



CEDAR GROVE VETERINARY SERVICE NEWSLETTER



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ARE ALL ORAL ELECTROLYTE SOLUTIONS FOR CALVES THE SAME?

Most farmers and veterinarians will admit that calf scours/diarrhea is one of the most difficult problems to deal with on a dairy farm. Calves can become severely sick so quickly that by the time interventions are made, a lot of damage has been done. Rehydration of the calf with electrolytes and/or IV fluids is critical but often there is never anymore consideration given to whether some products are superior to others. Usually the product that is used is the one that is already on the farm or the truck. Hopefully this article will provide some insight into why all electrolyte products are not created equal and give some direction into choosing the right product for your farm.

The reasons as to why a calf scours and how it can be prevented is a topic for another article, but the consequences of any calf diarrhea is the same: dehydration, metabolic acidosis, low levels of sodium

and chloride in the body, and negative energy balance.

Diarrhea in humans does not occur the same as in calves so it can be hard for us to understand why calves won't get better. In fact, the most comparable condition that a human can get that resembles calf scours is a hangover. Therefore, your scouring calves are experiencing hangover-like symptoms for days. Sounds terrible!

So, what should we be looking for in our oral electrolyte solutions to help these calves out?

Sodium: Sodium should be included at 90-130mmol/L. Sodium is tightly regulated by the body and is something that can't be too high or too low. Sodium and water also cannot be absorbed by the intestines without glucose or glycine present in the electrolyte solution. It is important to both check to make sure that the right amount of sodium is present and that another

DO YOU KNOW YOUR ANTIBIOTICS?

Pirsue

Use: Indicated for use in lactating dairy cattle for the following treatments:

- Clinical and subclinical mastitis associated with:
 - *Streptococcus* species including *S. agalactiae*, *S. dysgalactiae*, and *S. uberis*
 - *Staphylococcus* species including *S. aureus*

Dose: Infuse 1 syringe into each affected quarter. Use proper teat end preparation and sanitation and proper intra-mammary infusion technique. Repeat treatment after 24 hours. Daily treatment may be repeated at 24-hour intervals for up to 8 consecutive days

Special Notes:

- 36-hour milk discard period following last treatment
- 9-day pre-slaughter withdrawal period following the last treatment when used for 2 doses
- 21-day pre-slaughter withdrawal when used for 3-8 doses

carrier product is present to allow it to be effective. Milk is a poor source of sodium (approximately 40mmol/L), so a calf with moderate to severe diarrhea will be unable to correct its sodium imbalance if kept solely on milk or milk replacer.

Glucose: A calf with diarrhea is in a negative energy balance and needs an energy source. Glucose may be listed as dextrose on the package. No more than 200mmol/L should be included. More glucose than that will cause a shift in the overall osmolarity of the solution. High osmolarity can draw water out of the body and exacerbate the dehydration. The need for energy is also one of the major reasons that many veterinarians will recommend keeping the calf on milk or milk replacer when they have diarrhea since they are in a malnutrition state and need all the energy they can get.



"Ya gotta love the way this farmer gets into the Halloween spirit."

Alkalinizing Agents: Oral electrolyte solutions should include an alkalinizing agent to decrease the metabolic acidosis. They should be included at 50-80mmol/L. Bicarbonate is the most common ingredient seen on the label to fit in this category. The issue that can arise with bicarb is that it can slow the function of the abomasum leading to bloat. Better alkalinizing agents that don't have this consequence are acetate and propionate. Acetate and propionate have also been shown to add energy to the diet, stimulate water and sodium uptake, and inhibit bacterial growth. If bicarb is a part of the electrolyte solution, it is recommended that the electrolytes are fed 4 hours after a milk feeding to limit bloat issues.

It can be very hard to compare electrolyte solutions since the labels can have ingredients listed by percent, but the recommendations are made in mmol/L. Hopefully the chart will allow for comparisons to be a bit easier. For example, if the 75 gram pouch of electrolyte mix (that will be mixed in 2L of water) has 2% potassium, that means that it will have 1.56 grams of potassium per 2 liters ($75 \times .02 = 1.56$). Simple math

Table 2. Requirements of ingredient concentrations included in oral rehydration solutions in different units.

Ingredient	MW ¹ (g/mol)	Mmol/L	g/L
Glucose	180	<200	<36
Sodium	23	<145	<3.3
Glycine	75	<145	<10.9
Sodium bicarbonate	84	50-80	4.2-6.7
Sodium citrate	294	50-80	14.7-23.5
Sodium acetate	136	50-80	6.8-10.9
Potassium	39	20-30	0.8-1.2
Chloride	35	50-100	1.8-3.5

¹Molecular weight in grams per mole.

Useful conversion: 1 quart is approximately 1 liter (0.95 L).

converts that to 0.78 g/L of potassium ($1.56/2=0.78$), which is slightly under the recommendations. Products that have been studied to meet the requirements are: Diaque, Land O Lakes Base plus Add Pack, Bluelite Replenish, Calf-Lyte II, and Re-Vibe. This is not to say other electrolytes are not adequate, it will just require some reading of the label and math to make that decision.

Finally, you can make your own oral electrolyte solutions with the following mix that will meet all the requirements:

- 1 tsp. low sodium salt
- 2 tsp. baking soda
- 1 ¾ oz. (1 packet) fruit pectin
- 1 can beef consommé

Add water to make 2 quarts. Feed at the rate of 1 pint per 10 pounds of bodyweight 3 to 4 times a day.

