

SELEKT®

SELEKT Horse Electrolyte

Formulated for use in horses



SELEKT®

HORSE ELECTROLYTE



A palatable electrolyte formulation for horses. To be used as a hypotonic solution for horses requiring fluids or as an isotonic solution when required for an effect in the large colon. A complementary feedingstuff.

Een smakelijke elektrolytformulering voor paarden. Te gebruiken als een hypotone oplossing voor paarden die vocht nodig hebben. Te gebruiken als een isotone oplossing indien dit nodig is voor een effect in de dikke darm. Een aanvullend voedingsmiddel.

Une formulation d'électrolyte appétante pour les chevaux. Pour être utilisé comme solution hypotonique pour les chevaux nécessitant des fluides ou comme solution isotonique si nécessaire pour un effet dans le gros colon. Aliment complémentaire.

100 g

Enteral fluids for hydration of the gastro-intestinal contents and stimulation of the gastro-colic reflex

Success in large-colon impactions

Enteral fluid therapy with an isotonic solution was found to resolve 99% of large-colon impactions referred to an equine teaching hospital¹. The mean time to resolution was 21.2 hours and the mean total volume delivered was 113 litres.

Better than intravenous fluids, enteral water or enteral magnesium sulphate for hydration of the contents of the right dorsal colon

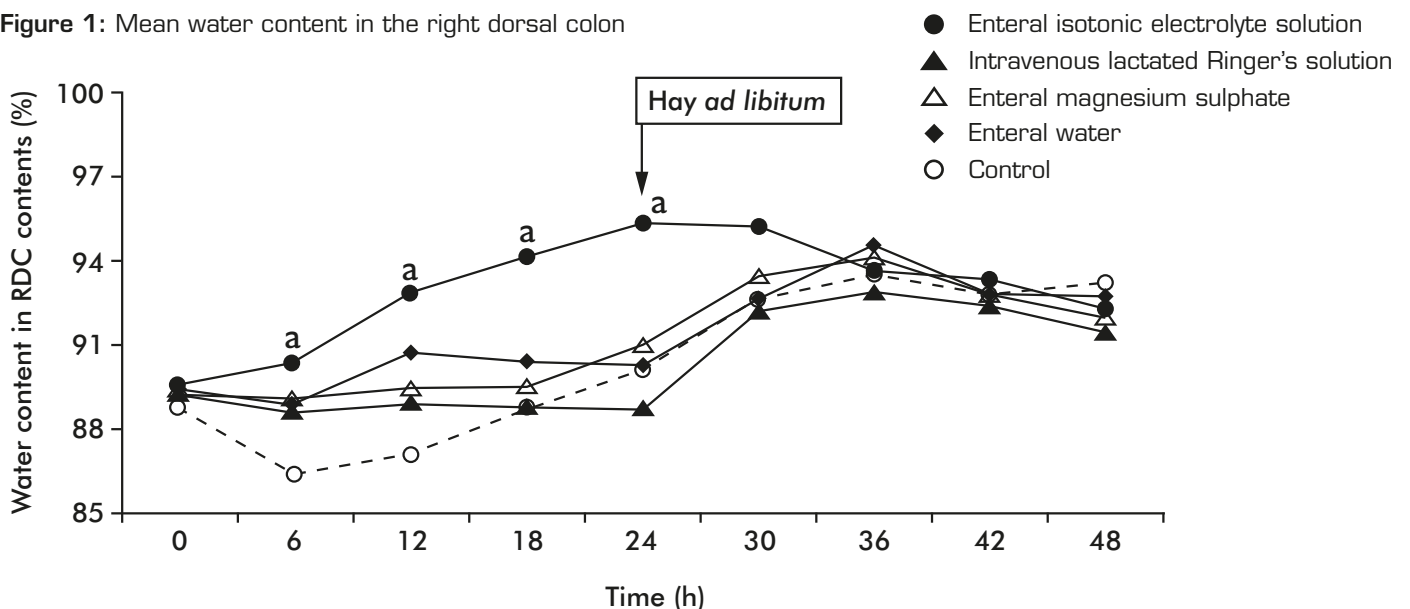
The effects of enteral and intravenous fluid therapy, and enteral magnesium sulphate, on the colonic contents have been investigated in fistulated horses, using a crossover design². Control horses had no treatment, but underwent naso-gastric intubation.

Treatments given included the following:

- Isotonic electrolyte solution given by naso-gastric tube, 5 litres/hour for the first 12 hours of the observation period.
- Intravenous lactated Ringer's solution, 5 litres/hour for the first 12 hours of the observation period.
- Tap water, 5 litres/hour, given by naso-gastric tube for the first 12 hours of the observation period.
- Magnesium sulphate, 1 g/kg in one litre of water, given by naso-gastric tube at Time 0.

The horses were muzzled for the first 24 hours of the observation period. They had no access to hay or salt, but free access to water. The naso-gastric tube and muzzle were then removed, and the horses had *ad libitum* access to hay, salt and water.

