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Calf Note #43 – Electrolytes for scouring calves

Introduction

Neonatal diarrhea, or scours, is a common malady of young dairy calves. Treatment of scours by oral rehydration therapy usually the first line of treatment for scouring calves. Electrolyte products are combinations of minerals, carbohydrates (sugars) and amino acids that provide assist in rehydrating the calf, replacing lost minerals and provide energy and protein (usually as amino acids) for the calf.

Dehydration is the most important effect that must be corrected as soon as possible. Signs typical of various degrees of dehydration include:

- 5-6% - no clinical signs
- 6-8% - sunken eyes, loss of skin turgor, dry oral mucous membranes
- 8-10% - loss of body weight, more distinct sunken eyes, dry mucous membranes, increased pulse
- 10-14% - comatose, cool extremities, poor peripheral pulse

Electrolyte products are formulated to replace lost water and minerals that are lost during periods of scours. The table below includes some of the important nutrients and ingredients required in electrolytes.

Note that some electrolyte formulas are not designed as a treatment for scouring calves, but instead are designed as a supplement for calves during periods of stress. These "supplement" formulas typically are less concentrated and may not provide optimal amounts of dextrose or glycine for optimal rehydration.

Table 1. Optimal nutrient and ingredient content of electrolyte products.

Item	Amount	Why?
Sodium	70 to 120 mEq/L	water absorption
Chloride	40 to 80 mEq/L	replace lost Cl
Potassium	10 to 20 mEq/L	replace lost K
Alkalinizing agent	40 to 80 mEq/L	correct acidosis
Dextrose		Na transport, energy source
Glycine		Na transport

Carefully evaluate the label of all formulas to be sure the meets the requirement above.

Some veterinarians use the "strong ion difference" (SID) to determine the quality of electrolyte preparations. This is the ratio of $[Na + K] - [Cl]$, expressed as milliequivalents per liter (mEq/L). Most professionals consider the optimal SID to be 50 to 80 mEq/L.

Amount to feed

The amount of electrolyte product to be fed depends on the degree of dehydration. For example if a 40 kg calf (about 88 lbs.) is 8% dehydrated, it will have lost $40 \times 0.08 = 3.2$ L of liquid. Therefore, to replace the lost water, the calf needs to received 3.2 L of liquid *in addition to its normal liquid intake*. So,

if a calf is normally fed 4 L of liquid per day (about 1 gallon), it will need $3.2 + 4 = 7.2$ L to become normally hydrated. Slight to moderate dehydration ($< 8\%$) can be treated with one additional 2 L feeding per day. More severe dehydration requires > 1 feeding. If the animal will not voluntarily consume the electrolytes, a veterinarian or other health care professional should be contacted immediately.

Mixing electrolyte products with milk or milk replacer to save time and labor defeats the purpose of these products. Remember, the most important component of electrolyte preparations is the water the producer adds to the product. Dehydrated calves require additional water - so additional feedings are *necessary*. In addition, some electrolyte formulations contain ingredients that can inhibit the formation of the casein clot. Therefore, it is important to feed these ingredients separately (see below).

Timing of electrolyte feeding

Electrolytes should be fed several hours after feeding whole milk or milk replacers containing significant amounts of skim milk or casein. Ingredients in electrolytes may impair the formation of the casein clot in the abomasum, thereby reducing digestibility and, possibly, exacerbating scours. If calves normally fed milk or milk replacer in the morning and afternoon, an optimal time to feed electrolytes is around noon. A second electrolyte feeding (if needed) can be offered at least 2 hours after the evening feeding.

Feeding milk or milk replacer

Milk or milk replacer feeding should be continued when calves scour. Calves need the liquid and nutrients provided by the normal liquid diet. Remember, very few electrolyte formulations contain sufficient calories to support maintenance and gain. Calories derived from milk or milk replacer are important to allow the calf to defeat the pathogen. Calves fed milk or milk replacer during periods of scours recovered more quickly than calves fed only electrolytes. For more information, see "[Calf Note #21 - Feeding scouring calves](#)".

Conclusions

Scours are common in preweaned calves. The first line of defense in treating scours in calves is to provide adequate hydration therapy. Treatment of the disease requires you to identify the source of the problem and if scours are caused by an infectious organism, to treat the calf with antimicrobials as recommended by your veterinarian.

For more information on feeding scouring calves and electrolytes, see:

- [Calf Note #21 - Feeding scouring calves](#)
- [Calf Note #42 - What are scours?](#)
- [University of Nebraska vaccination guide for replacement calves](#)
- [University of Nebraska NebGuide - calf scours](#)<http://www.ianr.unl.edu/pubs/animaldisease/g799.htm>
- [University of Florida guide to diseases of dairy replacement heifers](#)

- [Ontario Ministry of Agriculture, Food and Rural Affairs \(OMAFRA\) article on preventing scours in dairy calves](#)
- [University of California Vet. Extension circular on calf scours](#)
- [University of Alberta "Calf Care Tips"](#)

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