

# **Behind the Scenes**

At the monthly team meeting, Crystal Creek<sup>®</sup> employees learned communication styles by leading each other blindfolded through an obstacle course.

TRANSPORT OF















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# The Science Behind Aloe's Use in Livestock





With the passing of the Veterinary Feed Directive in 2015, which requires a veterinary prescription for most antibiotics to be added into feed, many livestock producers have become interested in nonprescription alternatives to help keep their animals

By Ryan Leiterman, D.V.M. Director of Technical Services

healthy and productive. As a result, the use of herbal supplements and flavoring agents in livestock diets has gained in popularity. Aloe vera, an herbal agent with researched health benefits, can be fed to livestock as a feed flavoring agent in accordance with the American Association of Feed Control Officials standards and guidelines. Crystal Creek<sup>®</sup> has aloe vera products labeled for use in livestock feed in liquid, pelleted and meal forms.

# How Aloe Works in the Body

The aloe plant has over 200 compounds which are responsible for its medicinal and growth promoting properties. Of these, the polysaccharide acemannan is one of the most versatile compounds, having been shown to:

- 1. Stimulate the immune system
- 2. Provide antimicrobial activity and
- 3. Have anti-inflammatory function

Specifically, acemannan has been shown to activate macrophages, a specific part of the immune system that fights infection. It also has been shown to

increase the activity of both B-lymphocytes and T-lymphocytes, which are the cells responsible for producing antibodies. These properties have made the use of aloe in various livestock raising applications a focus of continuing research and development.

### The Research

- Aloe has been shown to increase rumen microbial metabolism which leads to increased volatile fatty acid production.
- Poultry supplemented with 1% aloe in their diet had greater body weight gain, better feed intake and improved feed conversion rates than those fed diets without aloe.
- Broiler chickens fed 2 oz of liquid aloe per gallon of drinking water showed a significant increase in antibody titers to vaccines when compared to the control broilers that did not get aloe in their water.
- Broiler chickens fed aloe showed less gastrointestinal irritation and lower coccidia oocyst shedding in their feces compared to the control broilers.
- Weaned pigs fed 0.05% aloe polysaccharide in their diet had increased average daily gain and a reduced incidence of diarrhea and weaning stress.

# **Practical Applications**

Stress is defined as a state of strain from adverse or demanding conditions. Livestock can be stressed by many different factors: weaning, pen movement, dehorning, vaccinating, shipping, production demands, weather and flies. Some of these stressors can be reduced by good management, but not all stressors can be eliminated. The immune system of an animal has the ability to resist infection or disease. However, when animals are stressed, they are more vulnerable to disease due to decreased immune function. Figure 1 depicts the effect of cortisol on the immune system of a lactating dairy cow during freshening. Cortisol is a hormone that is released when animals are stressed. As the cortisol level



increases, immune function decreases. Once a stressful event has occurred, cortisol levels will eventually come down but it can take 2-3 weeks for levels to return to normal. During this time, livestock are more vulnerable due to their decreased immune function.

Crystal Creek<sup>®</sup> offers 3 different types of aloe product; each for a different application.

- 1. Crystal Pellets<sup>™</sup>: a pelleted aloe vera product best suited for inclusion into grain mixes or being top dressed
- 2. Crystal Meal<sup>™</sup>: a granular aloe vera product for inclusion into ground feed
- 3. Crystal Creek<sup>®</sup> Whole Leaf Aloe Vera Juice: a liquid aloe for inclusion in water, milk or oral drenches

The natural ingredients in these products have been scientifically proven to decrease inflammation, stimulate the immune system along the gastrointestinal tract, promote nutrient absorption in the lower gastrointestinal tract and promote antioxidant regeneration. The complete polysaccharide profiles found in Crystal Pellets<sup>™</sup>, Crystal Meal<sup>™</sup> and Crystal Creek<sup>®</sup> Whole Leaf Aloe Vera Juice are made up of small, medium, and large molecular weight molecules. The polysaccharide's molecular weight is very important and helps to determine what body system the polysaccharide supports. Figure 2 shows the breakdown of aloe vera's polysaccharides according to their molecular weight and the area of effect each molecular weight molecule has on the animal's immune system.

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### The Science Behind Aloe's Use in Livestock

(Continued from page 3)

## Not All Aloe Products Are the Same

Some companies are marketing aloe with a confusing lab test called the Methanol Precipitable Solids (MPS) test. The MPS test measures total precipitable solids and sugars within a product. The MPS test does not accurately distinguish between the active polysaccharides contained in an aloe product and other inert or inactive polysaccharides. That is to say that a product can have a high MPS test but have low amounts of active aloe polysaccharides, resulting in poor overall function.

