



Vigortone's 3V Formulation Concept and Nutrient Antagonists

Proper trace mineral nutrition is essential for optimum health, reproduction, and longevity in the cowherd. However, trace mineral shortages in the beef herd are common and the consequences economically devastating. Key trace elements and symptoms of their deficiencies are shown in Table 1.

TABLE 1.

<u>Element</u>	<u>Deficiency</u>
Copper	Delayed heats, early embryonic death, delayed puberty, decreased ovulation, lameness, poor immunity
Zinc	Reduced immunity, increased calving difficulty, abnormal heat periods, delayed puberty, poor growth, reduced libido and sperm motility
Manganese	Silent heats, reduced birth weight, and weak calves
Selenium	White muscle disease, retained placenta, scouring calves, weak or dead calves

Nutrient Antagonists

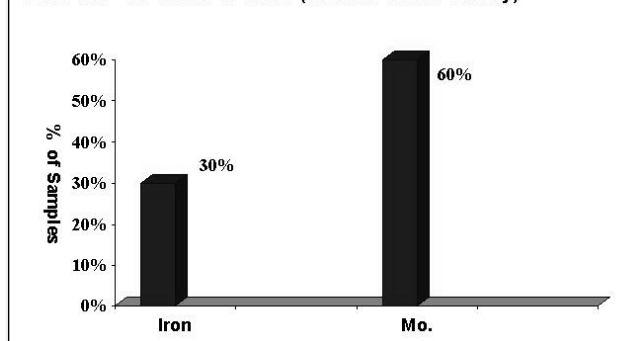
Nutrient antagonists in the feed and/or water can complicate trace mineral supplementation. Antagonists interfere and in some cases prevent the absorption or uptake of essential trace minerals. The main antagonists we "fight" are iron, molybdenum, and sulfur in forages and/or water (Table 2).

TABLE 2.

<u>Antagonist</u>	<u>Effect</u>
Iron	Ties up copper, phosphorus, and zinc (need iron:zinc ratio less than 2:1)
Sulfur	Ties up copper and selenium
Molybdenum	Ties up copper, especially in combination with sulfur (need copper:molybdenum ratio of 4:1 or greater in diet)
Sulfur + Molybdenum	Sulfur/molybdenum complex ties up copper in the rumen

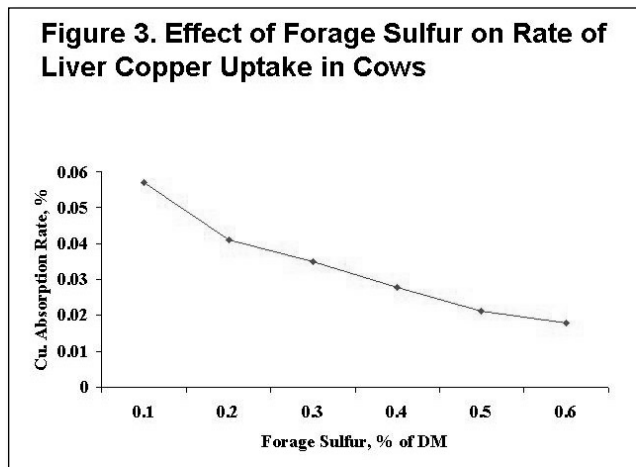
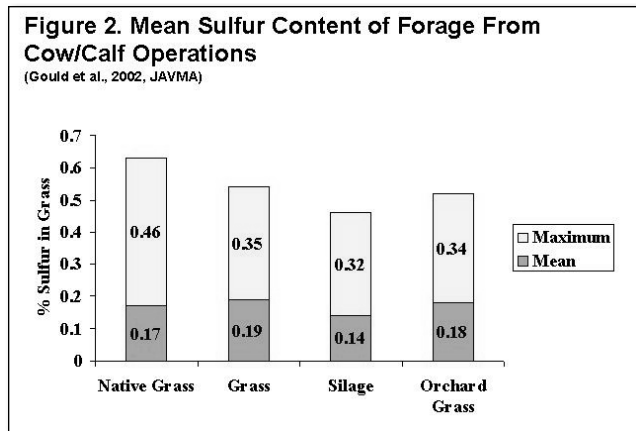
In a recent USDA survey across 18 states (Figure 1), 30% of forages sampled contained antagonistic levels of iron. Sixty percent of these samples also contained antagonistic levels of molybdenum.

Figure 1. Forage Samples With Antagonistic Levels of Iron & Mo. (18 State USDA Survey)



Iron is plentiful in soil and grasses, and supplementation in range minerals is rarely needed. In fact, diet iron levels of 250 to 500 ppm have caused copper depletion from the body.

