

Effect of Selenium on Feed Efficiency of Steers Wintered on Selenium Deficient Hay

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SUMMARY

The objective of this study was to test the effect of selenium (Se) on feed efficiency of steers. Steers receiving supplemental Se were found to consume 0.34 percent less forage on a dry-matter basis, based on body weight.

INTRODUCTION

Much of the feed produced on the Eastern Oregon Agricultural Research Center (EOARC), Union Station, is selenium (Se) deficient (<.05 ppm). Station cattle traditionally respond to supplemental Se in terms of additional weight gains or improved reproductive performance. Past studies have not measure feed efficiency. In year 1, 89 Hereford X Simmental weaned steers were utilized to test the effect of supplemental Se on weight gain and feed efficiency on a Se deficient diet.

MATERIALS AND METHODS

Steers were stratified by weaning weight and randomly assigned to treatments of Se or control. Se treated steers received controlled release selenium boluses releasing 3 mg per day (Dura Se-120 Shering -Plough Animal Corp. Kenilworth, New Jersey), on day 0 of the study. Steers ran together at Union with adequate shelter, free access water, and free access to selenium deficient hay (.023 ppm). Hay, in 1,100-pound round bales, was fed in 4-round bale feeders.

Steers were weighed three times over the 105-day study at days 0, 56, and 105. Animals were gathered the previous afternoon and shrunk overnight, without access to feed or water. Blood was collected from each animal on weigh dates, in 10-ml purple-topped EDTA Vacutainer tubes, for determination of Se content of whole blood. Whole blood Se determination was performed by fluorometry following nitric and perchloric acid digestion and dissolution of whole blood sample.

Intake and feed efficiency were determined on 20 head of steers with the use of chromium marker boluses (Captec Chrome Captec PTY. Ltd. Australia). Steers were paired based on their 56 day weight, 10 control, and 10 Se treated. Chromium boluses were administered on day 56. Steers receiving chromium boluses ran in a pen separate from the remaining steers until the end of fecal collection. Seven fecal samples were collected between days 8 and 18 after administering chromium boluses, and then composites were made to achieve a representative sample for each animal. Twelve core samples were taken on six round bales that were fed to steers with chromium boluses, to analyze in vitro digestibility.

RESULTS AND DISCUSSION

Steers receiving Se consumed less hay; however the difference was not statistically significant. Intake of steers receiving the Se boluses was 0.34 percent less on a dry-matter basis, based on body weight, than the controls. Weight gains over the length of the trial were similar between controls and Se-supplemented group, with both groups losing. Losses were 9.2 pounds for the controls and 9.5 pounds for the Se-supplemented groups. Weight loss was due to poor-quality forage with no concentrate supplements. Both protein and energy were deficient. Properly fed, this class of animal should gain between .75 and 1.5 pounds per day to realize an economic return on a winter feeding program. Actual target levels would depend on future management of these steers.

Adequate blood Se levels are .03 to .05 ppm. Whole blood Se values of .130 to .212 ppm for these animals did not indicate a deficiency for either group.

A few years ago, the effect of Se on gain and feed consumption was tested, in Alturas, California. These studies found similar gains in controls and Se-injected groups; however, there was a decreased hay consumption of 1.58 pounds one year and 0.61 pounds another, in the selenium-injected group. It is interesting to note that despite the poor feeding regime and adequacy of Se blood levels throughout the trial, our results were similar to those of the California studies in terms of feed efficiency.

CONCLUSIONS

Decreased intake with the same gain means less feed is required for each increment of gain. A .34 percent decrease in intake for a 500 pound steer equals 1.9 pounds of hay per day assuming 90 percent dry-matter. A feed savings of 1.9 pounds per steer for 100 steers comes to 190 pounds per day. Steers wintered over 150 days would equate to a total savings of just over 14 tons of hay. A repeat of this study is currently underway.