Crystal Creek<sup>®</sup> uses an independent third-party lab with the approved testing method of high performance liquid chromatography (HPLC) to independently verify our aloe vera sources. HPLC testing can separate the polysaccharide molecules to tell what sugars come from the aloe plant and provide the quantity of each polysaccharide size range that is present.

The International Aloe Science Council (IASC) is an international committee that is compromised of scientists from around the world that specialize in aloe science. The IASC endorses the HPLC test and rejects the MPS test.

Manufacturing techniques can vary and can significantly impact molecular weight distribution and retention, thus impacting performance of products. Crystal Creek<sup>®</sup> prides itself on thoroughly testing our aloe products with methods approved of by the IASC.

# All Crystal Creek<sup>®</sup> Aloe Sources Are:

- Compliant with the International Aloe Science Council's standards
- Subject to quality control testing with HPLC analysis (both from the manufacturer and our own internal quality control testing protocol)
- Tested for a confirmed molecular profile and the amount of each active polysaccharide compound
- · Certified for use on organic operations

Choosing the right aloe product is more than just buying on price. Purchasing an aloe product that is

backed by recommended IASC scientific testing will assure your animals are receiving a quality, proven nutritional support. Crystal Pellets<sup>™</sup>, Crystal Meal<sup>™</sup> and Crystal Creek® Whole Leaf Aloe Vera Juice are varying forms of aloe vera that can easily be added to vour livestock's diet. To learn more about these products and how they can be used on your farm, call Crystal Creek<sup>®</sup> today.

References available upon request.

# 2023 CRYSTAL CREEK® PRODUCT CATALOG

Crystal Creek<sup>®</sup> is excited to announce that our annual product catalog is available in digital format. In addition to our print version, for customers who prefer a hard copy, a convenient digital version can be found on our website. This digital version is easily shared with a longer life span than a physical copy that can be damaged or misplaced. Crystal Creek<sup>®</sup> takes great pride in producing an interactive catalog with high quality images and features that provide our customers with product and technical information. Visit our website at <u>www.crystalcreeknatural.com</u> to get your copy today.



# CRYSTAL CREEK<sup>®</sup> FLY REPELLENT A SAFE, EFFECTIVE, NATURAL CHOICE

Flies are known to spread disease, cause stress and leave painful bites. Crystal Creek® Fly Repellent is a natural, economical tool that provides safe, effective relief from flies. In a recent efficacy trial, independent laboratory testing reported repellency rates as high as 96.7% and the lead PhD researcher concluded that the Crystal Creek® Fly Repellent "provided a high degree of repellency." The Crystal Creek® Fly Repellent showed exceptionally good performance repelling stable flies, who are known to be extremely aggressive.

Crystal Creek® Fly Repellent can be used as a spray, wiped on for more sensitive areas such as the face and ears, or used in an oiler at pasture. The versatile, oil or water based formulas can be diluted to various concentrations to best fit your operations need. As with any good fly control program, it is important to use other fly control methods, in addition to an effective fly repellent, such as keeping facilities clean of manure and waste, dumping out stagnant water and disposing left over feed to discourage areas flies may be attracted to. If you want to provide your livestock with immediate, effective, safe relief from flies, try the Crystal Creek® Fly Repellent today!



# CRYSTAL CREEK®

#### NATURAL FLY REPELLENT

- Immediate, effective relief
- Versatile, oil or water based formulas
- Wipe on, spray on or use in an oiler

# 1-888-376-6777

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# Water: The Forgotten Nutrient



By Cassy Golburg, B.A. Livestock Specialist

Water is the most vital nutrient for livestock and crucial to many functions in the body. An animal's body is made up of 50-80% water and it helps regulate temperature, spread nutrients throughout the body and eliminate waste. Several factors affect

an animal's water requirement including weather, age, production level and life stage. Despite the importance of water, water quality is often overlooked. Offering easy access to clean water is an important factor when considering the health and productivity of your animals. Just ask yourself... would you drink out of your animal's water cup or water trough?

### Water Quality: What Does It Mean?

There are two basic categories of contaminants that can negatively affect water quality. They are: 1) pathogens like bacteria, protozoa and viruses and 2) inorganic components such as minerals and nitrates. Understanding how each of these categories of contaminants impacts the water livestock drink is important in putting together a plan to improve water quality. The best place to start is with a water test.

# Water Testing

Testing water annually is considered a best practice on many operations while more frequent testing is recommended during a drought or if a shallow water source is being used. Testing should be done at a certified facility and many labs will provide sample collection kits free of charge upon request. A typical livestock water test includes pH, total dissolved solids, total soluble salt, salinity, hardness, iron, manganese and other trace minerals, nitrates and sulfates. Common tolerance levels for dairy cattle can be seen below in Table 1\*.

# **Biofilm:**

The first category of contaminants include pathogens such as bacteria, protozoa and viruses. Most often, bacteria grow and create a slimy film on the inside of the water system of a farm. The scientific word for this slimy film is biofilm and it is defined as: thin, slimy films of bacteria, protozoa and

Table 1   WATER ANALYTE CONCENTRATIONS DRINKING WATER FOR DAIRY CATTLE				
Measurement:	Expected:	Possible Problem:		
pH (cows)	6.8-7.5	Under 5.1 or over 9.0		
	In parts per million (ppm)			
Nitrate	0-44	Over 100		
Calcium	0-43	Over 500		
Magnesium	0-29	Over 125		
Copper	0-0.6	Over 0.6-1.0		
Iron	0-0.3	Over 0.3 (taste, veal)		
Sodium	0-3	Over 20 for veal calves		
Manganese	0-0.05	Over 0.05 (taste)		
Sulfate	0-250	Over 2,000		
Total Bacteria/100ml	Under 200	Over 1 million		
Total coliform/100ml	Less than 1	Over 1 for calves; over 15-20 for cows		

\*Water Analyte Concentrations Drinking Water For Dairy Cattle. Dr. Beede DairyLand Laboratories, Inc.

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Figure 1	gure 1 BACTERIAL BIOFILM FORMATION - 5 STAGES:			
ATTACHMENT	GROWTH	MATURATION	DETACHMENT	RE-DEVELOPMENT
Bacteria attach to a variety of surfaces, from metal, to plastic, to skin tissue, using specialized tail-like structures.	The cells grow and divide, forming a dense matrixed structure, many layers thick. At this stage the biofilm is too thin to be seen.	When there are enough bacteria in the developing biofilm the bacteria secrete a slimy extracellular matrix of proteins and polysaccarides.	The slime protects the bacteria from the harsh environments, shielding them from many chemicals, antibiotics and immune systems.	As the colonies mature, the structures created weaken and cast off bacteria that look for new places to grow and prosper.

viruses adhered to a surface in a resistant matrix of cellular materials. Once these bacteria start to grow inside water lines, valves, water nipples or troughs, they secrete a sticky protein that helps them adhere to the surface.

An ATP meter is a tool that can measure biofilm levels in the water. Readings above 200 RLU indicate a biofilm is present. The meter has a max reading up to 9,999 RLU and on occasion, the Crystal Creek® staff has seen water test this high. In many cases, this slimy film can be felt by running a finger along the plastic surface underwater. If you can manually feel the biofilm in your water system, it is negatively affecting livestock. Figure 1 shows how biofilms develop over time.

The most effective way to control biofilm formation is with the routine injection of chlorine dioxide into the water line. Typical maintenance injection rates range from 0.5% to 1% for most livestock operations. Crystal Creek<sup>®</sup> offers AquaSoar<sup>™</sup>, a chlorine dioxide water injection system. The AquaSoar<sup>™</sup> system is a two-component activator/ base system that can create chlorine dioxide on site. This can then be injected into the water system to break up biofilm, help reduce iron in the water and is approved for livestock use up to 4 ppm. The amount of chlorine dioxide injected can be adjusted over time. For instance a producer may wish to start at 4 ppm to break up biofilms and reduce down to a maintenance level of 1 ppm. For more information on the AquaSoar<sup>™</sup> system, see Dr. Ryan Leiterman's article, "*Water Hygiene, How Often Do You Think About It?*" in the April 2021 Crystal Creek<sup>®</sup> Newsletter. The AquaSoar<sup>™</sup> system is more effective and less expensive than hydrogen peroxide.

#### Nitrates

Nitrates can get into the water supply through fertilizer, animal waste or decaying organic matter. In cattle, nitrates digested in the rumen convert to nitrites, which is ten times more toxic to the animal. Poisoning occurs when enough nitrite is present in the blood to cause oxygen deprivation. For cattle, problems can start occurring when levels are over 100 ppm. Symptoms of nitrate poisoning in cattle vary, but often have a rapid onset. Difficult and/or noisy breathing, rapid pulse, weakness and staggering are all possible symptoms of nitrate poisoning. Keep sources of nitrates away from water supplies to prevent leaching. Livestock operations should be kept 100-200 feet away from wells to reduce the risk of contamination.

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#### Water: The Forgotten Nutrient

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#### Iron and Manganese

High iron and manganese levels can affect the taste, smell and appearance of the water, decreasing water consumption and leading to production and health problems in the animals. The taste of the water is affected once manganese levels reach .05 ppm and iron levels of .3 ppm, respectively. Having high levels of iron and manganese in the water can also have a negative effect on nutrient absorption within the animal. These cations can interfere with other nutrients in the GI system, binding them and preventing their absorption into the body. Elevated iron and manganese levels are one of the leading causes of biofilm growth within the farm's water system. High amounts of iron and manganese in the water encourages bacteria growth, which leads to a biofilm buildup if troughs and waterers are not cleaned properly. The AquaSoar<sup>™</sup> system can help reduce iron levels through ionization.

