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Feeding Electrolytes: *How much does a calf need?*

by Rob Costello

If I were to pick the conversation I have most often with calf raisers, it would be about feeding electrolytes: how much and how often to feed oral electrolytes to scouring calves. Confusion often arises when trying to apply package instructions. Feeding directions are limited and typically describe a narrow set of applications. They often read like cookbook instructions which simply don't – and can't – describe all situations.

Instructions for feeding electrolytes may run counter to personal intentions. Some say to use the product in place of milk feedings, others say to feed in addition to normal milk feedings. Add to milk; don't feed in milk. Feed two quarts twice a day, once a day, feed for three days – what if the calf still has diarrhea?

To begin with, it helps to have a good idea or a sense of what a scouring calf needs. A calf with diarrhea and no other visible signs of dehydration is about 4-5% dehydrated. This means a 100 pound calf needs about 4-5 pounds of water to get back to normal.

100 pound calf that is 4% dehydrated: $100 \text{ pounds} \times 0.04 = 4 \text{ pounds water loss}$

100 pound calf that is 5% dehydrated: $100 \text{ pounds} \times 0.05 = 5 \text{ pounds water loss}$

(easy to calculate for a calf of any weight)

Since a gallon of water weighs about 8 pounds, a quart of water weighs 2 pounds. Therefore, our 100 pound calf needs 4-5 pounds of water, or about 2 quarts of electrolyte solution. This is the amount of electrolyte solution that would be administered each day to this calf until it improves.

Keep in mind that this calf became 4-5% dehydrated while it was drinking its regular milk/milk replacer feedings. This means the calf needs the 2 quarts of electrolyte solution in addition to the liquid nutrition it normally receives, not instead of.

If the calf shows additional signs, such as sunken eyes, depression, tight skin (skin tents when pinched), or water-like diarrhea, it may be 7-8% dehydrated and in need of additional electrolyte feeding. The table on the next page summarizes daily electrolyte requirements for 100, 80 and 60 pound calves.



A calf with diarrhea and no signs of advanced dehydration requires treatment at the 5% dehydration level. Calves with water-like diarrhea or other clinical signs of advanced dehydration are likely losing water at a higher rate and would benefit more from treatment at the 8% dehydration level. Calves that are 10% dehydrated may not be good candidates for oral rehydration therapy, and usually require other methods of administering supportive fluids such as intravenous administration.

Guidelines for Feeding Electrolytes to Dehydrated Calves

% Dehydrated	Clinical Signs	Weight of Water (lb)			Amt of Electrolyte Solution Required (qt/day)		
		100 lb calf	80 lb calf	60 lb calf	100 lb calf	80 lb calf	60 lb calf
5	Diarrhea, no other signs	5	4	3	2	2	1.5
8	Profuse watery diarrhea, sunken eyes depression, tight skin (skin tents when pinched)	8	6.5	5	4	3.25	2.5
10	Resting on sternum, no suckle reflex, more severe signs	10	8	6	5	4	3

Note:

Some organisms damage intestinal villi while other cause hypersecretion of water into the digestive tract. These situations can lead to decreased absorption of fluids. If, for example, only 70% of the electrolyte solution is absorbed, the other 30% will pass through the calf, increasing fecal water loss. This makes the diarrhea appear to be worsening even though treatment is effective. In these situations, the frequency of treatment should be increased. Based on the table, you treat calves with water-like diarrhea at the 8% dehydration level.

Also, keep an eye on the front end of calf. If the calf is alert, active and wanting to eat, you are on the right track. Balance what's happening at this end of the calf with what you see at the other end.

Once you have a good idea of what the calf needs, you can administer oral electrolytes accordingly. Be sure to read the product label to understand what the product is and to understand how to mix the product and how the manufacturer intends/suggests that it should be used.

That won't necessarily end all conflicts, but at least now you'll be able to decide how to use the product or whether you should choose another one. If the label tells you to mix with water and feed in place of regular milk/milk replacer feedings or to add directly to the milk or milk replacer, you may choose to do that, but what are you going to do to correct the calf's water loss? Correcting dehydration is what electrolyte therapy is all about.



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April Quality Care Matters

Wow That Cow. The Incredible Recycling Machine.

by Adam Zurin, Agri-Basics, Inc. Nutritionist

On Sunday, April 22, the U.S. celebrated Earth Day. Established in 1970, Earth Day shines the spotlight on sustainability efforts to protect our natural resources. For cattlemen, environmental stewardship is an everyday affair.

