

ONA REPORTS

published in

THE FLORIDA CATTLEMAN AND LIVESTOCK JOURNAL

May - 2001

Copper Oxide Boluses for Grazing Cattle

By Dr. John Arthington
UF-IFAS, Range Cattle REC



For questions or comments regarding this publication contact
[Dr. John Arthington](#)

The need for supplemental copper for grazing cattle in Florida has been realized for many years. In most all situations a balanced free-choice, salt-based mineral supplement will provide adequate copper nutrition. More recently, I have had several inquiries at the Range Cattle REC regarding the use of commercial boluses containing copper oxide needles. This form of supplementation involves the oral administration of a gelatin capsule (bolus) containing a measured amount of copper oxide in the form of small needle particles. Once administered, the capsule drops into the reticulum where it dissolves slowly over time.

In the 1994/95 season we investigated the use of copper boluses in two cowherds. At the start of the trial, cows assigned to the treated group received two boluses (20 grams of copper oxide needles), and their respective calves received one (10 grams of copper oxide needles). The effect of treatment on copper status of the cows was determined by liver biopsy collections at the start and end of the study (106 and 154 days for Herd 1 and 2, respectively). While control cows experienced moderate declines in liver copper, copper-oxide bolus administration increased liver copper levels 21 and 129 ppm in Herd 1 and 2, respectively. This increase was less dramatic for cows in Herd 1, probably due to the high levels of forage molybdenum at this location. Molybdenum, a well-known antagonist of copper absorption, averaged 10.65 and .78 ppm in the forages available to Herd 1 and 2, respectively. Copper bolus administration decreased calf ADG in Herd 1 (1.78 versus 2.11 lb/day for bolused and control calves, respectively). Similarly, copper bolus administration reduced calf weaning weights for both bull calves (31 lb) and heifer calves (55 lb) in Herd 2.

One explanation for the negative impact of copper oxide bolus administration on calf gain relates to the potential antimicrobial effect of copper in the rumen. Copper may be altering the ruminal microflora in such a manner as to negatively impact forage digestion.

To investigate this, we examined the effect of copper bolus administration (28 grams) on forage digestion in growing crossbred steers. During a 39-day study steers were individually offered ground limpgrass hay (8.6 ppm copper) in quantities sufficient to ensure ad libitum access. On day 12 (Period 1) and day 33 (Period 2) steers were placed in metabolism crates and total forage offered, refused, and fecal production were collected for 7d. Liver biopsies were collected on day 12 and day 33. Cu oxide bolus administration increased liver Cu at the start of Period 1 (556 versus 296 ppm) and Period 2 (640 versus 327 ppm). Bolused steers had increased fecal Cu output during both periods. Intake of forage fiber (NDF and ADF) and crude protein did not differ between treatments for either period, however, digestibility of NDF and crude protein were higher for Control steers in Period 2 (62.2 vs. 57.1 and 50.2 vs. 43.4 % for NDF and crude protein digestibility, respectively). Digestibility of ADF tended to be higher for Control steers in Period 2 (57.3 vs. 52.3 %).

These data suggest that although copper oxide boluses are effective in increasing tissue Cu stores, they may contribute to lower forage fiber digestibility and poorer cow and calf performance.