#### Sodium

Livestock can have varying sensitivities to sodium levels. Water that has passed through a water softener can have a high level of salt, and should not be used to mix milk replacer without testing. Sodium levels in water over 1,000 ppm can affect calves and cause scours, lethargy, abnormal gait and



muscle twitching. Poultry are also more susceptible to increased levels of sodium in the water. This increases water intake, which leads to higher litter moisture and can adversely affect air quality.

There are many things a producer can do to keep livestock from suffering from sodium toxicity. Checking water supplies frequently and making sure troughs are clean can reduce the risk. Producers should also make sure that water does not accumulate in salt lick or block containers.

#### Sulfates

High levels of sulfates in water will have a bitter taste. Younger animals are more susceptible to sulfate levels, which can cause scours in calves. Very high levels of sulfates can cause central nervous system damage or death. These high levels can also tie up copper so water should be tested if an animal has a copper deficiency. Sulfate levels over 50 mg/L can affect poultry if the sodium level is also over 50 mg/L. If both are present, this can have a laxative effect on the flock. A water filtration system can help remove sulfates and other contaminants. An alternative water source can also be used.

There are many benefits to ensuring livestock are properly hydrated. A study conducted in 2014 found that calves given water from birth had improved growth and development compared to those given first water at 17 days of age. The calves given water at birth had better hip height, body length and feed efficiency. A Utah State University study found that calves are more likely to drink from buckets that are rinsed daily compared to those that are only rinsed once a week. The study also found that the calves had higher daily gains and weaning weights. Ensuring water is clean is an effective way to ensure proper hydration.

Ensuring livestock have access to plenty of clean, fresh water can have a positive effect on not only the animal's health, but on an operation as well. To learn more about the AquaSoar<sup>™</sup> system or to review your water analysis results, contact Crystal Creek<sup>®</sup> at 888-376-6777 to speak to a nutritionist or livestock specialist.

References available upon request.



# April 2023

1-3 boxes: \$10/box discount

4-9 boxes: \$18/box discount (\$10/box discount + \$8 per box existing volume discount)

10+ boxes:\$23/box discount (\$10/box discount + \$13 per box existing volume discount)Pail:\$2/pail discount

HEIFER PRIDE<sup>™</sup> \$10/bag discount & \$2/pail discount

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Receive a **FREE Jar of Jam** or **4 oz. Udder Fancy**<sup>™</sup> for every \$150 of product purchased. Limit 5 per order.

# June 2023



### FLY REPELLENT

 \$5 per gallon discount (4 gallons or more)
\$2 per gallon discount (2-3 gallons)
Normal Volume Discounts Do Not Apply CRYSTAL ADVANTAGE<sup>®</sup> EQUINE FLY REPELLENT

Concentrate: \$4 per bottle discount Ready-To-Use: \$2 per bottle discount



HEIFERPRIDE

(11)

# July 2023

### **Save 10%** on all HabiStat<sup>®</sup>/Sanitation Products

HABISTAT<sup>™</sup> LIQUID, HABISTAT<sup>™</sup> TABLET, CHLOR-A-FOAM DETERGENT, FOAMASTER CLEANING GUN

# August 2023

ABISTAT

VETERINARY DAIRY LINIMENT<sup>™</sup> Save 10% <u>IN ADDITION TO</u> Normal Volume Discounts

# **Free-Ranging Your Family Flock**



By Alex Austin, B.S.

Raising and keeping your own small flock of poultry has grown in popularity over the last few years. These small backyard flocks are often allowed out of the chicken run to free-range around the property. Free-ranging is believed to improve chicken welfare as it provides the opportunity

to move freely outdoors, increases exposure to sunlight, and provides greater opportunities for natural behaviors. Although there are many benefits to free-ranging chickens, it is also important to be aware of some of the challenges faced when doing this.

# Nutrition

One challenge owners can have is decreased nutrient consumption and/or an imbalance of nutrients. When chickens are free-ranging, eating bugs and plants will take up a portion of their daily diet intake. This decreases the amount of feed they will consume, potentially leading to nutrient deficiencies. For freerange laying hens, problems with eggshell quality can be a common issue seen. Many owners will free-choice oyster shells to help correct this. Some other ways to help address nutrient deficiency challenges are to look at your feeding program.