Figure 1: Mean water content in the right dorsal colon



Success in left dorsal colon displacements

In a university study, 30 horses with displacement of the left dorsal colon were treated with enteral fluid therapy using an isotonic solution. 25 cases (83%) were resolved. The mean time to resolution was 15.3 hours and the mean total volume delivered was 127 litres¹.

Provision of electrolytes and maintenance of acid-base balance

Hypokalaemia

65% of horses with colon impactions and displacements have a low plasma potassium concentration¹, and 50% of horses are hypokalaemic after colic surgery⁴. Hypokalaemia may cause muscle weakness, reduced gastro-intestinal motility and cardiac abnormalities⁶.

The amount of potassium in Hartmann's solution is frequently inadequate for maintaining plasma potassium concentration⁶.

Increased urine production and kaliuresis make it hard to replace potassium intravenously. So the **oral route is preferred for correcting severe hypokalaemia**. Five litres of electrolyte solution containing 10 to 40 mmol/l of potassium, depending on the measured deficit, is recommended in the most recent review⁶. When made up as an isotonic solution, SELEKT Horse Electrolyte contains potassium at 27 mmol/l.

Calcium and Magnesium

60% of horses with colon impactions have low plasma calcium concentration¹. A number of authors recommend intravenous infusion of calcium gluconate for horses with colic.

Horses with colic requiring surgery have abnormally low concentrations of ionized calcium and magnesium. The roles of calcium and magnesium in intestinal motility suggest these deficits could contribute to ileus. Horses which develop post-operative ileus have been found to have a significantly lower serum concentration of ionized magnesium at Day 3, Day 5 and Day 7 than horses that do not develop ileus⁷.

SELEKT Horse Electrolyte made up as an isotonic solution contains calcium at physiological concentration and magnesium at more than physiological concentration. It may therefore be used for enteral fluid therapy without diluting plasma calcium and magnesium.

Acid-Base Balance

Acidosis has been reported in 67% of horses with serious colic⁸. An isotonic solution of **SELEKT Horse Electrolyte contains bicarbonate at 54 mmol/l for correction of acidosis.**

As an isotonic solution

One sachet of SELEKT Horse Electrolyte dissolved in 5 litres of water makes a palatable isotonic solution that may be offered for drinking or delivered into the stomach through a naso-gastric tube.

1.5 litres of electrolyte solution per 100 kg liveweight, given through a naso-gastric tube at intervals of no less than 30 minutes, has been proposed for hydration of the gastro-intestinal contents³.

Approximately 90% of 8 litres of fluid delivered into the stomach of horses weighing 428±28 kg through a naso-gastric tube has been found to be emptied within 15 minutes. This is not affected by the tonicity of the fluid⁵.

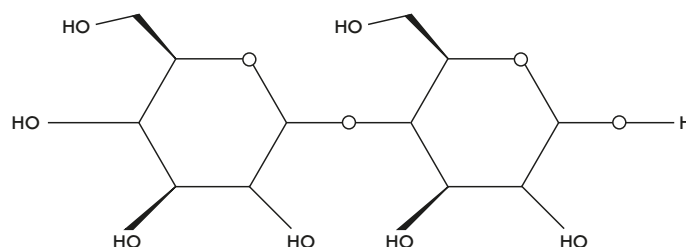


Rehydration

Hypotonic solutions have been found to perform better than isotonic ones for rehydration in man and in animal models. An investigation of the use of various hypotonic solutions in horses, including a solution based on maltodextrin, concluded that **hypotonic electrolyte solutions are the best option for dehydrated horses**⁹.

Maltodextrin is a polymer of glucose that allows delivery of glucose sub-units to the intestine in a solution with a lower osmotic potential than one with the same number of glucose sub-units in the form of glucose molecules. It is digested on the epithelial brush border of the intestine and provides glucose for the sodium-glucose pump that drives water absorption.

Figure 2: Structure of maltodextrin



SELEKT Horse Electrolyte is the only product for horses that exploits maltodextrin to combine:

- the superior rehydrating power of a hypotonic solution with
- the provision of substrate for the intestinal sodium/glucose cotransporter.

Acid-Base Balance

Horses with diarrhoea develop metabolic acidosis. There is evidence that this is explained mainly by a reduction in strong-ion difference consequent upon loss of sodium in diarrhoeic faeces¹⁰. It has been suggested that the danger of increasing metabolic acidosis should be avoided by using an electrolyte solution in which the concentration of sodium exceeds that of chloride, as it does in plasma. SELEKT Horse Electrolyte provides sodium in excess of chloride at similar molar proportions to those in plasma.

As a hypotonic solution


One sachet of SELEKT Horse Electrolyte dissolved in 7 litres of water makes a palatable hypotonic solution that may be offered for drinking or delivered into the stomach through a naso-gastric tube.

1.5 litres of electrolyte solution per 100 kg liveweight may be given through a naso-gastric tube at intervals of no less than 30 minutes.

