zn and Mn as either metal methionine hydroxy analogue chelated trace mineral (CTM; provided as MINTREX®) or the same trace minerals in SO₄ form. The experimental design utilized 3 ranches, each having 2 replications per treatment with pen as the experimental unit for ADG, DMI and G:F. Individual heifer was the experimental unit for pregnancy diagnosis. Ranch A contained 498 Angus heifers, Ranch B, 240 Red Angus composite heifers, and Ranch C, 1,742 Angus composite heifers. All heifers were fed silage based diets that contained approximately 13.5% CP, 64% TDN (DM basis) and had no significant levels of SO₄, Mo or Fe in feed or water. Diets contained an average of 24 ppm Cu, 70 ppm Zn and 64 ppm Mn. Diets were fed for 181 d (Ranch A), 149 d (Ranch B) and 151 d (Ranch C) prior to breeding. Heifers were weighed once at trial initiation (initial BW 270 kg 2.8), end of drylot feeding, at breeding and at pregnancy diagnosis. Ranch A heifers were bred by AI followed by natural service (45 d breeding), Ranch B heifers were bred by natural service (50 d breeding) while Ranch C heifers were bred by AI once. Pregnancy was determined via ultrasound using trained technicians. No ranch x treatment interactions were detected for any measurements ($P \geq 0.47$) and no differences ($P \geq 0.46$) were detected between treatments for total gain, ADG, G:F or the number of heifers that conceived during the first 21 d on Ranches A or B. Ranch effects were significant ($P < 0.001$) for gain, ADG, G:F and overall pregnancy rate, but not for conception in the first 21 d of breeding. Conception rate increased ($P = 0.03$) for CTM fed heifers from Ranch C with one AI breeding. Conception rates during the first 21 d of breeding did not differ ($P = 0.12$) between treatments but overall pregnancy rate was greater ($P=0.05$) for heifers supplemented with CTM vs. SO₄ form. Under the conditions of this experiment, results suggest that supplementation with CTM contributed to increased pregnancy rates in heifers.

Introduction

- Deficiencies in Cu, Zn and Mn can result in poor reproductive performance (Paterson and Engle 2005)
- Research has shown that chelated minerals are often more bio-available than sulfate forms of minerals

Objective

- The objective of this study was to determine if chemical form of supplemental trace minerals influenced rate and efficiency of gain and first service conception rates in beef replacement heifers

Materials and Methods

- 2 mineral treatments– Methionine chelate form of Cu, Zn and Mn (MINTREX®) vs. inorganic sulfate form
- 3 ranches with 2 reps/trt per ranch
 - Ranch A 498 heifers
 - Ranch B 240 heifers
 - Ranch C 1,742 heifers

Results

- Minimal differences in dietary antagonist levels among ranches
- No treatment differences at any location for rate and efficiency of gain (Fig. 1)
- Treatment effect of CTM for overall pregnancy rates (Fig. 2)
- Ranch C showed a 7% better pregnancy rate to AI breeding for heifers fed CTM.
- No differences in % pregnant after 21 d.
- Ranch was significant, indicating environment and management may be factors in responses measured

Implication

Under the conditions of this experiment, supplementation with CTM (provided as MINTREX®) may contribute to greater pregnancy rates in replacement heifers; best response was after a single AI.

