



Dairy Briefs

The Latest Information on Dairy Cattle Nutrition



Organic Confusion

Laura Martin, M.Sc

Using organic trace minerals in dairy rations isn't a new technology but the different terminology used can make this nutritional tool confusing. Trace minerals, organic or not, have many different important roles throughout the cow's body. To optimize health and production high producing dairy cows and dry cows may require trace mineral levels over the current recommendations. Organic trace minerals are costly but the benefits may outweigh the costs.

Trace minerals are only required in small amounts in dairy rations but these compounds impact almost every system in the animal (Table 1). Important trace minerals often supplemented in dairy diets are: Cobalt, copper,



manganese, selenium, and zinc. These compounds are involved in metabolizing energy, as components of enzymes and cell structures throughout the body, and as activating signals for different pathways in the body. Deficiencies can result in loss of appetite, anemia, reduced growth, milk yield and reproduction, diarrhea, weight loss, retained placenta, and an increase in mastitis severity. While possible, it is rare to see dairy cows with severe deficiency symptoms. Instead producers are more likely to notice reduced reproductive performance and an increase in health issues on the farm; and these are the warning signs for a variety of problems.

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Inside this Issue...

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Table 1: Milk Cow Trace Mineral Requirements and Their Role in the Body

Trace Mineral	Requirement * (mg/kg diet)	Role
Cobalt	0.11	Used to make Vitamin B12 Metabolizes propionate
Copper	11	Involved in blood formation Copper dependent enzymes Antioxidant system Structural integrity of collagen and elastin Energy metabolism
Manganese	14	Component of enzymes Enzyme activator Formation of cartilage
Selenium	0.3	Antioxidant system Metabolic regulation
Zinc	48	Component of enzymes Enzyme activator Immune system
* NRC 2001		

We ask a lot from our dairy cows. While genetic progress has increased the milk production capacity of our dairy cows it has also increased their need for key nutrients. Work out of Illinois recommends higher levels of trace minerals for milk cows and dry cows than NRC due to the stress of production and requirement for optimal health that we put on the cows. Also with changes to manure management and the use of commercial fertilizers the level of trace minerals in forages may be lower than book values.

This is where dairy feed companies come in. They provide a complete package of trace minerals for farms. To keep prices reasonable the inorganic forms of these minerals are used as they are less expensive than organic minerals. For the majority of cows these packages work and organic trace minerals are not required. If there is a health challenge on the farm or the cows are milking to beat the band, then that is when extra trace minerals may be needed. Just supplementing extra inorganic minerals can be tricky. At high levels trace minerals can have toxic effects. These minerals can interfere with each other and by feeding more it is possible to reduce the amount that the cow can actually use.

Organic trace minerals are minerals that have been bound to organic compounds like polysaccharides, amino acids, and proteins. Once the mineral is bound to these compounds it is less likely to interfere with other minerals, reducing the potential for toxic effects due to mineral interactions. Also research has shown that organic trace minerals are more available to the animal than inorganic minerals. In the case of ruminants, where the rumen microbes get first crack at minerals from the diet, organic minerals are protected from the microbes. These minerals break down in the small intestine allowing more mineral to be used by the cow rather than her microbes. The term organic mineral has nothing to do with certified organic farming but with how the minerals are bound.

There are many different products available that fall under the organic mineral umbrella, and this is where it gets confusing. The first group of organic minerals are mineral complexes. These organic minerals are bound to large organic compounds, like polysaccharides (complex chains of sugars). Chelated is a common term that is often used interchangeably with organic when it comes to supplementing minerals. Actually chelated just

refers to the chemical process of how they bind the mineral with the organic compound. Chelated minerals are often organic minerals that are bound to proteins or amino acids; zinc methionine would be a good example of a chelated mineral. While there are differences due to the nature of the chemical bonds, both complexed and chelated minerals have higher availability, and are less likely to cause negative interactions with other minerals, than inorganic compounds.

If organic minerals are more available and less likely to interact with other minerals why don't nutritionists recommend feeding only organic minerals? The first reason is the cow, or her rumen microbes to be more accurate. Organic minerals are designed to bypass the rumen and get absorbed in the small intestine. A 100% organic mineral ration would mean that very few minerals would be available to the rumen microbes, and they need minerals too. Research done by Nocek et al. (2006) showed that performance in dairy cows was better with a combination of inorganic and organic minerals rather than a straight organic program. The recommen-

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Potential Benefits

- Organic minerals seem to have higher bioavailability, which means that a higher percentage of the nutrients may be available to the animal
- Added potential for enhanced fertility & reproduction
- May help improve immune system response
- May help improve mammary and hoof health



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dations are to only replace one-third of the mineral requirement with organic. This strategy would also help reduce the cost of an organic mineral program, as the second reason 100% organic minerals are not recommended is cost. Organic minerals typically cost 10 – 15 times more than their inorganic counterpart and even though they are only required in small amounts this extra cost can add up.

Another strategy for using organic minerals is to add selected organic trace minerals over and above the inorganic minerals already in the ration. This strategy is probably more commonly used as it can help boost milk production, health status and reproductive fitness in our high producing dairy cows. This approach, and the responses from the cows, adds weight to the idea that current recommendations for milk cow requirements may be lower than what the cows actually need with the stress of high production.

Trace minerals may only be required in small amounts but they contribute to different systems throughout the cow. Organic trace minerals, whether they are complexed or chelated, provide producers with the opportunity to top up the mineral status of their cows with low risk of harmful interactions. Monitor the herd to ensure that the organic mineral program is providing results in terms of milk production, health or reproduction and that the extra cost of the organic minerals is providing a return.



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