

Calf Electrolytes

Professional Services Veterinarian Department Technical Bulletin



Why are electrolytes important?

When a calf has diarrhea, also known as scours, they can lose 5-10% of their body weight in one day.

% Dehydration	Symptoms	Treatment
0-5%	Mild depression, standing, strong suckle	Oral electrolytes
6-8%	Depression, weakness, sunken eyes, dry mouth/nose, skin tents, some suckle	Oral electrolytes
8-10%	Marked depression, down, very sunken eyes, prolonged skin tent, no suckle	IV fluids
10-12%	Comatose, down, cold	IV fluids
12-14%	Death	N/A

Scours is caused by multiple things, **but fluid replacement via electrolytes is a requirement for all scours treatment.** By simply reversing the dehydration, the calf can be saved without antibiotics. IV fluids are the fastest way to correct dehydration, but can be challenging to administer; making oral electrolytes the easiest alternative.

What should you look for in an oral electrolyte product?

WATER, SODIUM AND SUGAR.

- Water is required to reverse dehydration. Electrolytes should be mixed with water according to the manufacturer's directions and **should NEVER be mixed with milk** - it will be too concentrated, which will make the scours worse and further dehydrate the calf.
- Sodium and sugar (glucose) are the most important components of an electrolyte besides water. Calves need both sodium and glucose in order to absorb water and other electrolytes. They should range between **90-145 mmol/L**. Glucose should not be higher than 200 mmol/L unless free-choice water is offered at the same time.
- Dextrose is the most common sugar in electrolyte replacers; others include fructose, maltodextrin, lactose, amylose and sucrose. **Sucrose should never be given to calves as they cannot digest it and it will worsen the diarrhea.**

Using a buffer:

A buffer, also known as an alkalinizing agent, is equally important. Virtually every calf with diarrhea has a certain degree of acidosis, which is evident by a cold mouth, lack of suckle, or an inability to stand. A buffer will help bring the acid level down and restore a normal blood pH. An electrolyte product should contain between **50-80 mmol/L** of a buffer. All buffers increase the absorption of other electrolytes, making the product more effective.

- Common buffers include acetate, bicarbonate (baking soda) and citrate. Both bicarbonate and citrate decrease milk clotting, thus making the milk less digestible. This can promote bacterial growth in the intestine which may worsen the diarrhea.
- If a product contains either bicarbonate or citrate, you should offer electrolytes 4 hours after milk was fed.
- To not interfere with milk clotting, **acetate is considered the best buffer** and is the easiest to metabolize.



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Potassium and Chloride

In general, **potassium should range between 10-30 mmol/L and chloride should range between 40-100 mmol/L.** Both are necessary for heart and muscle function and are lost when the calf is scouring, although there has been little research done on the required levels in an electrolyte product.

Glycine

Glycine is an amino acid that is commonly added to electrolyte replacers. Research has shown that **glycine increases absorption of glucose and may aid in the healing of the intestinal lining.** To calculate the recommended level of glycine, **add the amount of sodium and glycine together;** the total should not be greater than **145 mmol/L.** This total should also be about equal to the level of glucose.

For example: If a product contains 80 mmol/L of sodium, 45 mmol/L of glycine and 129 mmol/L of dextrose, the total would be 125 mmol/L - (80 + 45). This is similar to the amount of dextrose, 129 mmol/L, in the product.

Other Additives

Protein, fat, vitamins, minerals, probiotics, charcoal, kapectate and fecal bulking agents may be added to electrolyte replacers. They are not required but may lead to a faster recovery. Protein and fat will help boost energy content, while vitamins and minerals provide essential nutrients. Little research has been done on the effectiveness of probiotics but they may help restore beneficial bacteria. Charcoal helps bind released toxins and kapectate may coat the intestines. Fecal bulking agents such as psyllium help solidify the stools.

Other Considerations

Most electrolyte replacers only provide 15-25% of the calf's daily energy requirement; thus **calves need to be fed milk in addition to electrolytes** in order for them to grow and fight off infections. Electrolytes should be offered at least twice a day in addition to the normal milk feedings. If a calf is alert and able to drink, milk should always be offered first followed by electrolytes. If a calf is down, IV fluids are usually required to rehydrate the calf and reverse the acidosis. Once a calf can suckle again, milk should be offered as soon as possible and further dehydration can be corrected with oral electrolytes. **A calf should never be kept off milk for more than 24 hours.** Oral electrolytes can safely be given by stomach or esophageal tube to any age calf. Milk should not be tubed to a calf over 7 days old as the milk will sit and ferment in the rumen, making acidosis worse.

Summary

The most important things to look for in an electrolyte replacer are sodium, sugar and a buffer. Acetate is the best buffer for milk-fed calves. Electrolytes should always be mixed with water and given orally either via nipple, bucket or tube. Please note that **oral electrolyte solutions should NEVER be given IV.** To help better understand the different products, a comparison chart is available at animart.com/techbulletins. These are all products ANIMART currently carries, but is not a complete list of all the electrolytes available on the market. If you have additional questions, please contact your veterinarian for further advice.

Calves are the future of the business.
Everything possible should be done to keep them healthy.

For more information contact:
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