

Bicarbonate (HCO₃)

- Important buffer
- Neutralises acids produced by metabolism
- Aids in the transport of waste Carbon dioxide in the blood
- Some concern in certain racing jurisdictions over the use of massive doses to enhance race performance. Excessive feeding of HCO₃ may result in an illegal blood reading. The use of Domhealth electrolytes and nutritional supplements according to the label will not contravene the rules of racing.

Other electrolytes

Calcium

- Cell membrane function
- Blood coagulation
- neuromuscular functions

Ammonium

- Flushes and cleans
- Removes toxins

Magnesium

- Essential for muscle contraction and energy production
- Acts as a buffer, helping to prevent the build up of lactic acid.

References:

Kellon, E.M. (1998), Equine supplements and nutraceuticals, Breakthrough Publications

Lewis, L.D. (1995), Equine clinical nutrition, William & Wilkins

Lawrence, L. (No date), Water and Electrolyte Balance in the Exercising Horse, Department of Animal Sciences, University of Kentucky, viewed 03/2008, http://www.vetpro.co.nz:888/Vet%20Talk_Equine/Importance_of_Electrolytes.htm

RCI (No date), How to understand performance animal treatments and use them for best results, Rural Chemistry Industries Ltd., Australia



Domhealth Electrolyte Product Range

Domhealth Electrolyte Extreme

- Replaces electrolytes lost during exercise in extreme conditions.
- Suitable for Endurance, Racing, prolonged exercise and extreme conditions.
- **Contains:** Chloride (438.50g/kg), Potassium (209.76g/kg), Sodium (118.02g/kg), Sulphate (79.80g/kg), Carbonate (59.96g/kg), Calcium (40.04g/kg), Ammonium (33.72g/kg), Magnesium (20.20g/kg)
- **Feeding:** up to 12g per 100kg (60g per 500kg horse) daily

Domhealth Electrolyte Plus

- Suitable for general, everyday use for all types of horses
- **Contains:** Chloride (403.176g/kg), Citric Acid (201.30g/kg), Sodium (196.70g/kg), Potassium (110.76g/kg), Sulphate (31.92g/kg), Magnesium (8.08g/kg)
- **Feeding:** up to 12g per 100kg (60g per 500kg horse) daily

Winters Equinex Electrolyte Replacement Salts

- **Contains:** Sodium (301.4g/kg), Chloride (138.2g/kg), Bicarbonate (58.7g/kg), Potassium (44.2g/kg)
- **Feeding:** 30g per day increase to 60g per day for heavy sweating and during summer months

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Electrolytes

An overview of Electrolytes.
Their Function & How to Use
them Safely



The importance of electrolytes

Electrolytes are fundamental for the control of membrane potential, muscle contractions, nerve conduction and many enzymatic reactions.

The typical diet of the performance horse does not contain sufficient levels of Sodium, Chloride, Potassium, Calcium and Magnesium.

Body fluids play a vital role in every day life by carrying oxygen and carbon dioxide around the body, as well as removing waste and distributing enzymes and hormones to their target tissues. In order for this system to operate efficiently, body cells must have a balanced environment to operate in. This means the fluid in and around them must have a balanced composition, volume, temperature and distribution.

Maintenance of fluid balance is of critical importance to the performance animal. Relatively minor changes can have disastrous effects on performance. Loss of fluid balance through dehydration will quickly reduce the capacity for training to peak fitness and can lead to muscle damage in extreme cases.

Cell activity requires electrical energy, but water (which makes up two thirds of the body) is a poor conductor. Thus, the body requires soluble salts (electrolytes) to give it that power which it needs. It needs a continuous supply of the key electrolytes – Sodium (Na), Potassium (K), Chloride (Cl), and Bicarbonate (HCO_3). Horses do not "store" sodium, potassium or chloride from one day to the next. Therefore, a high level of daily electrolyte supplementation is necessary when horses sustain high sweat losses every day. There are lots of opinions about appropriate administration schedules and dose rates. Small amounts of electrolytes can be safely given to most horses before they reach a critical depletion point.

While high rates of electrolyte supplementation are probably not necessary on a daily basis, relatively high levels of electrolyte administration may be appropriate during an event. It may be advisable to provide the electrolytes as a paste or in feed, rather than in the water to eliminate any possible negative effects on water intake.

Electrolyte administration will be most effective if the horse is actively drinking, and should be given only under the supervision of a veterinarian if the horse is already very dehydrated or experiencing metabolic problems. While administration of electrolytes without water can create problems, administration of water without electrolytes may also be detrimental to a dehydrated horse. A veterinarian will be most qualified to determine what combination of fluid and electrolytes is most beneficial for a very dehydrated or exhausted horse.

Electrolyte Requirements

Studies have shown that the body salt requirements and losses are influenced by all of these inter-related factors:

1. Type of work - Fast (Short duration/high intensity)
 - Slow (Long duration/low intensity)
2. Sweat output - Normal (up to 10L/day)
 - Heavy (up to 30L/day)
 - Very heavy (up to 60L/day)
3. Climatic conditions - Temperature relative to humidity

Reasonable strategies for horses that are competing in situations that will result in large sweat losses include the following:

Give small doses of electrolytes at rest periods, before the horse gets dehydrated. A reasonable dose might contain around 3-7g sodium, 6-15g chloride, 1-3g potassium, 0.4-0.8g calcium and 0.1-0.3g magnesium.

Make sure water is available and encourage the horse to drink. If possible, keep track of about how much water the horse is consuming. Like water, electrolytes can be retained in and then absorbed from the large intestine, so **adding some electrolytes to the diet just prior to the event** may be helpful.

Once the event is over, **monitor the horse carefully.** Although it is not always convenient, it may be best to **wait several hours after finishing a long ride or event before transporting the horse home.** Transportation can be a dehydrating experience on its own, and transporting an already dehydrated horse may increase the potential for more serious problems such as colic.

Key Dietary Electrolytes

Sodium (Na)

- Mostly occurs in fluid outside of cells
- Maintains osmotic pressure
- Responsible for water regulation
- Vitally involved in blood viscosity
- Important in neuro-muscular function
- Activates enzyme systems to facilitate absorption of glucose and other nutrients from the gut and kidneys



Chloride (Cl)

- Inside and outside of cells
- Maintains acid: base ratio
- Involved in muscle physiology
- Essential for manufacturing Hydrochloric Acid (vital for digestion)



Potassium (K)

- Most important electrolyte inside cells
- Important in muscle physiology
- Activates enzyme systems
- Concerned with the flow of electrical impulses along the nerves
- **Orally administered potassium has little risk of toxicity** as it is absorbed gradually, allowing the kidneys time to clear any excess before it can build up to dangerous levels in the blood. Therefore excess is not harmful **unless renal excretion is decreased** (as excess is readily excreted in the urine). If adequate water intake is not available, renal function is significantly impaired.
- A deficiency is quite detrimental and causes muscular weakness and cramping. It can also cause irregularities of the heart and thumps. Supplementation is not required under normal conditions but when sweating increases supplementation may be necessary.

