

Mineral and Vitamin Supplementation

For Neonatal Beef Calves and their Dams

A Guide for Beef Cattle Producers



Trace minerals and vitamins play crucial roles in the health and productivity of beef cattle. Although grazing may provide many of these nutrients, deficiencies in essential nutrients are common due to the types of plants available, soils low in minerals, climate factors, and stage of maturity of forage.

Rumen microbes provide cattle with many water-soluble vitamins, but fat-soluble vitamins such as A, K, and E must be taken up through food sources. Delivery of trace minerals and vitamins through injectable or feed supplements can have beneficial effects on cows and their calves. The concept of fetal programming suggests that the dam's nutrition is one component that affects the developing fetus' future productivity in life, such as carcass traits or reproductive performance of heifers.

Supplementation for Dams:

BACKGROUND

- Many micronutrients pass the placenta to reach the developing fetus and are essential for proper bone and muscle development, among other functions.
- Trace minerals reach higher levels in the fetus than in the dam if requirements aren't met, i.e., the needs of the fetus take priority over the needs of the dam.
- When a fetus is submitted to the diagnostic lab, trace element levels in the fetal liver may be higher than in the dam and have to be interpreted with caution.
- Pasture examination and drinking water evaluation are good starts to a trace mineral program assessment.
- Extension advisors can help with pasture sampling and interpretation of results.
- Your veterinarian can also help you with testing cattle for mineral status through a blood test or liver biopsy.

MINERAL FORMS

The decision on what type of mineral product to use may depend on pasture conditions or stage of the production cycle, e.g., organic supplementation could be offered from late pregnancy through the breeding season.

Inorganic Minerals

- Prone to form complexes with other minerals in the rumen.
- The complexes formed reduce the rate at which they can be absorbed in the digestive tract.

Organic or Chelated Forms

- Thought to be absorbed at higher rates than inorganic forms.
- Have shown superior results in some research trials, e.g., earlier puberty in heifers born to dams that were supplemented with chelated minerals.
- The cost is higher than for inorganic forms.

ADDITIONAL INFORMATION

- Selenium and copper boluses are available that provide supplementation over several months to a year by slowly dissolving in the reticulo-rumen.
- Injectable products, such as Multimin®, can be part of a supplementation program, but usually cannot replace it because they do not provide enough trace elements for an extended period of time.

Supplementation for Calves:

Calves that are born to well supplemented dams are ahead of the curve and will continue to be supplemented through the milk, although with less efficiency than through the placenta, and through their own supplementation.

SELENIUM

- In areas with severe selenium deficiency, supplementing the calf through injectable selenium, such as Bo-Se® or Multimin® may be beneficial. Both of those require a prescription from your veterinarian.
- A map showing levels of soil selenium is available from the US Geological Survey that can give an indication of the level of supplementation that may be necessary in your area.
- To avoid exposing people to high levels of selenium in meat products, The FDA has set a legal limit to selenium intake of 120 ppm in free-choice supplements and not to exceed 3 mg per head per day.
- Exposing cattle to high levels of selenium can lead to toxic. Signs of selenium toxicity include lameness, deformed hoofs, and loss of tail hair.
- As a rule, do not give two forms of selenium supplementation simultaneously, e.g., a bolus on top of a free choice mineral that also supplies sufficient selenium.

VITAMIN A

- Vitamin A is made from precursors in green forage and stored in the liver.
 - During drought conditions Vitamin A storage in the liver is likely depleted after 3 – 4 months.
- Vitamin A deficiency can lead to blindness in calves and poor fertility in cows.
- Vitamin A is poorly supplied to the fetus through the placenta and calves are dependent on colostrum intake for their initial Vitamin A needs.
- Due to shortages in Vitamin A manufacturing, many mineral mixes are not supplying enough Vitamin A to meet requirements.
 - Vitamins in mineral mixes degrade over time and with inappropriate storage.

VITAMIN D

- Vitamin D is produced in the skin when the animal is exposed to sunlight, so unless cattle are kept indoors, Vitamin D deficiency should not be a problem in calves or cows.
- There are injectable products that supply Vitamin A, D, and E that might be helpful for fall born calves.

VITAMIN E

- Requirements for Vitamin E and selenium are co-dependent, i.e., if one of them is low, higher levels of the other can compensate.
- Calves that are born during droughts when Vitamin E reserves may be low in forage and what they receive from their dams, may require higher selenium supplementation than when green feed is abundant.
- White muscle disease is a condition that is caused by a deficiency in Vitamin E and/or selenium characterized by stiff gate, trembling, increased breathing effort, or sudden death in calves.

VITAMIN K

- Vitamin K is produced by the microbes in the rumen and is usually sufficient to meet their needs.

ADDITIONAL VITAMIN INFORMATION

- Anecdotally, there is a higher risk of a vaccine reaction called anaphylaxis when vaccines for Gram negative bacteria (*Moraxella*, *Pasteurella*, *Salmonella*, *Mannheimia*, *Histophilus*, *E. coli*) are given at the same time.

Therefore, it is not recommended to do many vaccinations at the same time as Vitamin A, D, & E injections.

Take Home:

- Work with your veterinarian to assess what type of supplementation is necessary, based on your herd demographics and grazing location, as well as other feed sources.

This document was made in collaboration with the following organizations:

