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Advances in Electrolyte Therapy

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Scours can occur as a result of pathogens and stressors. When calves get scours they may experience electrolyte loss, dehydration and increased risk of death due to dehydration. During these times, oral electrolyte solutions become extremely important. A high-quality electrolyte is designed to replace lost fluids, restore the calf's acid-base balance, and provide energy and nutrients to the calf. However, with so many commercial oral electrolyte solutions available, it can be difficult to choose the rightone. Recently, new research on oral electrolyte solutions has emerged, giving you more information toward making the right decision for your calves.

New Research on Alkalinizing Agents

It is essential that oral electrolyte solutions contain an alkalinizing agent to correct acidosis caused by the acid-base imbalance that occurs during scours. Products containing bicarbonate have been used effectively for this purpose for years. However, new research by Dr. Geof Smith at North Carolina State University shows that electrolyte products containing acetate or propionate as the alkalinizing agent have advantages over bicarbonate. According to the research, oral electrolyte solutions containing bicarbonate can potentially raise the pH in the abomasum above 5.5 for a prolonged time period.

Raised pH levels promote the growth of salmonella and other bacteria, and may actually worsen scours. In the study, the increase in abomasal pH was lessened when acetate-based or propionate-based oral electrolyte solutions were used. Acetate and propionate have other benefits too. These volatile fatty acids produce energy when metabolized and promote sodium and water absorption in the calf's intestine. Bicarbonate does not do this. Commercial products containing acetate and propionate are available in Europe but are beginning to emerge here in the U.S.

Use Electrolytes Wisely

There are many electrolytes on the market, so it can be difficult to choose the right one for your calf-feeding program. Look for a product that provides these key ingredients:

- Sodium and potassium to replace these key electrolytes that are lost
- Glucose and glycine (an amino acid) to provide energy and promote absorption of sodium and water from the intestine
- Alkalinizing agents (acetate, propionate or bicarbonate) to correct acidosis

Oral electrolytes that contain dietary fiber (in the form of psyllium) are not recommended. These products may "gel" or thicken the calf's manure, making it appear as if the diarrhea is resolving. However, research has shown that the addition of fiber actually causes less glucose absorption, which actually reduces the calf's energy level and can cause prolonged scouring.

During electrolyte use, you should keep feeding milk or milk replacer to provide the fluids and nutrients found in the calf's normal diet. However, electrolytes and milk or milk replacer should not be fed jointly. Instead, it's best to add an oral electrolyte solution as an extra meal in between milk or milk replacer feedings. For example, if you feed milk twice a day, administer an oral electrolyte in the middle of the day and late at night. Remember, there is no proven benefit to withholding milk or milk replacer - it only worsens the calf's negative energy balance. In addition, be sure to provide free-choice, low-sodium water at all times. And as always, work closely with your calf specialist or veterinarian to select the product most appropriate for the situation you are facing. It's also important to know when other intervention is needed. Consult your herd veterinarian for calves that cannot stand or lift their heads, as they may need intravenous fluids instead.

Warm-weather Electrolyte Use

Sometimes it is necessary to deliver electrolytes to alleviate the effects of hot weather on calves. In these situations, feed the electrolyte solution during every other water feeding or offer it free-choice along with water. However, if the calves are healthy (not scouring), offer the electrolytes as a dilute solution or sodium toxicity could result. Electrolytes not only address dehydration caused by heat stress, but they also can be useful for combating dehydration that might occur during other stressful times, such as transport, weaning and pen moves. The quality of commercial oral electrolyte solutions can vary greatly. When choosing any product, remember that it must satisfy the calf's need for sodium and potassium to replace what is lost, as well as provide agents that promote sodium and water absorption from the intestine such as glycine. And now, thanks to new research, you have more information on alkalinizing agents and which ones are most effective in correcting acidosis during scours.

Getting Back to Basics with AI

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Introduction

As I go and visit dairy farms I am frequently asked “How can I improve my conception rate?” Conception rate is defined as the number of cows that become pregnant as a proportion of the total number of services. With the wide spread use of AI we have created a cow that produces a high volume of milk with great efficiency. We know that daughters of AI bulls produce more milk and live longer than non AI sired daughters. The downside is that we have a created a cow that is under extreme stress which negatively affects reproduction. However, getting back to basics with your AI technique and heat detection can alleviate some problems and maximize your results.

Semen Tank and AI Equipment Storage

One of the major items used in your reproduction program is often the least managed – the semen tank. The inventory of your semen tank can represent a significant amount of money. Envision your tank as a bank with the semen being the investments you have stored in the bank. The return on investments is only as good as how well the bank is managed. Therefore, create an area to store your reproduction supplies that can be managed effectively. The dedicated area should be secure, clean, dry, and easily accessible

with proper lighting. In addition, keep insemination equipment clean and dry in an enclosed container to prevent contamination. Semen tanks should be elevated off the ground to allow air circulation and prevent tank corrosion. Design a maintenance log and semen inventory list to reduce the amount of time spent searching for a specific bull to reduce nitrogen evaporation. Monitor the tank daily and perform liquid nitrogen measurements monthly. In addition, devise a backup plan just in case of tank failure.

Semen Storage and Handling

To maintain high quality reproductive performance be sure to adhere to proper semen handling techniques. Semen can be damaged permanently due to thermal injury. To prevent thermal injury it is imperative to control fluctuations in temperature. Prior to semen purchase charge the tank with liquid nitrogen. When transferring straws of semen from one tank to another place the tanks side by side and have another person help with the process. Identify the straws you wish to transfer and coordinate the transfer with your helper. This transfer should take less than a few seconds. The canisters should only be raised to a level necessary for location of the proper semen and quickly lowered down into the tank body.

When preparing to thaw the semen for insemination purposes prepare a 95˚F water bath. Locate the cane of semen you wish to use and bend the identification tab up 45˚. With the aid of tweezers remove one straw at a time. Once the straw is removed from the tank shake it to remove excess nitrogen and place in the water bath. The straw should thaw for a minimum of 45 seconds prior to loading the insemination gun. The insemination gun should be pre-warmed prior to loading. Rubbing the gun with a paper towel 5-6 times will pre-warm the barrel. Remove the straw from the water bath, shake the straw and dry off with a paper towel. Check the straw for the desired bull and place the cotton plug end of the straw in the gun. Cut off the crimped end ¼ inch below the seal with a clean pair of scissors and slide the protective plastic sheath over the gun. Attach the sheath and gun together with the O-ring and inspect for proper seal. To avoid temperature fluctuations keep the gun warm by wrapping in a clean paper towel and place in your clothing. Prior to loading the gun make sure the correct cow is secured. The general rule is not to thaw and load more straws that can be deposited in a 10-15 minute time frame. After breeding remove the sheath and straw while inspecting the end of gun for any signs of infection, check the semen straw identity, wipe the gun clean and place in an enclosed container.

Semen Placement

The first order of business in the insemination process is to properly identify and secure the cow in which insemination will take place. Approach in a calm manner and gently pat her on the rump to make her aware of your presence. Begin by raising the tail with one hand and place it over your arm. With the other hand form your fingers into a cup shape and gently insert into the rectum. Clean the vulva region with a paper towel to prevent contamination. With the inserted hand apply pressure to the internal portion of the vulva. This will facilitate the spreading of the vulva lips allowing gun insertion. Insert the gun in an upward fashion to avoid the entering the urethral opening which leads to the bladder. As the gun is gently moved forward 6 inches, level out the back end of the gun and slide forward until it contacts the cervix. This process may take some time and be difficult but patience is the key. After reaching the cervix grasp the external opening with your thumb and forefingers and guide the cervix onto the gun. The area past the third ring of the cervix is termed the body of the uterus and is where semen is to be deposited. Prior to depositing the semen use your fingers to check the location of the gun tip. The gun tip should be just past the third ring of the cervix. Raise your finger and slowly deposit the semen into the uterine body. However, if the gun is more than one inch past the cervix it will be deposited in only one horn.

Heat Detection and When to Breed

Accurate heat detection is a must when it comes to artificial insemination. The average cow comes into estrus or heat, on average, every 21 days and can last 8-30 hours. The primary sign that a cow is in heat is that she stands to be mounted by others. There are secondary signs of heat that may be used as an aid in heat detection such as: being vocal, increased activity, roughened tail head, dirty flanks, swollen vulva, decreased feed intake and decreased milk yield. However, being receptive to mounting is the primary sign of heat. Heat detection is a daily job nonetheless the best time to check heat is early in the morning, noon and late in the afternoon for about 20 minutes each.

Cows normally ovulate 25 to 30 hours after the onset of estrus. The ovum can survive 6-12 hours after ovulation. The best conception rates occur with breeding 12 hours after the beginning of standing heat. This is considered the AM-PM rule: a cow in heat in the AM should be bred in the PM and a cow in heat in the PM should be bred in the AM. The reason for this is that semen can live in the reproductive tract for 24 hours allowing for the proper amount of time for sperm transport, ovulation and fertilization.

Heat detection aids can help but should be used as a supplement to your reproduction management. Some common aids include: chalked tail head, Kamar® patches, pedometers, radio frequency technology and synchronization programs. In spite of this, the best aid to use in heat detection is to keep accurate records.

Summary

Getting back to fundamentals and following a standard operating procedure in your artificial insemination program can yield positive results without any added costs. A comprehensive evaluation of your Artificial Insemination program can determine if there is a problem. Strengthening your heat detection and semen handling techniques can increase your conception rate. Heat detection aids can improve fertility but should only be used as an aid and not a crutch. Keep accurate records and use them to improve performance. If you would like another set of eyes to help evaluate your reproduction program feel free to contact Dan Severson at severson@udel.edu or call 302-831-8860.

References upon request.

A Great Resource on the Web: Dairy Webinars

Here is a list of some web sites with prerecorded webinars on dairy management that you can access at anytime and without any "sign up" required.

Site: DAIRYeXNET
Copy and paste the following link into your browser:
http://www.extension.org/pages/15830/archived-dairy-cattle-webinars#.U39kUy-T7qQ

A partial list of topics that can be found at this site include:

Critical Economic Decisions when Raising Heifers
Jason Karszes, Cornell University

New Tools for Dairy Reproduction Programs
Dr. Paul Fricke, University of Wisconsin-Madison

Far Off to Fresh Cow – Opportunities to Improve Transition Performance
Dr. Mike Overton, Elanco

Cooling Strategies During Heat Stress
Dr. Pete Hansen, University of Florida

Managing Somatic Cell Counts
Multiple Presenters

Economic Benchmarks for Dairies: Eight Rules You Cannot Break
Gary Sipiorski, Vita Plus

Dairy Reproduction: Identifying Problems and Solutions for Your Herd
Ray Nebel, Select Sires

Site: Hoard's Dairyman
Copy and paste the following link into your browser:
http://www.hoards.com/webinars

A partial list of topics that can be found at this site include:

Update on starch utilization by dairy cows
Randy Shaver

Update on mineral nutrition of dairy cows
Bill Weiss

Cows and their calcium

Garrett Oetzel

What does the farm bill mean to you?
Scott Brown

Feed efficiency – what's new
Mike Hutjens

Site: Penn State University - Technology Tuesday Webinar Series
Copy and paste the following link into your browser:
http://extension.psu.edu/animals/dairy/courses/technology-tuesday-series/webinars

A partial list of topics that can be found at this site include:

Cow behavior and robotic milking
Dairy housing lighting
Is group calf housing for you?
Bedding for dairy cows: the good, the bad and the ugly
Silo safety

New Agriculture Agent for New Castle County

A note from Dan Severson

I am Dan Severson the new Agriculture Agent for the University of Delaware Cooperative Extension serving New Castle County Delaware. Along with my regular county duties, I have also been assigned to provide leadership for the statewide Dairy Extension program in conjunction with Dr. Limin Kung and Susan Garey. I was born and raised on a small farm outside of Dover, DE making me a native Delawarean. I bring broad experience and knowledge in the agriculture field, as well as a long history with the University of Delaware.
I earned a Bachelor's Degree in Animal Science at UD in 1994. After college I held various positions in the agriculture field, including managing a dairy farm, working as an Agriculture Agent for Cecil County, Maryland, running a feed mill and working at DuPont Pharmaceuticals. Everything came full circle when I returned to UD as the Lab Coordinator for the Department of Animal and Food Science. While working at UD, I earned a Master's Degree in Education, specializing in Science Education. I returned to Extension because I missed working with agriculture producers. The Ag community is full of wonderful people who have great stories. I love to visit with farmers and assist them with any issues they are having. The farm has always been a fun place for me, and to work with producers with agriculture related problems is a plus. I strive to bring my practical knowledge from living on a working farm as well as my experience in the dairy industry to best help our dairy producers. I look forward to learning new concepts in this position so I can share them with local producers. I find it extremely rewarding when producers succeed after incorporating new ideas.

I will be conducting on farm visits during the spring/summer of 2014. If you would like to schedule a visit or just have general questions, don't hesitate to contact me: severson@udel.edu or 302-831-8860.

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