

## **ELECTROLYTES, SODIUM AND HYDRATION: TRENDS, MYTHS AND FACTS**



During a hot day of competition, have you ever noticed a change in your horse's behaviour? Is he uncharacteristically sluggish or nervous? Are there signs of heat stroke? These types of reactions can occur when a horse is dehydrated. To prevent this, some basic principles are important to understand.

### **WHAT IS AN ELECTROLYTE?**

Electrolytes are minerals which, when dissolved in water, carry an electrical charge, either positive or negative. These minerals are sodium, chlorine, potassium and to a lesser extent calcium and magnesium.

There are pumps on the membrane of every cell in the body that maintain the balance of electrolytes and water inside and outside the cells. Depending on the type of cells, the concentration gradient allows, among other things, the transmission of nerve impulses and muscular contractions.

### **WHAT IS DEHYDRATION?**

Dehydration occurs when a horse loses too much water and electrolytes. There are multiple possible causes, including:

Health problems: diarrhea, choking, hemorrhaging, Cushings, etc.

Extended transport: horses drink less during transport, and might also suffer from light diarrhea and/or excess sweating.

Insufficient water intake and high fibre consumption: a horse's digestive system is designed for fresh pasture, which is at least 80% water. To replace that intake when eating dry hay, he needs to drink approximately 10 gallons (38 litres) of water per day.

An abrupt decrease in temperature: when the outside temperature decreases rapidly, the horse can considerably reduce his water consumption, because he will feel less inclined to drink, especially if the available water is cold.

Sweating: May cause a large loss of water and electrolytes (up to 20 litres per hour for a 1,200 lbs. [540 kg] horse on a hot day).

Summer being around the corner, let us focus on the last cause of dehydration.

### **WHAT ARE THE SYMPTOMS AND THE RISKS?**

A dehydrated horse's attitude can be affected: it will be nervous or sluggish, it may stagger, or look lost. He will have difficulty performing, notably due to less effective muscular contractions. He will be more susceptible to muscle cramps and tying up (recurrent rhabdomyolysis attacks). He will not be able to cool himself sufficiently because he is not sweating enough and if the exercise continues, he may suffer from heat stroke or worse a heart attack. He will also be at greater risk of colic by impaction, as the lack of water in the large intestine can reduce its motility. The intensity of the symptoms and the risks of health problems will depend on the level of dehydration. A slightly dehydrated horse will be more likely

to drink the water that is offered to him and can recover fairly easily. However, when dehydration has reached a certain level, the horse no longer feels thirst and the consequences could be more severe.

### **HOW TO CHECK IF A HORSE IS DEHYDRATED?**

The easiest and fastest way to check for hydration is to test for skin elasticity. Pinch some skin and then pull, either at the neck or the tip of the shoulder. If the skin is slow to return to its regular shape, it is a sign of dehydration. If the skin regains its place instantly, the horse is probably well hydrated. However, this is not a guarantee, as the horse could have drawn water from its reserves—like that of the large intestine—to send it to the rest of the body to compensate. In older horses with less elastic skin, it is advisable to use the fold of the eyelid. Another reliable and easy method is to check the capillary refill time. A good technique is also to monitor the manure: the pellets should hold their shape, but contain a large amount of water (confirming that there is water in the large intestine). The most accurate method remains a blood test, but there is a delay between sampling and results.

### **WHAT TO DO TO REHYDRATE?**

The rehydration method will depend on the degree of dehydration. In the case of mild dehydration, i.e. after intense exercise, it is suggested to administer water having a concentration of 0.45% to 0.9% of electrolytes (between 90 g and 180 g per 20 litres) at a temperature of about 20°C within minutes following exercise, and then offer clear water at the same temperature immediately after. Using this method, researchers found an increase in the total amount of water ingested and an improvement in the state of hydration. Generally, at this level of dehydration, the horse is thirsty. The popular belief is that a horse should not be given water immediately after exercise to avoid complications that could cause colic or laminitis. In fact, this is true only for cold water and not for tepid water. The horse's reflex is to drink almost immediately after exercise as well as after eating. So do not miss these two windows of opportunity to have him drink.

