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VITAMIN C – A POTENT NATURAL ANTI-OXIDANT

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WHAT ARE FREE RADICALS AND OXIDATIVE STRESS?

Oxidation is the process that converts oxygen to energy. Most of the consumed oxygen forms carbon dioxide and water - however, 4 – 5% of the oxygen is not completely used and forms a reactive type of oxygen known as a **free radical**. Cells continuously produce free radicals as part of metabolic processes.

Free radicals are unstable and highly reactive with other molecules, causing chain reactions. These chain reactions contribute to the oxidation of fats, breakdown of proteins and DNA damage. When free radical generation exceeds the cell's antioxidant capacity, tissue-damage develops due to oxidative stress.

The role of free radicals in many aspects of health and disease has become of increasing interest because when antioxidant systems are insufficient free radicals may damage DNA and contribute to degenerative changes including heart disease, diabetes, aging and cancer. In addition, if their production is not effectively neutralized, they will ultimately weaken the immune system.

Oxidative stress results in increased membrane fragility, compromised integrity and inactivation of membrane activities and enzymes. The effects may be immediate or cumulative ¯ deleteriously affecting muscle membranes, cartilage and blood vessels and implicated in several equine diseases including tying up, osteochondrosis, exercise-induced pulmonary hemorrhage (bleeding) and chronic inflammatory airway diseases.

ANTI-OXIDANTS & VITAMIN C

Free radicals are neutralized by an elaborate antioxidant defence system that includes vitamins C - the major water-soluble antioxidant with additional powerful abilities including:

- potentiation of vitamin E activity
- protection of the lungs against oxidant damage
- reduction of exercise-induced muscle damage and delayed muscle soreness.

EXERCISE INCREASES FREE RADICAL PRODUCTION

Physical exercise increases muscle use of oxygen, causing an overproduction of free radicals and lactic acid, which damage the muscle and result in muscle membrane leakage, fatigue and injury. Plasma increases in CK and AST reflect the leakage of proteins and other substances through muscle membranes.

During exercise Vitamin C is mobilized from body stores - increasing the free-radical scavenging ability, quenching the excess of free radicals and combating oxidative damage in the muscles and lungs.

VITAMIN C

At rest, horses have the ability to synthesize sufficient ascorbic acid and the importance of antioxidant supplementation may only become apparent if the diet is deficient in antioxidants, if exercise intensity is higher or more prolonged, or if disease or additional stresses are present. A horse that is not being stressed won't necessarily show any deficiency symptoms but the price may be paid in the long run in terms of immunity to disease, allergies, healing, rate of aging and development of degenerative diseases such as arthritis.

A horse in training is a completely different story because increasing demands create a dietary requirement. The demand for a constant supply of key nutrients to meet the needs for tissue repair and adaptation, energy generation, protection against oxidative damage from free radicals and resistance to infections is huge compared to a horse at rest. In the very early stages of viral infections, before a specific immune response can be mounted, tremendous amounts of oxygen free radicals are generated and Vitamin C levels are decreased in lung lining fluid of horses with airway inflammation.

However, controlled training and supplementary anti-oxidants significantly increase horse antioxidant defences in the muscles, the lungs and the blood. Daily administration of vitamin C in combination with the other key anti-oxidants, including vitamin E, vitamin A, zinc and selenium, significantly increase antioxidant defences in both the extracellular fluids and blood cells

Studies have found horses that receive additional vitamin C have enhanced systemic and pulmonary antioxidant capacity leading to a reduction in markers of oxidative damage, an improvement in pulmonary function during exercise and a correlation between blood vitamin C concentration and speed

The antioxidant defence system depends on the daily dietary intake of antioxidant vitamins and minerals. The horse is equipped with mechanisms for dealing with excess free radical production, but it must have the raw materials required to supercharge the anti-oxidant defence system. A single oral dose does not result in any increase in plasma concentrations of vitamin C, however daily administration results in significant increases in plasma concentrations.

As anti-oxidants are mobilised during exercise, blood vitamin C levels decrease, especially in hot conditions. Daily administration of vitamin C results in greater tissue stores that are released into the circulation during exercise.

To support the increased daily requirement of horses in training, MITAVITE now contains a new form of protected, heat-stable, supplementary vitamin C - to complement the already high levels of vitamin E, vitamin A and anti-oxidant minerals,

zinc and selenium. For further information please contact Mitavite toll free on 1800 025 487.