The first solution is to offer a high quality complete feed for your flock. The Crystal Creek® complete poultry feed, Family Flock<sup>®</sup>, is formulated using only highly digestible protein sources. It contains fortified levels for key nutrients that are set high based on the most recent industry recommendations. Family Flock® is formulated using a combination of proteinate and polysaccharide-chelated trace minerals. Crystal Creek® also uses selenium yeast as the sole selenium source. Research shows that both these trace mineral sources, and selenium yeast are over 90% bioavailable, whereas other sources are far less available for absorption by the chicken. Family Flock<sup>®</sup> also contains an enzyme pack that works to improve the digestibility of minerals and amino acids. A quality feed like Family Flock® paired with free choice oyster shells will help deliver ideal nutrition with increased absorption that supports optimum health and production for free range flocks.

To help encourage the feed intake of Family Flock<sup>®</sup> by free-range chickens, owners should always have full feeders and 4 inches of feeder space per standardsized chicken. This is most important during the most common feeding times for chickens. Chickens eat throughout the day but they all will eat as soon as they rise in the morning due to their crops being empty. Owners should either plan to get up early to fill feeders or fill feeders the night before. This will guarantee chickens have plenty of feed available in the morning. Also, leaving chickens locked in the coop or run at the beginning of the day will help ensure they fill up on their feed before going out to free-range.

# Predator Protection

A major concern to consider when allowing chickens to free-range is the exposure to predators. It is much more difficult to protect chickens from outside threats when they are allowed to freely move about. Some recommendations for predator protection include:

- 1) Limit free-range activities to supervised times only.
- 2) Provide shelter that birds can easily access when in open areas.

Unfortunately, chickens are on the menu for many different predators. They can be attacked from both the sky and ground, day, and night. Common predators for poultry are hawks, foxes, raccoons, possums, coyotes, and even domestic dogs and cats. Owners can try to protect their flock by letting birds out only when they are home. This helps to ensure someone is available to stop/prevent attacks should they occur. Trees, shrubbery, or other forms of shelter around the yard can help prevent aerial attacks. It is also important to have a predator-proof, secure coop that the chickens can be locked up in at night.

# Disease Control

Allowing chickens to free-range increases the risk of exposure to pathogens, both viral and bacterial. Two examples of viral diseases are Egg Drop Syndrome and Avian Influenza (Bird Flu). These diseases can be brought in from direct contact with wild waterfowl that naturally spread them worldwide, or even by human visitors that walk on the property with infected fecal matter on their footwear. Bacterial diseases include E. coli and Salmonella, which can cause health issues within a flock as well as posing a food safety risk.



Crystal Creek<sup>®</sup> has protocols and tools owners can implement to help protect their flock from exposure and infection. Protocols include limiting access to areas where wild birds might congregate and asking human visitors to not handle chickens and stay out of the common chicken areas. Implementing an effective cleaning and disinfecting protocol using a safe, effective, and non-corrosive agent, such as chlorine dioxide will also decrease pathogen exposure. Crystal Creek<sup>®</sup> HabiStat<sup>™</sup>, a chlorine dioxide disinfectant, comes in two easy-to-use forms: a ready-to-use tablet and a liquid activator/base set. Mixing and applying HabiStat<sup>™</sup> to disinfect equipment as well as any tools or equipment brought in from off the property will help to decrease a flock's exposure.

Another tool to implement is offering a high-quality feed that meets all the nutritional requirements for the flock. Chickens that are lacking nutritionally in areas such as vitamins and minerals are more susceptible to developing infections. The Crystal Creek<sup>®</sup> Family Flock<sup>®</sup> poultry feed line is formulated using 100% proteinate and chelated trace minerals and high levels of vitamins to ensure the diverse nutritional needs of a small backyard flock are met. Another benefit of the Family Flock<sup>®</sup> feed line is the highly effective, natural pathogen blocker all formulas contain. It binds the GI pathogens, such as Salmonella or E. coli, in the gut and renders them harmless once excreted. This reduces the risk of serious pathogens in the bird's digestive tract as well as decreasing the potential food safety risk for owners.

Free-ranging chickens can create both happy birds and happy owners. It is important to be aware of the potential challenges and consequences when determining how to best keep your flock healthy and safe. The knowledgeable staff at Crystal Creek<sup>®</sup> is here to answer any questions you may have on free-ranging your chickens. Give us a call today.

References available upon request.

# Livestock Nutrition Fundamentals That Can Have Big Returns



By Dan Leiterman

In any life endeavor it is critically important to get the fundamentals done right, or else the whole project is at risk, no matter how much added effort and resources are applied. This is true in any business and is definitely the case in an agricultural business.

When it comes to livestock nutrition, meeting the basic nutritional needs of the animal at the right time of need is fundamental to the success of a livestock enterprise. This is true no matter what the species. In this article I will use dairy cows and calves as my example of concepts that would apply to all livestock.

The examples I will site here are fundamental nutritional practices that have a tremendous return-on-investment (ROI) to the producer, not only in the short and mid-term, but even more importantly in the long-term. Listed below are some key fundamentals to focus on for improving dairy profitability.

