



## What are the benefits?

Trace minerals are required for numerous metabolic functions: growth and development, immunity, reproduction and lactation. Supplying zinc (Zn) and copper (Cu) in a highly bioavailable form has shown benefits for these functions. Response to stress is affected by the trace mineral status of an animal. Negative effects from stress are decreased when animals have adequate trace mineral status and are consuming a balanced diet with readily bioavailable minerals.

### Hoof Condition

- Zn** • Cell division to support hoof wall growth and repair
- Cu** • Hoof wall protein synthesis: collagen, keratins, cell envelope proteins and intercellular cementing substance

### Joints and Skeleton

- Zn** • Cell division and protein synthesis for skeletal growth and repair
- Cu** • Formation of connective tissue (tendons and ligaments), bones and cartilage lining joints

### Immune Response

#### Zn and Cu

- Humoral immunity: antibody titers in response to vaccination
- Cell-mediated immunity
- Non-specific immunity
- Antioxidant activity to remove free radicals and protect cell membranes

### Skin and Coat

- Zn** • Epidermal (skin) cell maintenance through cell division, protein synthesis and antioxidant activity to remove superoxide radicals
  - Facilitates wound healing
- Cu** • Normal production and maintenance of skin and hair pigmentation

### Reproduction

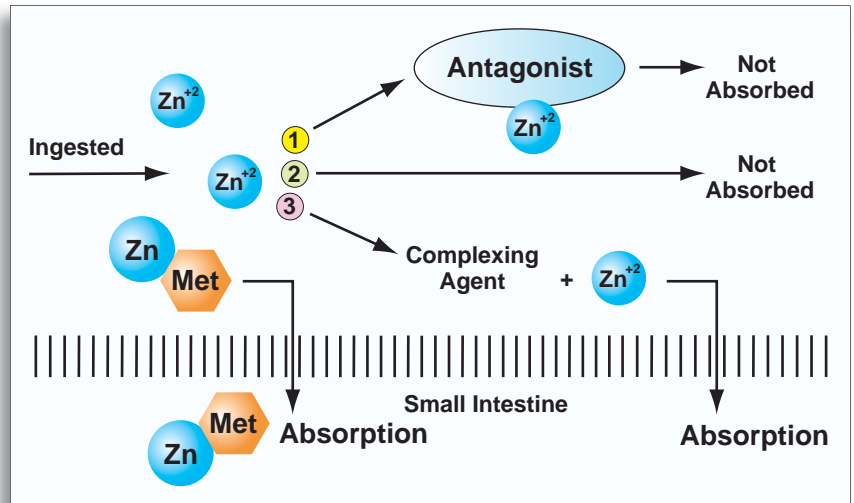
- Zn** • Reproductive tract tissue integrity
  - Conception rates
  - Sperm maturation and quality
- Cu** • Early embryonic survival
  - Estrus and conception rates
  - Central nervous system development in offspring

## How are trace minerals absorbed?

Trace mineral absorption occurs in the small intestine. Once inorganic trace minerals reach the small intestine, one of three things happens:

1. The trace mineral interacts with an antagonist and cannot be absorbed,
2. The trace mineral remains in the inorganic form and cannot be absorbed, or
3. The trace mineral binds to a ligand (such as an amino acid) to be transported across the gut lining.

Zinpro Zn and Cu avoid interaction with antagonists for more efficient trace mineral absorption.

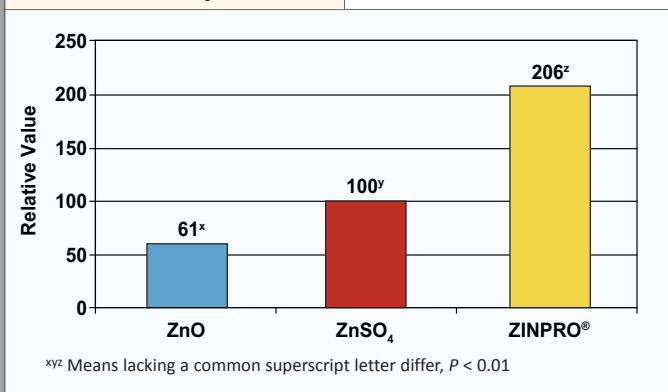


## Why is bioavailability important?

Bioavailability is the ability of the animal to absorb and utilize a nutrient. In bioavailability trials, Zinpro Performance Minerals® continually show improved bioavailability values in comparison to inorganic sources.

When horses are exposed to stress or have increased trace mineral requirements due to performance, production or growth, feeding trace minerals with higher bioavailability helps to better meet requirements and maintain adequate trace mineral status.

**Bioavailability of Zinc**



**Decreasing Status Affects Performance**