In this month's *Quality Care Matters*, we explore how Pennsylvania cattlemen and food processors work together to recycle high quality cattle feed by-products and simultaneously, reduce processing waste.

According to Adam Zurin, Agri-Basics, Inc. beef nutritionist consultant, cattle feed by-products are the residual products from grain and food processing. By-products can include floor screenings, peelings, or expired products for human food production.

"In Pennsylvania, the two most common by-product ingredients are potato waste and candy meal," explains Zurin. As a "Snack Food Capitol," Pennsylvania provides by-products that are high in fat/energy, starch, and salt.

Zurin says the growing craft beer market has increased the amount of available brewers grains in the state too. As a by-product, brewers grains tend to be higher protein and an adequate energy source.

While potato by-products typically are higher moisture, they supply more energy in comparison to most forages. "I will use potato products to lower the corn silage and corn amount in the ration," Zurin shares.

Mark Moyer, Plant Engineer/Asst. Controller at Keystone Potato Products, LLC, remembers that his company recognized there was a market for potato processing by-products when they began planning their plant in 2004.

"We have two production lines in our plant - the dehydration line and the fresh cut line," Moyer explains. "The main by-product from the dehydration line is peel waste; it's consistency is similar to a bowl of oatmeal. Our fresh cut line by-products are peel and pick out cut products."

Keystone Potato Products LLC recycles all of its potato waste - eight to 10 million pounds per year - to five beef producers.

"Our beef producers transport the by-products using a dump trailer, hauling approximately 25,000 pounds per load," Moyer says. "The processing by-products have good nutritional value, so it only makes sense to make it available for people who can use it. Our company has always been good environmental stewards."

Darwin Nissley and Bernard Nissley, Nissley Bros., Mount Joy, Lancaster County, incorporate by-products, including potato waste, into rations for their 800-head feedlot. "We've been feeding by-products for 25 years and are currently feeding potato chips, candy meal and wet potato waste. Over the years, we've also fed bagel chips, cereal and pasta," Nissley notes.

And after 25 years, what by-product does Nissley think cattle prefer? "Their favorite by-products are whole potatoes and bagel chip bread sticks," he says.

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Darwin Nissley



Bagel chip shipments occasionally include 12 - 14" bread loaves from the chips. "The feed mixer would break them to about 4" in length and they would roll out on top of the feed. The cattle loved them," recalls Nissley.

"With by-products, you have to watch the fat and salt content," Nissley says. "A balanced ration is critical as to not depress cattle feed intakes. We do not purchase a by-product without talking to our nutritionist first to see if it will work in our feeding program and decrease our cost of gain (COG)."

In addition to working with a nutritionist, Nissley also encourages producers to decide if the by-product's "grief factor" is worth the time investment. "The wetter the by-product, the more grief you experience with transporting, handling and storing of the byproduct, adding to the total cost," explains Nissley.

When considering by-product economics, Zurin explains that in Pennsylvania, the positive basis of corn results in lower (COG) in comparison to the mid-west. By using by-products, producers can lower their COG and be more competitive with mid-west cattle feeders.

Despite by-products' benefits, corn remains king for maximum performance in the feedlot, Zurin notes. "Make sure the by-product is cost effective and will not inhibit cattle performance or feed conversion," he shares. "Just because the ingredient is 'cheap', it does not mean it will always be the better alternative to corn."

When analyzing if a by-product is an alternative feed source for your operation, Zurin makes the following recommendations.

- Test products at a certified forge lab to determine feed value
- Watch fat and salt nutrient levels in the finished ration
- Understand the volume of the byproduct supply to determine feeding rates
- Determine the shelf life of the product
- Plan for extra storage and transportation

Zurin, Moyer and Nissley all agree that feeding by-products is an effective way to provide nutrient-rich feed sources and reduce landfill space. "In my mind, it's a win-win for everybody," says Nissley.

To learn more about feeding by-products to cattle, contact Courtney Cowden, PA Beef Quality Assurance (BQA) Director at ccowden@pabeef.org or 1-888-4BEEFPA.

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Adam Zurin



The Pennsylvania Beef Council is a producer-controlled and funded organization, which administers the Beef Checkoff Program in Pennsylvania. The Beef Checkoff Program assesses \$1 per head on the sale of live domestic and imported cattle, in addition to a comparable assessment on imported beef and beef products. Checkoff revenues may be used for promotion, education and research programs to improve the marketing climate for beef.

