Understanding Electrolytes For Horses and The Role That Electrolyte Supplements May Play In Maintaining The Health Of Your Horse.

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Electrolytes are mineral salts that create electrical current in the horse. Electrolytes are needed for many biological processes including muscular contraction, water balance and a regular heartbeat. If electrolytes are depleted from the horse and not quickly replenished, health problems can occur including dehydration, diarrhea, inability to contract and relax muscles, cramping and irregular heartbeat. The most important electrolytes are : Chloride, sodium, potassium, calcium and magnesium. Substances such as dextrose and sucrose are sugars, not mineral salts and therefore should not be incorporated into an electrolyte mixture except in very small amounts which helps with the absorption of the minerals into the bloodstream.

Horse sweat is hypertonic, meaning it contains more mineral salts or electrolytes than water. This is the opposite of the way in which human beings sweat – they lose more water and retain the salt. The two different mechanisms explain why when people sweat they get thirsty right away. Salty blood activates thirst receptors in humans, causing them to drink which results in water re-entering the bloodstream and diluting the salt. Horses on the other hand do not have the same thirst response because their blood already has too much water and not enough salt, hence the old saying " You can lead a horse to water but you cannot make them drink."

Calcium is a very interesting and important electrolyte for several reasons. Approximately 99 percent of the calcium in the body is found in the bones and teeth and bone is comprised of about 35 percent calcium. In bone, calcium plays a structural role but serves in other functions throughout the body such as causing muscle to contract, cardiac function, blood coagulation, cell membrane function and regulation of enzymes that are needed for many biochemical reactions.

Calcium regulation in the blood is very tightly controlled because so many functions are dependent on it. A normal reference range for ionized calcium (the physiologically active form that is measure clinically) in the horse is 6.44 to 6.74 mg/dl serum. Because of this narrow range and a highly efficient process of increasing or decreasing blood calcium levels by release or uptake from bone stores, blood values do little to assess how much mineral is stored in the bone. For example, when furosemide (a loop diuretic that causes water and electrolyte loss through urine) is administered before a race, large amount of calcium as well as other electrolytes are removed from the blood. Within 15 minutes, calcium is being mobilized from the bone to replace what is lost in the blood and return the level to the acceptable range.

When furosemide is administered, the water and electrolyte losses are so great that at times, even homeostasis mechanisms cannot be maintained. When this happens, horses often are afflicted with what is termed "thumps" or synchronous diaphragmatic flutter. "Thumps" is seen in horses that have sweated or been depleted of water and electrolytes for prolonged time periods. Low blood calcium, potassium, and chlorine result in an increase in neuromuscular irritability and hypersensitivity of the phrenic nerve. With thumps, the beating of the heart stimulates the hypersensitive phrenic nerve to fire. This results in a contraction of the diaphragm seen at the flank each time the heart beats. Horses affected with thumps must be given intravenous calcium and electrolytes immediately to prevent sudden cardiac failure and other musculo-skeletal and neurological problems.

Anhidrosis or nonsweating, is a condition is horses in which the ability to sweat is compromised or ceases to occur. Horses are most commonly affected in areas with hot, humid climates, such as in the southeastern United States. In normal horses, sweating is initiated by stimulation of sweat glands, which are activated by nerve signals (neurotransmitters) called catecholamines. Recent studies have indicated that the condition is likely a problem with the sweat glands and their response to nervous signals needed to initiate sweating.

Maintaining proper hydration and electrolyte balance is very important to overall health of horses that have stopped sweating. The most effective way to handle anhidrotic horses is by making environmental/management changes. Horses that do not sweat should train/ride during the coolest time of the day, and provide access to shade/water/white salt at all times.

Taking an affected horse out of a hot, humid climate can sometimes reverse the condition within a month or so. Misting fans and other barn-cooling management practices should also be employed to assure the anhidrotic horse remains cool at all times.

To prevent dehydration and electrolyte depletion in exercising horses, be sure to have plain white salt and fresh water available at all times when horses are stabled and turned out. Adding a couple tablespoons of salt to the feed can be helpful as well but never add any salt or electrolyte mixture to water as horses will not drink salty water. If necessary, use a paste preparation that is formulated to mimic the correct concentration of electrolytes in horse sweat and administer orally. If a horse is severely affected, a veterinarian should administer intravenous fluids at once.