

TS K-Mix

Trace Minerals plus Selenium

- **The need for trace element supplementation has increased in recent years due to the gradual depletion of minerals in farm soils and increase animal confinement. Trace elements iron, manganese, cobalt, zinc and manganese are minor but essential minerals in live-stock nutrition.**
- **Selenium – Vitamin E metabolism.**
- **Iron (along with Copper) is essential to form hemoglobin in the blood.**
- **Manganese affects the metabolism of calcium and carbohydrates.**
- **Cobalt is needed to enable rumen bacteria to synthesize Vitamin B12. Cobalt deficiency causes loss of appetite, weakness, anemia, decrease in fertility and lowered milk production.**
- **Prolonged stress or disease can create a new set of metabolic and nutritional requirements for nutrients. If the animal cannot maintain adequate plasma and tissue levels, as well as adequate enzyme activity levels, the disease becomes more difficult to control. Loss of these nutrients can result in depressed or reduced immune response.**

COBALT

- **Cobalt is a component of Vitamin B-12 and is added to feed products to provide the cobalt needed by bacteria to synthesize Vitamin B-12. There appears to be little need to add cobalt to the diets of non-ruminants.**
- **Cobalt deficiency results in anemia that is different from iron and copper deficiency anemia. Other symptoms are reduced appetite and reduced growth rates.**
- **Cobalt increases the urinary excretion of Iodine.**
- **Fe accumulates during Co deficiency (Co needed for Fe metabolism).**
- **Cobalt toxicity is unlikely due to the very high cost.**
- **Cobalt Deficiency has been linked to increased incidence of Brucellosis.**

MANGANESE

Manganese is a co-factor in enzymes involved in carbohydrate metabolism, amino acid metabolism, fatty acid synthesis and cholesterol metabolism. Manganese is involved in normal growth, normal bone formation and normal reproduction.

The efficiency of manganese absorption decreases as dietary levels increase. Calcium, phosphorus, copper, zinc, iron and phytate reduce manganese absorption. Manganese is the only mineral with significant absorption in the large intestine. The absorption rate for manganese is low and relatively constant at 1 – 4 %. There is tissue storage of manganese in bone, muscle, liver, gastro- intestinal tract and pancreas.

There appears to be homeostatic control of manganese absorption and excretion, but the control mechanisms are unknown.

Manganese deficiency results in poor growth, impaired reproduction (testicular degeneration in males, defective ovulation in females), and slipped tendon in birds. Manganese deficiency is involved in anestrus in all species.

High Mn interferes with Iron utilization and lowers serum Mg.

Se (Selenium)

- **Selenium is involved in Vitamin E absorption, utilization and retention. It is essential for glutathione peroxidase activity, which helps in prevention and repair of oxidation (rancidity) of lipid material.**
- **Selenium is found primarily in muscle and high protein tissue, with very little selenium found in fatty tissue. Blood selenium levels are highly responsive to changes in dietary selenium levels.**
- **Excretion of selenium is primarily in the urine. Urinary losses appear to be dependent on a renal threshold, that is, selenium is conserved by the kidneys up to a certain level, and there is essentially 100% loss of selenium over that level.**
- **Selenium deficiency results in muscular dystrophy (white muscle disease) in calves and lambs, exudative diathesis in poultry, liver necrosis in pigs and retained placentas in beef, dairy, sheep and swine.**
- **Selenium toxicity results in blind staggers or alkali disease which is characterized by hair loss, sloughing of hooves, lameness, excessive salivation, blindness, paralysis and death. In poultry, egg production and hatchability are reduced and there is a high incidence of deformities, including lack of eyes and deformed wings and feet.**
- **High sulfate and As levels as well as high protein in the ration protects against selenium toxicity.**