Sulfur in feed and water can be a problem, too. Levels of sulfur above 0.3% of the diet dry matter reduce copper and selenium absorption. If sulfur levels exceed 0.4% in the diet dry matter, cattle can exhibit symptoms of polio. A survey of pasture forages found in the Journal of the American Veterinary Association (Figure 2) indicates there is wide variation in forage sulfur content. In some cases sulfur levels were very high – often approaching 0.5% of the dry matter. Figure 3 demonstrates the effect of diet sulfur content on the rate of liver copper absorption.

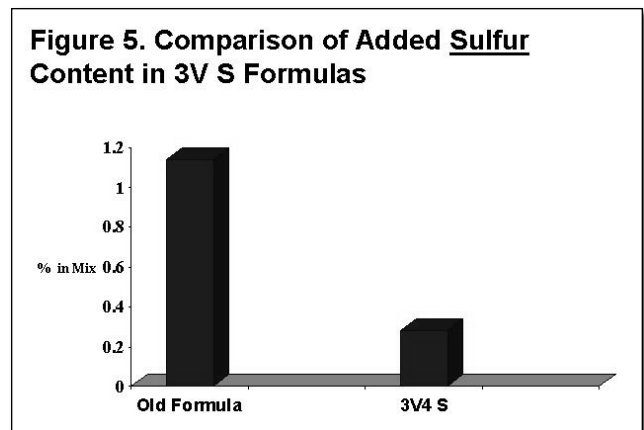
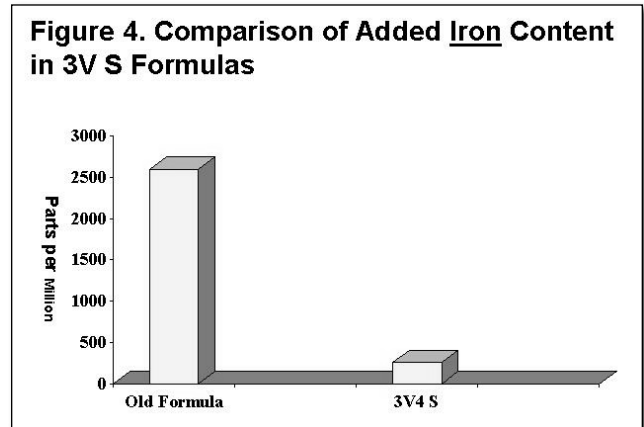


Sulfur content of water can be a problem. Sulfur levels exceeding 1,000 ppm begin to cause nutrient tie-ups.

Vigortone’s 3V Formulation Concept

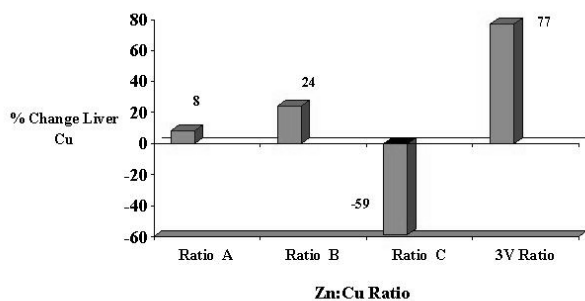
The Vigortone 3V formulation concept was developed to improve nutrient uptake not only

from the mineral but from the producers own feedstuffs. For example, iron (Figure 4) and sulfur (Figure 5) content of 3V minerals was reduced. This results not only in a more available and stable formula but accounts for potential antagonists present in the feed and/or water.



Also, 3V minerals contain a specific ratio of zinc:copper to enhance copper and zinc uptake by the cow or calf. Montana State University research (Figure 6) shows that the zinc:copper ratio used in 3V formulations results in a 77% increase in liver copper over other ratios. In this trial heifers were fed various ratios and levels of copper and zinc. After 90 days on test, liver biopsies were obtained and the increase in liver copper determined. This trial was conducted with a significant level of molybdenum in the diet.

Figure 6. Effect of Mineral Zn:Cu Ratio on Liver Copper Increase After 90 Days
(Heifers in presence of high molybdenum)



Patterson, Montana State University

High Expectation Minerals

Vigortone produces “high expectation” minerals. Producers on a Vigortone mineral program have a right to expect more dollars in their pocket because of healthier, heavier weaned calves, better reproduction, and greater cow longevity. Such high expectation minerals are the result of Vigortone’s extreme attention to formulation detail. The 3V concept is the next step in precision formulation and builds upon the principles of the past.