### Calf Milk Mate<sup>™</sup> for Newborn and Young Calves

Whole milk is a wonderful feedstuff for calves, however, there are at least eleven key nutrients that are deficient and/or devoid in whole milk that the calf needs. Research has shown that how the calf is fed in the first eight weeks of age does set the stage for how it will perform as a cow in the dairy herd for the rest of her life. This is a critical time to get the basics done right. Feeding Calf Milk Mate<sup>™</sup> with the whole milk provides these needed nutrients. For example, Calf Milk Mate<sup>™</sup> provides oral selenium to help prevent selenium deficiency. A deficiency of selenium will manifest itself initially as a calf that is not an aggressive drinker on the bottle, a poor doer, lethargic and eventually having white muscle disease/heart damage. Other key nutrients provided by Calf Milk Mate<sup>™</sup> are, vitamins A, D<sub>2</sub>, E, C and trace minerals cobalt, copper, iodine, iron, manganese and zinc.

Calf Milk Mate<sup>™</sup> is very economical to feed and only requires two grams per calf twice a day mixed into the whole milk.

## Calf Shield<sup>®</sup> for Young Calves to Eight Weeks of Age

Calf Shield<sup>®</sup> is a well-designed formula that can help stabilize the calf's digestive function. Calf Shield<sup>®</sup> provides a baseline of stability in the digestive tract that is broad based, so that the calf can optimize the nutrition it is getting. Keep in mind, it does not matter how good the nutrition program is for the calf, if the calf cannot use the nutrition properly because of a digestive upset. When this occurs, the fundamentals of nutrition delivery have failed and the efforts of raising a healthy calf and a solid cow for the herd are at risk. Many customers that use Calf Shield<sup>®</sup> see improved calf performance. They have found that problem issues fade away and they see the benefits of feeding Calf Shield<sup>®</sup> to their calves for the first eight weeks of age.

A typical feeding level can vary from 7 to 15 grams/ head/day depending on the challenge level to the calf. Several calf operations that feed Calf Shield® find that other additives are no longer needed, bringing about a significant cost savings. On its own merit, calf performance and ROI, feeding Calf Shield® outweighs its cost. Calf Shield® comes in organic and nonorganic formulas. Calf Shield® reduces calf operation risk, improves ROI and is a significant strategy to support the fundamentals of feeding a healthy calf.

# A Crystal Creek® Dry Cow Nutrition Program Is a Smart Fundamental Strategy

A proper dry cow nutrition program is the fundamental cornerstone to a successful lactation. The dry period is a time to prepare both the cow and the fetus for optimum performance postpartum. Feeding the dry cow the correct forage to meet her nutritional requirements is paramount. I see many dry cow programs in the industry feeding the wrong forage to the dry cow and then trying to patch it up with expensive, 'high-tech' additives and other feedstuffs. Two examples of these additives are anionic salts and calcium/cation binders. Both of these flawed strategies are only necessary when the dry cow feedstuffs include inappropriate forages like alfalfa haylage that contains high levels of cation. It is much more biologically beneficial and economically efficient to feed the correct forage to the dry cow to begin with and not have to do nutritional contortions to fix a seriously flawed strategy.

A much more economical and successful approach to dry cow nutrition is to have feedstuffs that are put up to meet the unique needs of the dry cow so you do not need to purchase anionic salts or cation binders for the diet. The concept of growing forage specific to a dry cow seems counter intuitive to some people because it does not meet the high protein and perceived standards of high-octane alfalfa. If you do not want to, or cannot grow proper dry cow forage, it will then be necessary to purchase a dry cow hay. A good dry cow hay is one that is low in calcium and more importantly, potassium. Grass hay is going to be the best style of hay. Some target nutrient analysis values for grass hay that fit well into a dry cow diet would be: an NDF of 60% or more, a potassium level of 1.5% or less, a calcium value of less than 0.8%. A leafy hay with some good sugar levels of 6% or more would also do well to support rumen function and help the cow prepare for the lactation ration.

Contact a Crystal Creek<sup>®</sup> nutritionist to design a dry cow nutrition program specific to your herd.

### Use Super Boost™ and Fresh-N-Easy™ for Fresh Cows

Properly addressing metabolic requirements immediately after freshening will support a cow's ability to express milk production and reproduction to her best ability. The cow's



calcium requirements are high after freshening and the industry has done a decent job of highlighting the need for oral calcium shortly after freshening. Research shows that proper oral calcium significantly reduces the risk of milk fever as well as ketosis and helps increase milk production during the entire lactation.

Calcium is only part of the cow's nutritional requirement, however. The cow's liver also needs significant support. A sound fundamental fresh cow strategy would be beneficial to the producers bottomline. Here are some basics I would recommend:

- At Freshening:
- a) Administer 4 Fresh-N-Easy<sup>™</sup> boluses at freshening and repeat in 12 hours
- b) Administer 2 Super Boost<sup>™</sup> boluses at freshening for liver support.

