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EFFECT OF A PROBIOTICUM ON EXERCISE-INDUCED CARDIO-RESPIRATORY AND BLOOD PARAMETERS CHANGES IN THOROUGHBRED HORSES DURING TRAINING

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Two groups of thoroughbred horses, randomly distributed, were compared during a 12-weeks period for their cardio-respiratory and metabolic adjustment to strenuous exercise. During the whole experimental period, the principal group (n=6; weight: 500.2±15.5 Kg; age: 4.5±0.7 yrs) received once a day a probioticum (Bioracing®, Chemoforma, Berne, Switzerland) while the control group (n= 5; weight: 500.2±16.3 Kg; age: 4.0±0.3 yrs) received a placebo. All other conditions were similar for both groups. The horses were trained following the same highly standardised schedule. The effect of (a) 2 different types of training, i.e. aerobic and interval training, as well as (b) detraining on some cardio-respiratory parameters measured during a standardised exercise were regularly investigated. The eleven horses underwent 5 standardised treadmill exercise tests (SET): 1st SET, at the start of the experimental period; 2d SET, after 3 weeks acclimatization; 3th SET after 3 weeks of aerobic training; 4th SET after 3 weeks of anaerobic -interval- training and 5th SET after 3 weeks detraining.

The SETs (consisting in 5 min warm-up and 6 min test: 1min at 1.7m.sec⁻¹; 1min at 4m.sec⁻¹, 1min at 8m.sec⁻¹, 1min at 9m.sec⁻¹, 1 min at 10m.sec⁻¹ and 1min at 11m.sec⁻¹) were carried out in an air-conditioned laboratory on a treadmill inclined at 6°. Respiratory airflow, tidal volume, respiratory rate and expired minute volume were obtained using a face mask and 2 ultra-sonic pneumotachographs. The oxygen uptake ($\dot{V}O_2$) and carbon dioxide production ($\dot{V}CO_2$) were calculated on a breath-by-breath basis, using a mass spectrometer. Heart rate (HR) was continuously measured with a polar horse tester. Oxygen pulse (OP= $\dot{V}O_2/HR$) and ventilatory equivalent (EV= expired minute volume/ $\dot{V}O_2$) were calculated from the collected data. Lastly, venous blood was sampled before and after the test and analysed for plasma lactate (LA), cortisol (COR), hematological evaluation, enzymatic activities in phosphocreatine kinase, lactate dehydrogenase and aspartate amino transferase, and ions.

The results show that, in both groups, training induced significant modifications of all the cardio-respiratory parameters, but HR_{peak}, $\dot{V}O_2$ and $\dot{V}CO_2$ were significantly increased; the cardiac and respiratory efficiencies were significantly improved as assessed by the increase of OP and the decrease of EV respectively. The anaerobic training period induced the most substantial improvement of the cardio-respiratory parameters. After the 3 weeks detraining period most of the values were similar again to the pre-training (SET1 and/or SET2) ones in both groups. The training-induced modifications in most of the blood parameters were non significant, except for LA and COR.

The training-induced improvement of the following parameters were proportionally more important in the principal group (PG) than in the control one (CG): $\dot{V}O_2$ (+11% more in PG vs CG), $\dot{V}CO_2$ (+19%), EV (+ 14%), OP(+19%), LA (+19%) and COR (+18%). All other parameters changed similarly in both groups. On the other hand, detraining induced a return to the basal values in both groups.

This suggests that the probioticum used in the present experiment accelerates the effect of training by improving some aerobic metabolic capacities, but that its benefit occurs only during training and not during periods of physical inactivities.