UF IFAS Extension UNIVERSITY of FLORIDA

UF/IFAS PEER REVIEWED AN348

Methods of Trace Mineral Supplementation[1]

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Introduction

Trace mineral supplementation is an integral component of the total diet for beef cattle. Trace minerals function in many of the metabolic processes associated with animal growth, health, and reproduction. It is essential that cattle have access to trace minerals in their diet. However, the forage cattle consume as the bulk of their diet is often deficient in trace mineral concentrations. Therefore, feed needs to be supplemented with trace minerals on a regular basis. Cattle producers can choose from a number of different methods to provide supplemental trace minerals to cattle. Each method has advantages and disadvantages. The suitability of each method depends on the needs of the animal, the mineral concentrations of the feedstuffs consumed by the cattle, and the ability to provide trace mineral supplementation. Cattle producers should evaluate the methods against management activities to determine the optimal trace mineral delivery strategy. Below are several common ways to provide trace mineral supplements as well as their advantages and disadvantages.

Trace Mineral Supplementation Options

Table 1. Free choice or fortifying other feedstuff with trace minerals.

Advantages	Disadvantages
Can supply via free-choice loose mineral	Animals can over- or under-consume free-choice mineral
Can supply via manufactured supplement	Spoilage, shrink, weathering losses
Can incorporate into other feedstuffs or with other additives	Producers need to select the appropriate formulation
Flexibility in formulation to fulfill specific needs	Ongoing expense
"Everyday" consumption opportunity	Animal has to consume the product
Can include all macro and micro minerals	
Can incorporate a variable amount of salt in supplement	
Can be used to move/distribute animals	
Can be used to supply other nutrients	
Provides minerals for rumen microbe metabolism	

1. This document is AN348, one of a series of the Department of Animal Sciences, UF/IFAS Extension. Original publication date October 2018. Visit the EDIS website at https://edis.ifas.ufl.edu for the currently supported version of this publication.

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Figure 1. Loose trace mineral supplement and manufactured feed with trace minerals incorporated.
Credits: Matt Hersom, UF/IFAS

Table 2. Injectable sources.

Advantages	Disadvantages
Guaranteed delivery of defined amount of certain trace mineral	Sources do not feed rumen microbes
Every animal receives defined amount of supplied trace mineral	Producers need to follow Beef Quality Assurance procedures for injections
Option when delivering a free-choice or feed-based mineral supplement is not possible	Bolus supply of certain trace minerals results in an immediate peak in mineral concentration with declining concentration over time
Immediate effort to correct deficiencies	Potential for toxicity if paired with other sources
One-time cost	Require repeated injection if only source of supplemental trace minerals
Easy to supply certain trace minerals to animal	Have to handle animal to provide trace minerals
	No formulation flexibility
	Possible injection site issues
	Provide only 1 to 4 specific micro minerals (Zn, Mn, Se, Cu), no macro minerals
	Require a veterinarian's prescription

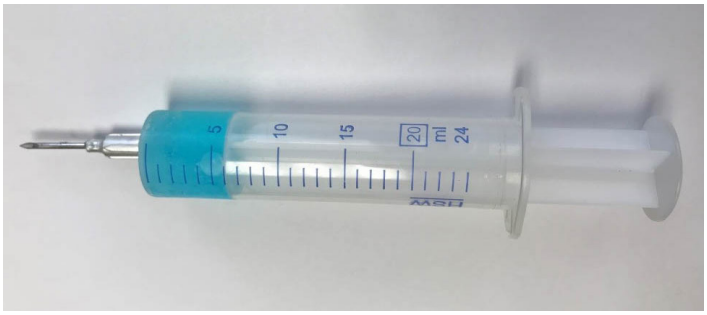

Figure 2. Injectable trace mineral solution in a syringe, dose for a 1,200 lb mature cow.
Credits: Matt Hersom, UF/IFAS

Table 3. Trace mineral block.

Advantages	Disadvantages
Provides salt	Not a viable source of any trace minerals, 97 to 99% salt
Can be used to move/distribute animals	Use of the block can be inconsistent
Inexpensive	Animals can over- or under-consume
	Animal has to consume the product
	Ongoing expense

Figure 3. Trace mineralized salt block.
Credits: Matt Hersom, UF/IFAS

Table 4. Yellow or blue salt block.

Advantages	Disadvantages
Provides salt	Not a viable source of trace mineral, 97 to 99% salt
Can be used to move/distribute animals	Use of the block can be inconsistent
Inexpensive	Animals can over- or under-consume
	Provides only single element (sulfur or cobalt)
	Animal has to consume the product
	Ongoing expense

Figure 4. Blue cobalt block.
Credits: Matt Hersom, UF/IFAS

Table 5. Cafeteria style.

Advantages	Disadvantages
Can provide salt	Individual minerals are not palatable
Can be used to move/distribute animals	Have to manage offering multiple individual minerals
	Poor consistency of consumption
	Animals can over- or under-consume
	Animal has to consume the product
	Requires numerous inventories of mineral products
	Cattle do not know which minerals they need
	Ongoing expense

Issues can arise when producers pair several of the trace mineral supplement options together (e.g., free-choice mineral and salt block, or a free-choice mineral and injectable). Under consumption of the free-choice mineral is common when a salt, yellow, or blue block is offered alongside the free-choice trace mineral supplement. Cattle will consume the block to satisfy their salt requirement, but may under-consume the formulated mineral supplement. In this scenario, insufficient mineral consumption can lead to decreased trace mineral status in the animal. Some producers may appreciate the cost savings afforded by replacing mineral consumption with salt block consumption, but they may suffer production losses. Conversely, when a free-choice trace mineral or fortified feed supplement is paired with injectable mineral treatment, the potential for toxicity or antagonisms increases. Consistent free-choice mineral consumption can result in an adequate mineral status in cattle, but the bolus application of injectable mineral can produce detrimental outcomes. Exercise caution when combining multiple trace mineral supplementation options. Remember to include all feed resources and water when determining an animal's total macro and trace mineral consumption.

Conclusion

Grazed and conserved forages in Florida are generally deficient in many of the trace minerals that are important to beef cattle nutrition. Providing a consistent supply of trace minerals for the beef cow herd is a good management practice. Beef cattle producers should evaluate the trace mineral supplementation options for their herds. Each method has defined advantages and disadvantages. Understanding the appropriate application of trace mineral supplement methods is important to the long-term performance, health, and reproductive management of the beef herd.