

EFFECTS OF THE FIBROLYTIC ENZYME CATTLE-ASE™ ON GROWTH OF PREPUBERAL ROMOSINUANO CROSSBRED HEIFERS

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Background. Heifers that reach puberty at an earlier age are more likely to rebreed and maintain a yearly calving interval than those that reach puberty at a later age. In general, heifers that gain weight rapidly will attain puberty at an earlier age than contemporary heifers that experience lower rates of gain. Two major hormones that affect rate of gain are growth hormone and insulin-like growth factor-I (IGF-I). When growth hormone binds to its receptor in the liver, it stimulates the production and secretion of IGF-I. Both growth hormone and IGF-I have beneficial effects on development of bone, muscle, and fat, and increased circulating concentrations of IGF-I have been positively correlated with improved reproduction. Cattle-Ase™ is a fibrolytic enzyme preparation that is available in both liquid and dried forms. It has previously been shown to improve diet digestibility and increase milk production in dairy cows. It was our hypothesis that ingestion of Cattle-Ase™ would increase circulating concentrations of IGF-I, and enhance growth and possibly puberty attainment. We initiated two experiments, one on pasture and one in drylot, to ascertain the effects of Cattle-Ase™ on growth of prepuberal heifers.

Research Findings. In trial 1 (TR1), Cattle-Ase™ was delivered in a commercial molasses-urea lick tank (24% CP with 18% NPN, 3% fat) to 54 fall-born, prepuberal, crossbred heifers grazing coastal bermudagrass (CBG) for 84 d. Heifers were assigned to two replicate pastures according to breedtype, age, and body weight (BW): 1) pasture only (P), 2) P + molasses-urea lick (M), and 3) P + M + Cattle-Ase™ (MC). Cattle-Ase™ was added at a minimum rate of 30 g/19 lbs to a maximum rate of 60 g/11 lbs molasses. Average molasses consumed was 2.53 lbs/hd/d; thus, average urea intake was ~.46 lbs/hd/d. Weights and body condition scores (BCS) were recorded at initiation and 28-day intervals in TR1, with blood samples collected at initiation and weekly. Serum samples from TR1 were assayed for concentration of IGF-I by RIA. There was no treatment effect ($P > .10$) on BW, BCS, or serum concentrations of IGF-I throughout TR1, nor was there an effect on ADG ($P=.36$) with ADG as follows: 1.19, 1.43, $1.41 \pm .13$ lbs/hd/d for P, M, MC, respectively (Figure 1).

In trial 2 (TR2), heifers from TR1 were reassigned to two treatments: 1) Cattle-Ase (CSE) and 2) control (C). The MC heifers were assigned to CSE, M heifers assigned to C, and P heifers were divided equally between treatments. Heifers had ad libitum access to CBG hay and

were group fed 2:1 corn:soybean meal (33% CP) at 1% BW, with Cattle-Ase™ provided to CSE heifers at 1.85 g/hd/d for 126 d. Supplement was adjusted for changing BW each 28 d. Weights and body condition scores were recorded at initiation and biweekly in TR2, with blood samples collected at initiation and weekly. In TR2, Cattle-Ase™ increased ADG ($P < .04$). The CSE heifers gained $.92 \pm .07$ lbs/hd/d compared to C heifers that gained $.75 \pm .04$ lbs/hd/d (Figure 2).

Application. The effects of Cattle-Ase™ ingestion may be dependent upon a variety of factors such as the carrier, the amount of non-protein nitrogen consumed, and/or the forage source. These studies demonstrated that addition of Cattle-Ase™ to molasses-urea lick tanks did not improve ADG of prepuberal heifers grazing coastal bermudagrass pastures; however, addition of Cattle-Ase™ to a dry supplement when heifers consumed coastal bermudagrass hay increased ADG. While not confirmed with these data, the increase in ADG when Cattle-Ase™ was fed in dry form may lead to decreased age at puberty, which would improve reproductive performance of prepuberal heifers.

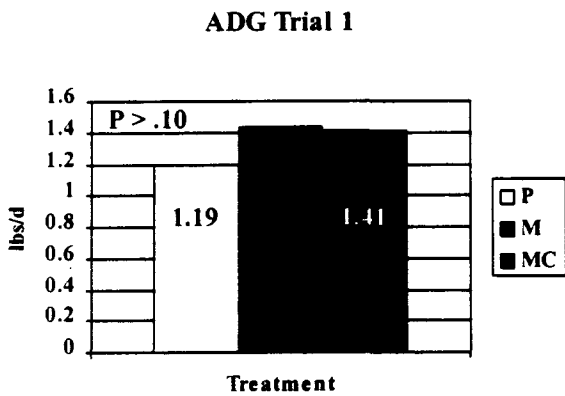


Figure 1. Average daily gain of heifers During Trial 1.

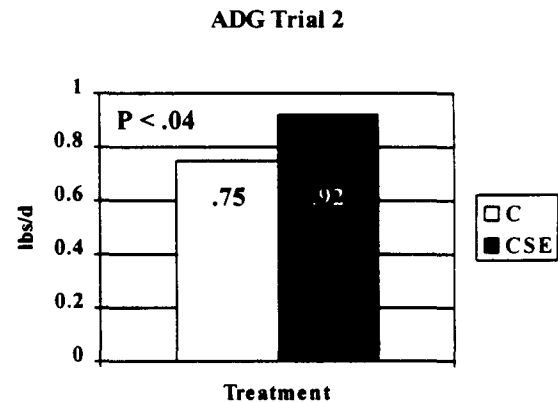


Figure 2. Average daily gain of heifers During Trial 2.