

Improvement of muscular integrity in horses with MELOFEED® and ALKOSEL®



CONTEXT

Intense training in horse is a major source of **oxidative stress**, due to the excess production of free radicals in the cell respiration process. This condition adversely impacts the resistance to training, by weakening muscle cell membranes and disturbing cell functionality. An innovative approach to prevent oxidative stress is to act at **the first line of defense by promoting antioxidant enzymes**: superoxide dismutase (SOD), catalase (CAT) and glutathione peroxidase (GPx). In an animal model, SOD ingested by **MELOFEED®** can induce the endogenous expression of the 3 antioxidant enzymes, therefore

stimulating the overall first line of antioxidant defense. **Organic selenium (ALKOSEL® R397)**, as a **cofactor of GPx**, potentiates Melofeed effects by acting at the removal step of hydrogen peroxide. Therefore MELOFEED® and ALKOSEL® R397 combination, acting synergistically to enhance primary antioxidant defenses, is of major interest in the prevention of Reactive Oxygen Species formation and in the control of oxidative stress. In the present experimental trial, MELOFEED® was combined with ALKOSEL® R397 and vitamin E and their combined effects were investigated on markers of muscle cell integrity: CPK and SGOT.

OBJECTIVE

To investigate the effect of MELOFEED®, ALKOSEL® R397 and vitamin E supplementation to horses on blood parameters CPK and SGOT, markers of muscle cell membrane integrity. A decrease of these parameters in blood is indicative of a better protection of cell membranes and therefore of an improved muscular integrity.

MATERIAL AND METHODS

LOCATION France

DURATION July 2013 - march 2014.

ANIMALS 37 horses split in 3 groups :

- « red » group (n = 8): horses stopped in training (myositis),
- « orange » group (n = 11): horses kept in training and presenting high initial values of blood CPK and SGOT,
- « green » group (n = 18): horses kept in training and presenting acceptable initial values of blood CPK and SGOT (horses with problematical background).

SUPPLEMENTATION PERIOD 15 weeks for the « red » group.

10 weeks for the « orange » group.

31 weeks for the « green » group.

TREATMENT Antioxidant combination:
MELOFEED®: 200 mg/horse/day,
ALKOSEL® R397: 500 mg/horse/day,
Vitamin E: 1,25 mg/horse/day.

MEASURED BLOOD PARAMETERS CPK and SGOT: enzymes of muscular cells. Disruptions of cell membrane due to free radical attack induce enzymes release in blood. These enzymes are therefore used as markers of cell membrane integrity in muscles.

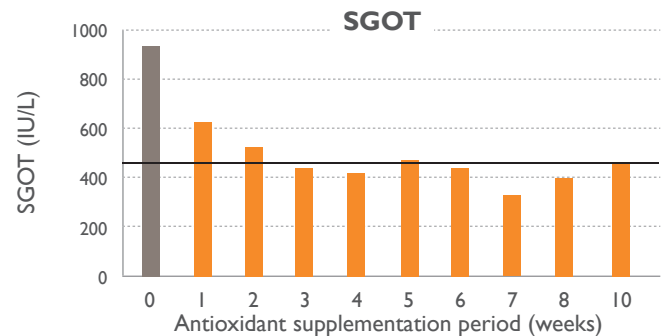
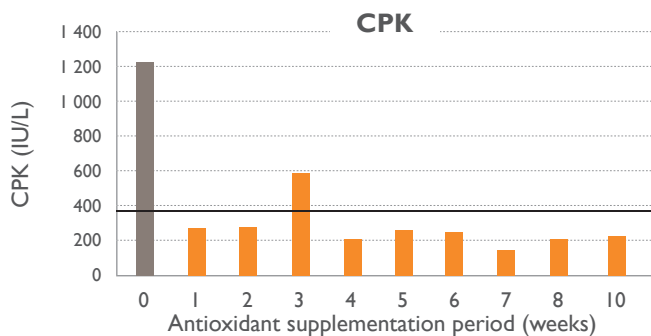
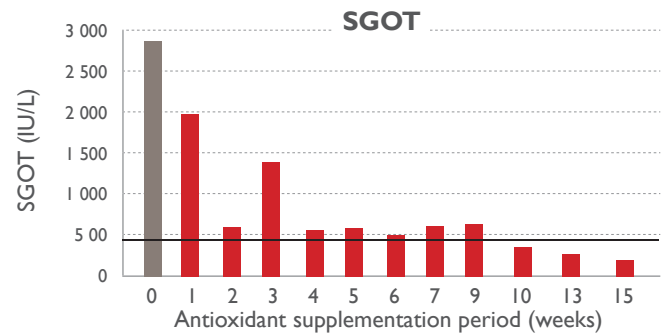
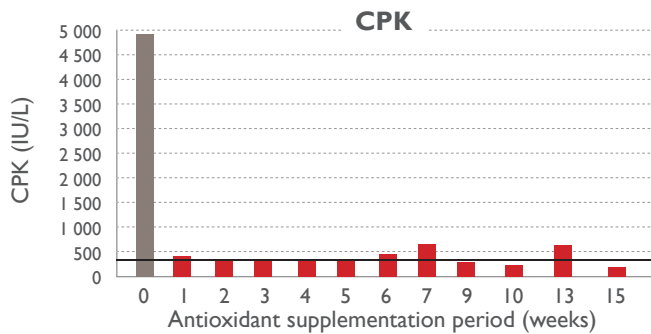
- CPK (creatine phosphokinase): peak in 3-4h after the physical effort and return to basal values in 24-72h
- SGOT (ASAT= aspartate aminotransferase): slower kinetics with a delayed peak at 24h after the physical effort and elimination between 7-10 days.

