

Minerals and Livestock Nutrition

Mineral nutrition for livestock is a critical part of their diet, affecting health, fertility, production and your bottom line. Supplementation requirements can vary greatly depending on feed types, animal requirements and your operation's location. Mineral levels influence reproduction and performance / growth, immunity and disease resistance. Mineral requirements are made up of macro (required in large quantities) and trace minerals (small quantities but equally important). Often Vitamins are included in mineral supplementation programs.

- **The Macro Minerals include:**
Calcium, Phosphorus, Magnesium, Potassium, Sulphur, and Salt (Sodium Chloride).
- **The Trace Minerals include:**
Selenium, Copper, Zinc, Manganese, Iron, Iodine, Cobalt, Molybdenum.

Vitamins are essential for normal metabolism and when absent or not provided in adequate quantities lead to a deficiency symptom.

- **Fat soluble vitamins are vitamins A, D, E and K.** They are required in a balanced feeding program. They can be readily available in growing forage, but rapidly oxidize (are destroyed) in stored hay. Supplementation is required when feeding cured forages.
- **Water soluble vitamins are B complex vitamins and vitamin C.** Ruminants and non-ruminant herbivores (i.e. horses) typically don't need dietary supplements of water-soluble vitamins and vitamin K as they are synthesized by gut microbes.

Feeds can have a wide range of mineral levels depending on crop type and the soils where they are grown. While it is essential to know what your feeds contain by testing your feed, here's a table to show some of the ranges you can expect on the Macro Minerals (Table 3 from the BC *Livestock Drought Management Guide*):

Typical Mineral Ranges:

Calcium:

Alfalfa:	1.0 – 2.0%
Grass:	0.1 – 1.0%
Grains:	0.02 – 0.1%

Phosphorus:

Alfalfa:	0.1 – 0.4%
Grass:	0.1 – 0.4%
Grain:	0.25 – 0.5%

Ca : P Ratio:

Alfalfa:	10:1 to 5:1
Grass:	1:1 to 2.5:1
Grains:	0.08:1 to 0.2:1

Magnesium: 0.2 – 0.5%

Potassium: 1.0 – 4.0 %

Sulphur: 0.1 – 0.3%

If an operation is feeding a forage type (e.g. purchased alfalfa when usually they have grass forages) or vice-versa, it can create a requirement to make a mineral change to avoid metabolic disorders. Forages from different locations can also have different trace minerals levels and require changes.

Purchased minerals are often identified as 1:1, 1:2, or 2:1 which is the ratio of Calcium to Phosphorus in the mineral. Diets that are high in alfalfa are typically balanced with a lower Ca:P ratio mineral and diets higher in cereal greenfeed/ silage or grain with a higher Ca:P ratio. It is also important to consider whether salt is included in your mineral and at what level.

Previous forage testing projects within the BC interior have shown that many areas have deficiencies in trace minerals including Selenium, Copper, Zinc, and Manganese. There are also areas that have excessive even toxic levels of minerals.

Minerals can have antagonist effects; these are substances or other minerals that decrease or block the metabolic function or absorption of other nutrients like vitamins and/ or minerals. Excess of specific minerals such as Sulphur or Molybdenum can cause antagonistic factors that decrease availability of other critical minerals such as Copper. It is important to consider mineral levels in livestock drinking water sources as excesses within water (such as Sulphur) can also cause these interactions. Some types of forage are more prone to accumulate minerals, for example cereal greenfeed can have higher sodium levels which can influence intakes including those of salt blended minerals. In circumstances where antagonists are present or animals are under stress, utilizing trace mineral forms with higher bioavailability such as Chelated can be advantageous.

Steps to consider when planning your mineral program

1. Testing Forages and Water:

When developing a mineral program or troubleshooting a suspected mineral problem, it is important to test your forages (using Wet chemistry for minerals), consider drinking water and other sources of mineral. It is very helpful to collect and analyze information on your herd's performance (growth, reproduction, health) and any changes. Working with professionals including Nutritionists and your Veterinarian is recommended to ensure your herd's requirements are met economically.

2. Ration balancing to adequately provide minerals

Select a mineral to complement the forage you are feeding. Diets that are high in alfalfa are typically balanced with a lower Ca:P ratio mineral and diets higher in cereal greenfeed/silage or grain with a higher Ca:P ratio

3. Selecting the appropriate mineral supplement for your operation

There are many supplementation strategies depending on what works best for your operation, while dry, loose mineral is often the most economical form there can be a convenience factor to using other forms such as molasses tubs or liquid, or including minerals within a grain-based supplement. It is important to compare the costs and monitor consumption to ensure the livestock are receiving the targeted amount. Follow any instructions regarding multiple sources to ensure you are not accidentally causing a toxic level. Also pay attention to label instructions on feeding added salt or if and how to mix the mineral with a loose salt.

4. What do the options cost?

There will be options regarding what to use to meet those requirements. Compare the cost of those options to ensure your requirements are met as economically as possible.

Written by: Mike Witt, P.Ag, Jim Forbes, P.Ag and Greg Tegart, P.Ag,

One-on-one support access

If you have questions and would like to follow-up with one of the Livestock Drought Management consultants for an individual appointment, please contact via one of the following to book a virtual appointment. When calling, please indicate whether you would like to talk about animal nutrition, forage management or economics/business decisions so that the administrator can best direct your request.

Phone: 250-573-3611

Toll-free: 1-877-688-2333

Email: drought@cattlemen.bc.ca

(Please note: these contact options will connect you with the BC Cattlemen's Association; however, appointment options are available to all livestock producers across BC and are not limited to cattle.)