

# Use of Non Medicated Oral Rehydration Therapy to Treat Diarrhea and Scouring in The Young Calf.

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## Introduction

Diarrhea and scouring are still major problems associated with rearing of calves. Calf mortality in the dairy herd may be as high as 15% and much of this is attributable to deaths as a result of dehydration, electrolyte imbalances and physiological starvation, associated with digestive disturbances (diarrhea & scours). Although the use of oral rehydration therapy has been advocated for a long time producers have been slow to move away from reliance on antibiotics to treat diarrhea.

Most oral electrolyte products simply aim at replacement of lost ions and perhaps replenishment of some energy with dextrose. Many of these electrolytes have severe imbalances in tonicity resulting in reduced absorption of ions. In addition, few electrolyte products slow rate of passage to prevent further excessive loss of ions through the feces.

With these problems in mind, an oral rehydration product (ORP\*) was developed and tested in clinical situations.

The ORP consisted of a number of ingredients which are common components of diets and oral rehydration products for both animals and humans. These included: energy sources - dextrose, corn syrup solids, lecithin; fibers - to absorb water and slow flow rate in the gut; vegetable gums - to increase viscosity of gut contents to slow rate of passage and aid in suspension of insoluble fibers; electrolytes - sodium, potassium, magnesium.

The formulation is proprietary but ingredients were: dextrose, apple flakes, oat hulls, dried corn syrup, xanthan gum, guar gum, vegetable fat, sorbitol, lecithin, sodium bicarbonate, salt, potassium chloride, ascorbic acid, calcium pantothenate, potassium phosphate, dried whey product, magnesium sulfate, polysaccharide complexes of iron, zinc manganese, copper and cobalt, fumaric acid, citric acid, calcium propionate, sodium propionate, potassium sorbate, ethylenediamine dihydriodide, silicon dioxide.

\*ORP - Now available as ADVANCE ARREST™, through Milk Specialties Company, Dundee, Illinois 60118

### Experimental Design

The study was conducted in a commercial veal raising facility in Southern Wisconsin. The experimental design was a randomized block with a split plot in time. The objective was to test the efficacy of ORP versus a conventional system for treatment of scours. Calves were fed a commercial milk replacer diet twice a day according to a standard feeding schedule for rearing veal calves. The milk replacer was an all milk protein product containing 21% crude protein and 16.5% fat.

Fifty one Holstein bull calves of approximately 4 days of age and weighing 100 lb live weight, were randomly assigned to receive one of the two treatments when a bout of scours was encountered. The calves (26) in the ORP group received 4 consecutive feedings of ORP in place of their normal milk feeding (twice/day for 2 days) regardless of the change in degree of scouring. Calves assigned to the conventional group received the antibiotic and/or commercial electrolyte therapy as deemed necessary based on the fecal score and general health of the calf. It was also understood at the outset that calves which did not respond to ORP treatment or which developed other complications (respiratory) would be eligible for an alternate treatment or antibiotic therapy.

Fecal scores were recorded twice daily (am & pm) over a 4 day period from the time a calf was first diagnosed as scouring and allocated to a treatment. Fecal scoring was as follows:

- 1 = Normal
  - 2 = Soft
  - 3 = Runny (semi-solid, mostly fluid)
  - 4 = Watery (all fluid)
  - 5 = Watery (all fluid with evidence of blood)
- Medications given during the period were recorded.

The data was analyzed statistically using the General Linear Model Procedure of SAS (SAS Institute, Cary, N.C.).

### Results

Results are summarized in tables 1,2,3 and 4. Data in Table 1 show the mean fecal scores for the 8 recorded periods, for the calves in the two treatment groups. At the start of the treatment the mean fecal scores were essentially the same (ORP - 3.58, conventional 3.56). One feeding of ORP resulted in a significantly ( $P<0.02$ ) lower fecal score (1.77) than found for the calves receiving the conventional treatment (2.48).

ORP feeding continued to result in significantly lower fecal scores compared to the conventional treatment. The overall mean fecal score for the ORP group (1.70) was significantly lower ( $P<0.02$ ) than the mean fecal score (2.05) for the conventional treatment for the test period.

Days	Treatments			Statistical significance (P <)	
	ORP	Conventional	SEM		
		Fecal Scores			
1 Start of Trt.	a)	3.58	3.56	.12	.92
	b)	1.77	2.48	.20	.02
2	a)	1.58	2.24	.20	.02
	b)	1.15	1.88	.18	.005
3	a)	1.23	2.00	.18	.005
	b)	1.54	1.48	.19	.83
4	a)	1.38	1.44	.15	.80
	b)	1.38	1.32	.15	.77
Mean		1.70	2.05	.11	.02

**Table 1** Fecal scores of calves receiving ORP or Conventional treatment of antibiotics and/or electrolytes

Days	Treatments			Statistical significance (P <)
	ORP	Conventional	SEM	
		Fecal Scores		
Start of Treatments	3.58	3.56	.12	.92
1	2.67	3.02	.12	.06
2	1.37	2.06	.16	.003
3	1.38	1.74	.16	.13
4	1.38	1.38	.13	.98
Mean for 4 days	1.70	2.05	.11	.02

**Table 2** Daily fecal scores of calves receiving either ORP or Conventional treatment.

Data in Table 2 again show the rapidity at which ORP feeding reduced the fecal score. After only one day of ORP feeding (2 feedings) the mean fecal score had dropped to 1.37 and remained at this level to the end. The Conventional treatment resulted in a mean fecal score of 1.38 but it required 4 days to achieve this level. Analysis of the data as a Split Plot in Time design, (Table

3) reveal that both treatments resulted in significant ( $P < .0001$ ) declines in mean fecal scores over time; however, the ORP treatment brought about the most rapid decline in fecal scores (Treatment\*Time -  $P < .03$ ).

Effect	Statistical Significance
Treatment (ORP vs. Conventional)	$P < .02$
Time (day)	$P < .0001$
Treatment* Time	$P < .03$

Table 3: Statistical analysis of the data (fecal scores) as a Split Plot in Time.

Antibiotic therapy	ORP	Conventional
No. of calves per group	26	25
<b>SPECTAM<sup>1</sup></b>		
No. of calves treated	1	1
No. of doses	1	48
<b>NEOMIX<sup>2</sup></b>		
No. of calves treated	1	1
No. of doses	3	3
<b>VETISULID<sup>3</sup></b>		
No. of calves treated	2	6
No. of doses	5	10
<b>NAXEL<sup>4</sup></b>		
No. of calves treated	1	2
No. of doses	1	4
Total no. of calves treated	5 <sup>6</sup>	25 <sup>5</sup>
Total no. of doses	10	65

Table 4: Effectiveness of ORP in Replacing Antibiotics in Treatment of Scouring in calves.