RESULTS

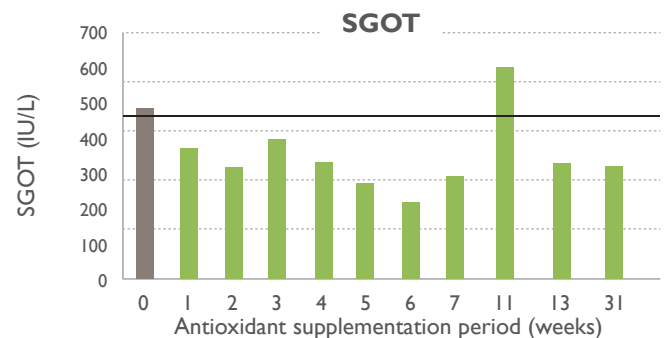
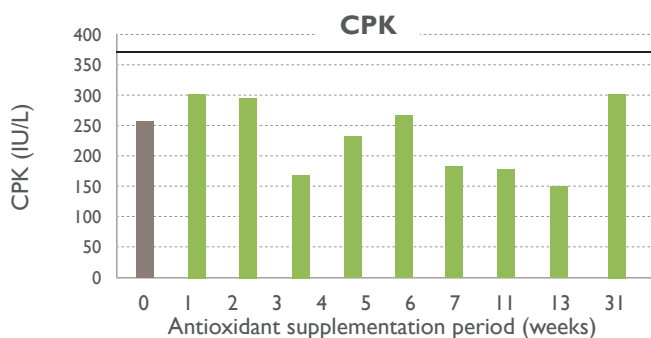
Graphs below display the evolution over time (weeks of antioxidant supplementation) of the mean blood concentration in CPK and SGOT (IU/L) for each group of horses.

The first value (0) shaded in grey represents the mean value before antioxidant supplementation. The horizontal black lines represent reference critical values, set to 370 IU/L for CPK and 460 IU/L for SGOT. Horses in orange and red group present high initial values for both CPK and SGOT (horses were stopped in training for the red group).

CPK values are kept below the critical value of 370 IU/L from the 1st week of antioxidant supplementation for both groups. **SGOT values** are also decreased, but more slowly over time, with final values below the critical value of 460 IU/L after 10 weeks of antioxidant supplementation for the red group and after 3 weeks of antioxidant supplementation for the orange group. These results confirm SGOT having slower kinetics than CPK.



Horses in green group present acceptable initial values of CPK and SGOT, which are below the reference critical values (black lines). Antioxidant supplementation with MELOFEED®, ALKOSEL® R397 and vitamin E in long term (31 weeks) allows keeping these values at an optimal level over time.



CONCLUSION

- Supplementation with an antioxidant combination (MELOFEED®, ALKOSEL® R397 and vitamin E) proves to be efficient at reducing values of blood parameters CPK and SGOT for horses having high initial values, starting at the first week of supplementation.
- Supplementation with this antioxidant combination proves to be efficient at maintaining optimal values of these parameters in long term, for horses having acceptable initial values at the beginning of the trial.
- Combining MELOFEED®, ALKOSEL® R397 and vitamin E is therefore of particular interest to restore and maintain cell membrane integrity in muscular cells, and consequently to improve horse resistance to physical effort.