Trouw Nutrition INTERNATIONAL

Technical Report

DURABILITY OF HOOVES FROM CATTLE FED ZINC AND COPPER FROM SULFATE OR PROTEINATE SOURCES

One hundred ninety-two yearling heifers were fed 180 mg per head daily of supplemented zinc (Zn) from $ZnSO_4$ or Zn proteinate alone or in combination with 50 mg of supplemented copper (Cu) from $CuSO_4$ or Cu proteinate for 123 days. At slaughter, the front hooves from each animal were collected. A 5 mm thick cross section of the hoof was taken from shear analysis using a MTS material testing machine. Maximum shear force, elasticity, feedyard performance and carcass characteristics were examined.

KEY POINTS:

1. Supplementation of copper sulfate to cattle fed zinc sulfate reduced the hardness of the hooves.
2. Supplementation of copper proteinate to cattle fed zinc proteinate had no significant effect on the hardness of the hooves.

Trace minerals complexed to organic compounds have become an interest to animal nutritionists as a way of enhancing absorption and utilization by tissues. Zn and Cu supplementation has become of particular interest to beef and dairy producers for reducing lameness due to hoof disorders. Earlier studies conducted at the University of Illinois showed that cattle supplemented with zinc from a proteinate source had harder and more elastic hooves than those given $ZnSO_4$. A sequential study by the same researchers examined the effect of additional copper from a proteinate or sulfate source on the condition of hooves. In this study, the hooves from cattle fed zinc proteinate were similar in hardness and elasticity to those fed $ZnSO_4$. However, the supplementation of $CuSO_4$ to cattle fed $ZnSO_4$ significantly reduced the force necessary to shear hooves ($P < .12$). The supplementation of Cu proteinate to cattle fed Zn proteinate did not significantly reduce the force needed to shear hooves. Elasticity of the hooves was not affected by dietary supplementation of zinc and copper. Feedyard performance was not affected by mineral supplementation. The supplementation of both Zn and Cu decreased the incidence of dark cutters ($P < .10$).

Zinc and copper absorption and metabolism are interrelated. Excess of one of these minerals can cause a deficiency in the other. Negative interactions between minerals are more likely to occur from the use of inorganic sources than proteinated sources. Results from this study support this observation. Supplementation of Zn and Cu from proteinated sources are more compatible and less likely to have negative interactions than from and inorganic source.