In the case of medium level dehydration, it is generally recommended to have the horse intubated by a veterinarian, because the horse does no longer feel thirst. In addition, the quantities of water and electrolytes to replace what is needed are so great that the horse will not succeed in ingesting them without intervention.

In the case of severe dehydration, and even occasionally for the more moderately affected horse, it is necessary to administer a large quantity of the electrolyte solution intravenously. This treatment should also always be done under the supervision of a veterinarian, as excess intravenous potassium can cause cardiac arrest.

### **BE CAREFUL OF OVERDOSES (WATER, SUGAR AND SALT)**

Over consumption of water without the addition of electrolytes will not lead to a rapid improvement in your horse. Unlike salt water, pure water does not help the horse to feel thirst, and it does not help reestablish electrolyte stores.

Care must also be taken not to over-administer electrolytes suddenly. If an excessive amount is administered to the horse orally without access to water, the animal will be worse off as the electrolyte concentration will be too high and the dehydration will worsen.

### **WHAT ELECTROLYTE TO CHOOSE?**

The choice of an electrolyte will depend on the degree of sweating of the horse. For a light worker, a well-balanced ration providing 25g to 30g of salt per day and free-choice hay suffice. For a horse performing moderate exercise, depending on the amount of sweat produced, 30 g to 60 g of salt per day should be added to a balanced diet and hay at will. The salt block alone is rarely adequate, since the consumption can vary and is often insufficient. Indeed, a 2 kg block should be consumed in less than eight weeks, which rarely happens. Therefore it is recommended to add salt (rock or cattle salt) in the feed. This is an economical way to replace lost electrolytes.

For horses in intense training or who sweating a lot, commercial electrolytes may be worth considering. There is a wide-range available, so it is necessary to examine the ingredients in order to make the right choice:

For horses performing anaerobic exercise (short and intense like race horses, gymkhana), a product containing sodium, chlorine, potassium, calcium and magnesium is suggested. It can contain a small amount of calcium bicarbonate and sugar in order to help muscle recovery. These same products are recommended for cases of diarrhea.

For horses that perform aerobic exercise (medium to long-term, low to medium intensity such as show jumping, dressage, reining, endurance), a product containing sodium, chlorine, potassium, calcium and magnesium should be used. However, it is not advisable to give a large quantity of sugar or, especially, bicarbonate which causes muscle cramps (the body produces different types of waste dependent on the type of exercise, so bicarbonate will have the opposite effect).

Beware of electrolytes whose first ingredient is sugar or dextrose. These ingredients are not very useful for restoring hydration. A certain quantity of sugar is, however, beneficial since it helps in the absorption of salt. The suggested salt/sugar ratio is 2:1.

## **HOW TO PREVENT DEHYDRATION**

Above all, daily maintenance is essential. A well-balanced ration with added salt should be fed. As such, in addition to the benefits of exercise and recovery, there will be a much smaller risk of impaction colic.

During long and intense work, especially when the temperature is hot and humid, small amounts of electrolytes should be given regularly. It is possible to give them between the sessions, or between stages during endurance events. It is essential that the horse also have access to plain water, as well as offering electrolytes in water, as a paste or as a powder in the feed. It can also be beneficial to soak the horse regularly, to remove excess water on the body and then start again. Water will evacuate heat instead of sweat, so the horse will not need to sweat as much.

Serving water in a bucket rather than an automatic waterer will allow to monitor the amount of water consumed and avoid pressure problems. Indeed, a horse might drink less water if the waterer has too much or too little pressure. It is also easier to serve lukewarm water in a bucket.

It is a lot simpler to prevent dehydration than to treat it, and it is a lot less stressful! This summer, check your horse's hydration several times a day, particularly on hot and humid days, and provide him with salt. The summer will be more enjoyable and profitable for both you and your horse!