Approximately 90% of 8 litres of fluid delivered into the stomach of horses weighing 428±28 kg through a naso-gastric tube has been found to be emptied within 15 minutes. This is not affected by the tonicity of the fluid⁵.

Data Sheet

SELEKT Horse Electrolyte

Presentation	<p>A white powder. Each sachet of 100 grammes contains the following ingredients.</p> <table border="0"> <tr> <td>Maltodextrin</td> <td style="text-align: right;">47.0 g</td> </tr> <tr> <td>Sodium bicarbonate</td> <td style="text-align: right;">22.5 g</td> </tr> <tr> <td>Sodium chloride.</td> <td style="text-align: right;">15.0 g</td> </tr> <tr> <td>Potassium chloride</td> <td style="text-align: right;">10.0 g</td> </tr> <tr> <td>Calcium propionate, micronized</td> <td style="text-align: right;">4.0 g</td> </tr> <tr> <td>Magnesium sulphate 7-hydrate</td> <td style="text-align: right;">1.5 g</td> </tr> </table> <p>When the contents of one sachet are dissolved in 5 litres of water, Selekt Horse Electrolyte forms a solution of the following concentrations: sodium 105 mmol/l, potassium 27 mmol/l, chloride 78 mmol/l, bicarbonate 54 mmol/l, calcium 4.3 mmol/l, magnesium 1.2 mmol/l, maltodextrin 27 mmol/l. Total osmolarity including propionate and sulphate, 302 mmol/l. When the contents of one sachet are dissolved in 7 litres of water, Selekt Horse Electrolyte forms a solution of the following concentrations: sodium 75 mmol/l, potassium 19 mmol/l, chloride 56 mmol/l, bicarbonate 38 mmol/l, calcium 3.1 mmol/l, magnesium 0.9 mmol/l, maltodextrin 20 mmol/l. Total osmolarity including propionate and sulphate, 216 mmol/l.</p>	Maltodextrin	47.0 g	Sodium bicarbonate	22.5 g	Sodium chloride.	15.0 g	Potassium chloride	10.0 g	Calcium propionate, micronized	4.0 g	Magnesium sulphate 7-hydrate	1.5 g
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Uses	<p>For enteral provision of fluid and electrolytes to horses.</p>												
Instructions for use	<p>For an effect in the large colon Selekt Horse Electrolyte should be dissolved in warm water at a rate of one 100-gramme sachet in 5 litres to make an isotonic solution.</p> <p>For fluid and electrolyte replacement Selekt Horse Electrolyte should be dissolved in warm water at a rate of one 100-gramme sachet in 7 litres to make a hypotonic solution.</p>												
Contra-indications and warnings	<p>Do not use less than 5 litres to dissolve the contents of the sachet.</p>												
Legal category	<p>Complementary feeding stuff</p>												
Package quantity	<p>Box containing 15 x 100 g sachets</p>												
Further information	<p>The molar concentration of sodium in a solution of Selekt Horse Electrolyte is 135% of that of chloride. This ensures it does not exacerbate the strong-ion metabolic acidosis that develops in dehydrated horses.</p> <p>Hypotonic electrolyte solutions compared with isotonic solutions have been found to reduce the duration of diarrhoea in man and to give greater net fluid absorption in animal models. They have also been found to be effective in horses.</p>												
Marketed by	<div style="display: flex; align-items: center;">  <div> <p>Nimrod Veterinary Products Ltd 2 Wychwood Court Cotswold Business Village Moreton-in-Marsh Gloucestershire GL56 OJQ United Kingdom</p> <p>Tel +44 1608 652593 Email nimrod@nimrodvet.co.uk www.nimrodvet.co.uk</p> </div> </div>												

References

- ¹ Monreal, L. *et al.* (2010) *Veterinary Record*, **166**, 259-263
- ² Lopes, M. A. F., *et al.* (2004) *American Journal of Veterinary Research*, **65**, 695-704
- ³ Hallowell, G. D. (2015) *Equine Veterinary Education*, **29**, 385-390
- ⁴ Protopapas, K. (2000). Thesis referred to by Borer, K. E., and Corley, K. T. T. (2006) *Equine Veterinary Education*, **18**, 266-271
- ⁵ Sosa León, L. A. *et al.* (1997) *Research in Veterinary Science*, **63**, 183-187
- ⁶ Borer, K. E., and Corley, K.T.T. (2006) *Equine Veterinary Education*, **18**, 266-271
- ⁷ Garcia-Lopez, J. M., *et al.* (2001) *American Journal of Veterinary Research*, **62**, 7-12
- ⁸ Larsen, J. (1994) Conference proceedings referred to by Nappert, G. and Johnson, P. J. (2001) *Canadian Veterinary Journal*, **42**, 703
- ⁹ Filho, J., *et al.* (2014) *Journal of Equine Veterinary Science*, **34**, 759-764
- ¹⁰ Ecke, E., Hodgson, D. R. and Rose, R. (1998) *Veterinary Journal*, **155**, 161-170