

## Copper Toxicity

### Introduction

**Copper:** is an essential element required by a number of enzymes involved in specific oxidase type reactions.

- derived from plants (5-20 ppm)
- legumes are higher than plants
- absorbed in the intestinal tract and stored in the liver (40-70%)
- normal copper levels are from 0.7 to 2.0 ppm

### Copper Poisoning

Copper poisoning in feeder lambs is often the result of feeding improperly formulated mixed diets.

- closely related to molybdenum toxicity
- sheep are 10 times more susceptible than cattle
- many outbreaks can be traced to feeding supplements that have been formulated for cattle and swine

### Cause and Disease Process

- triggered by stress
- excessive copper stored in liver (>15ppm)
- hemolytic crisis- destruction of red blood cells

### Clinical Signs

- chronic copper poisoning appears as an acute hemolytic crisis with death occurring in 24-48 hours.
- the animals suddenly go off feed and become weak
- mucous membranes and white skin are a yellowish brown
- hemoglobin in the urine is a dark red-brown color
- the number of animals in a group may be low (5-10%), the death of an infected animal may reach 75%

### Postmortem Findings

- pale tan liver
- dark green/black kidney

### Diagnosis

Very few conditions cause a severe hemolytic crisis. Phenothiazine and onion poisoning cause similar symptoms.

A definite diagnosis relies on copper serum or the copper tissue levels.

Feed samples should be analyzed for copper and molybdenum concentrations before feeding

### Treatment and Prevention

- source should be identified and removed immediately
- avoid stressful conditions
- Treatment is based on inactivating the copper with molybdate and sulfate.
- Drench with electrolytes and sodiumthiomolybdate to flush kidneys + bind copper 1qt/hr