



# Cattle Producer's Handbook

Nutrition Section

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## Mineral Supplementation of Beef Cows in the Western United States

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The beef cattle industry in the western United States is dependent on forage production. However, forage alone often does not provide all the essential nutrients necessary to maintain a healthy and productive cow herd. Consequently, the proper balance of protein, energy, vitamins, and minerals is needed to maintain an efficient and economical nutritional program.

If dietary nutrients are not in the proper balance, herd health, production, and efficiency will suffer. In other words, a cow's performance will be dictated by her most limiting nutrient. For example, providing 200 percent of a cow's energy requirement will not substitute for providing only 75 percent of her requirement for protein and/or minerals.

Minerals are commonly classified as either macro or micro (also known as trace) minerals. The macrominerals are calcium, phosphorus, potassium, magnesium, sodium, chlorine, and sulfur, while the common microminerals are iron, manganese, zinc, copper, iodine, selenium, cobalt, and molybdenum. Mineral supplementation of beef cattle consuming standing or harvested forage is necessary to maintain optimal reproductive efficiency, immunity, lactation, and growth.

Development of a mineral supplementation program to meet the requirements of cattle consuming a forage-based diet can be difficult. This is primarily because of challenges associated with (1) changes in animal requirements with the stage and level of production, (2) differences in the concentration of minerals in the forage, and (3) providing a mineral supplement in such a way as to ensure adequate intake and bioavailability (Green 2000). This paper will attempt to address these challenges.

### Mineral Requirements

The mineral requirements of dry and lactating beef cows are presented in Table 1. Caution should be exercised when estimating a cow's mineral requirements because of the many interactions associated with certain minerals. Copper is one of the most commonly affected nutrients by interactions with other minerals. For example, Herd (1997) suggests increasing the recommended level of copper above that listed as the requirement anytime dietary molybdenum exceeds 2 ppm (parts per million), sulfur exceeds 0.3 percent, iron exceeds 250 to 300 ppm, or some combination exists in the feed and water supply.

In addition, low dietary calcium and/or high dietary potassium has been involved with grass tetany (hypomagnesemia) as indicated by the so-called "tetany ratio" (diet potassium concentration divided by the sum of the diet calcium and magnesium concentration). If this ratio is greater than 2.2, the diet is classified as tetany-prone. Thus, a low content of calcium and/or magnesium (or high potassium) could create a ratio greater than 2.2.

Herd (1997) provides two points that cattle producers should consider when determining the level of supplemental mineral desired: (1) "moderately higher levels of mineral intake, for up to 6 weeks, may be needed and safe for cattle with severe deficiencies, but should not be continued once their mineral status has returned to normal" (obtain the assistance of a nutritionist and veterinarian before providing minerals in excess of requirements), and (2) "relationships in cows have been well established between stage of production and requirements for major minerals, protein, and energy; this is not true for trace minerals."