Crystal Creek<sup>®</sup> has additional products and strategies to help with a smooth transition into lactation. Examples such as Crystal Pellets<sup>™</sup> for supporting the cow during the stressful pre- and postpartum period of dairy cows, or Fresh-N-Drink<sup>™</sup> a high calcium supplement that provides key vitamins, trace minerals and digestive aids needed by fresh cows.

With today's increased cost of production, it is important to make decisions that provide a positive impact on the nutrition of your livestock. The products and programs chosen should have a payback resulting in healthy, productive animals and a better bottomline. Getting the fundamentals right will help you build a solid future for your farm and your livestock. Call Crystal Creek<sup>®</sup> to discuss questions you may have regarding calf, dry cow or transition cow nutrition.

# **Mineral Nutrition: Advancements Over Time**



By Darren Zimmerman, D.V.M. first livestock minerals

The use of minerals in livestock feeds is constantly evolving. The English word *mineral* comes from the Latin word *minerale*, which means "to be mined from the earth". The first livestock minerals were rocks mined from

the earth, then ground up, processed, and fed to animals. These minerals are referred to as inorganic minerals and they are still used in livestock feed; however, they have limitations. Due to scientific advancements, many minerals are now available in multiple forms beyond mined rock. One of the most advanced types of livestock minerals, chelated minerals, have many benefits. As a farmer and producer, it sometimes can get overwhelming when looking for the right feed and mineral to choose for your livestock. This article will address many commonly asked questions regarding mineral sources and nutrition, as well as provide guidance when reading feed tags.

## Mineral Classes: Macro and Micro Minerals

Minerals are categorized by the amount needed by the animal: macro and micro minerals.

Macro minerals are required by an animal in large quantities. These minerals include calcium, phosphorus, magnesium, sodium, potassium, chloride, and sulfur. In a cow's diet, macro mineral requirements are described as a percent of the diet.

Micro, or trace minerals are needed by the animal in much smaller quantities but are still very important. There are up to 20 different trace minerals known, but the most important ones for livestock are copper, manganese, zinc, selenium, iron, iodine, and cobalt. Their requirements are listed in ppm (parts per million).

### **Bioavailability**

Bioavailability is defined as the percentage of minerals that can be absorbed out of the feed into the bloodstream to be utilized by the body. Minerals are chemically viewed as inorganic ions, very often they are metals. These ions can be found in stable inorganic compounds within the earth. When plants and microorganisms absorb these minerals from the ground they get incorporated into their cells and with this biologically bound. In this bound form, the minerals now move up the food chain as they get consumed by larger animals. Biologically bound minerals are easier to digest and absorb than the original, inorganic form. They have a higher bioavailability.

One of the most complex processes of the biological binding of minerals is chelation. With chelation, minerals are getting bound multiple times to organic components to create a ring-formed molecule. The English word *chelate* comes from the Greek word *chela* which translates into *crab's claw*. The organic component grabs onto the metal ion much like the way a crab pincer would grasp food.

Macro minerals are generally not chelated as it is not cost-effective, however strong economic return has been shown when using chelated trace minerals in a variety of livestock species.

Chelated trace minerals bring two main advantages for the animal. First, the 'organic ring' protects the mineral within from reacting or binding with other inorganic minerals in the GI tract and becoming completely unavailable to the animal. And secondly, the organic portion of the chelated molecule can easily be absorbed by the animal's body, absorbing the metal part with it. Therefore, the bioavailability of chelates is much higher than that of inorganic mineral complexes. For example, the commonly used inorganic zinc oxide has less than 10% of the fed zinc bioavailable to the animal. While polysaccharidechelated zinc has a bioavailability of over 90%.

### Why Is It Important to Me as a Livestock Producer, to Use Chelated Trace Minerals?

Feeding a diet that contains chelated trace minerals has a strong economic return on investment. Providing livestock with a ration that meets all their requirements for minerals not only keeps them healthy but also helps them to be most productive and thrive to their full genetic potential. For example, goats and cattle both have a high requirement for supplementary copper in their feed. Their diet should contain between 80 and 100 ppm of copper. Lower copper values, or high molybdenum contents that bind copper, will lead to copper deficiency. Goats show a copper deficiency in the form of neurological symptoms.

Another great example is selenium. Many soils in the US are very low in selenium, especially in the Midwest. Due to that, the selenium supply from forage is usually below the required need for livestock. Selenium deficiency can lead to unthrifty calves and white muscle disease. At the same time, overconsumption of selenium poses a health

#### TAG EXAMPLES

#### Brand X Tag Analysis

day.

FEEDING DIRECTIONS

Field this product free choice to cattle receivin composed largely of grass hay or to cattle grazing

orass pastures. Optimum intake is 4 ounces pe

Cattle receiving phosphorus deficient diets

consume this product when it is first offered, mineral feeder near the water supply or in the anir

fresh, clean water near the feeding area.

area. Put out fresh mineral at least once per week free choice salt is not required with this mineral

GUARANTEED ANALYSIS	
Calcium (Ca). Not less than	1125
Calcium (Ca). Not more than	
Phosphorus (P), Not less than	4.0 %
Salt (NaCi), Not less than	
Salt (NaCI), Not more than	
Magnesium (Mg), Not less than	1.0 1.
Potassium (K), Not less	0.1 %
Zinc (Zn), com, Not less than	3,600
Manganese (Mn), com. Not less than	3,600
Copper (Cu), ppm. Not less than	1,200
Iodine (I), pom. Not less than	
Selenium (Se), ppm, Not less than	27
Vitamin A. I.U./b. Not less than	150,000
Vitamin Dy, I.U./Ib, Not less than	15,000
Vitemin E. I.U/Ib, Not less than	150
INCORDIENTS	

Figure 1

sam i former Sat, Doacom Propies, Monocican motore, Processed Cours & Provident, Polacion Chundo, Senaam Oude, Minani OL, Sodam Selente, Filon Profes Janie, Nitr Occis, Wanner E Souphermeit Valenin A Supplement generen Sultin, Zen Sultan, Cagent Checke, Ethylere ermen y societie. Monopeli Products, Valenie Discoperture Cuoni neme Manuel Anii Athlice Flavor.



### **ROI® Beef Mineral**

#### A Mineral, Trace Mineral And Vitamin Supplement For Beef Brood Cows, Calves, Feeders, Replacement Heifers And Bulls

#### GUARANTEED ANALYSIS

Calcium	Minimum	16.00%
Calcium	Maximum	17.00%
Phosphorus	Minimum	8.00%
Salt	Minimum	15.00%
Salt	Maximum	16.00%
Sodium	Minimum	6.00%
Sodium	Maximum	7.00%
Magnesium	Minimum	4.00%
Potassium	Minimum	3.00%
Copper	Minimum	880 ppm
Selenium	Minimum	27 ppm
Zinc	Minimum	3,500 ppm
Vitamin A	Minimum	500,000 IU/lb.
Vitamin D3	Minimum	70,000 IU/lb.
Vitamin E	Minimum	1,600 IU/Ib

#### INGREDIENTS

Monocalcium Phosphate, Dicalcium Phosphate, Calcium Carbonate, Salt, Magnesium Oxide, Potassium Carbonate, Brewers Liquid Yeast, Manganese Polysaccharide Complex, Zinc Polysaccharide Complex, Selenium Yeast, Brewers Dried Yeast, Soybean Oil, Copper Polysaccharide Complex, Vitamin E Supplement, Dried Aspergillus oryzae Ferrmentation Extract, Vitamin A Supplement, Vitamin D, Supplement, Calcium Iodate, Cobalt Sulfate

risk to the animal. The FDA has regulated a maximum of 0.3 ppm of selenium in a diet. To make sure the offered selenium in the feed can be used at its best, a selenium source with a high bioavailability like yeast-bound selenium should be chosen.

### How Do I Know What Is in the Mineral I Am Feeding?

When looking for the right feed for livestock it is important to pay close attention to the label of each feed choice. The guaranteed analysis result tells how much

> of which mineral is in the feed, but not in which chemical form it is included. For that information, the ingredient list needs to be consulted. See examples, Figure 1. Here is listed which source of minerals were used to formulate the feed. Minerals that are included as oxides and sulfates have a lower bioavailability. So, if for example zinc sulfate was used, for *Brand X*, only 50% of the listed zinc content can be utilized by the animal. If a chelated polysaccharide-zinc was used, 90% conservatively calculated, can be utilized. All of Crystal Creek's livestock minerals are formulated with highly bioavailable trace minerals like polysaccharide chelates and yeast-bound selenium.

Modern livestock breeds keep improving their genetic potential through breeding and selection techniques. A higher production potential comes with a growing need for nutrients like minerals. To keep up with this growing need it is advisable to choose a feed that sources minerals in the best possible form: highly-bioavailable chelated trace minerals and above-requirement level macro minerals. Chelated minerals are a tool that we can use to meet these needs and continue supporting livestock health and production which in turn supports the end goal of our producer's profitability. To learn more about mineral nutrition and the impact it can have on your operation, call Crystal Creek® to talk to a livestock nutritionist.

References available upon request.



1600 Roundhouse Rd., Spooner, WI 54801

Sustainable and Effective Livestock Nutrition Programs for Today's Progressive Producer.





Start your chicks right with Family Flock® Chick Starter