Heart rate of horses undergoing aerobic exercise and supplemented with gamma-oryzanol

Alexandre A. O. Gobesso*[1], Iaçanã V. F. Gonzaga[1], Rafael Françoso[1], Fernanda M. P. Taran[1], Thiago Centini[1]; Júlia R. Ferreira[1], Fernanda P. Rodrigues[1], Yasmin N. Bortoletto[2], Carolina T. Marino[1]

[1] Department of Animal Science, School of Veterinary Medicine – São Paulo University

[2]School of Animal Science and Food Engeniring – São Paulo University

* Av. Duque de Caxias Norte, 225 – Pirassununga/SP, 13635-900, E-mail: gobesso.fmvz@usp.br

Introduction

The heart rate has been conventionally used as an indicator of respiratory and circulatory functions of horse (HODGSON et al., 1994), and its measurement during exercise allows to quantify the intensity of the workload and monitor the fitness, becoming an important tool for the maximization of any training program, both for athletes of the human species (LINDINGER, 1999) as for the equine (TRILK, 2002).

This study aimed to evaluate the heart rate of horses submitted to aerobic exercise and supplemented with gamma-oryzanol as well as recovery time after exertion.

Material and methods

- The experiment was conducted at the Laboratory for Research in Food and Exercise Physiology in Equine (Labequi) - FMVZ / USP – Pirassununga, during 180 days.
- 10 Arabian horses, geldings, aged 35 ± 8.15 months and body weight of 375 ± 22.78 kg, divided into control group and treatment group (gama).
- Individual daily consumption of 2% body weight/dry matter, 50% concentrate and 50% forage - Tifton 85 hay and commercial concentrate.
- All horses received 50 mL of vegetable oil added to the feed at meal time, the treated group received gamma-oryzanol (5 g/meal) mixed within vegetable oil. Both groups were exercised into circular walker for 60 minutes at maximum speed of 12 km/h, five times per week.
- Measurements were made monthly in heart rate (HR) of all animals using digital monitors adapted for horses. At each time, we obtained the HR: baseline, maximum, ultimate, 10 and 20 minutes after the end of the exercise.

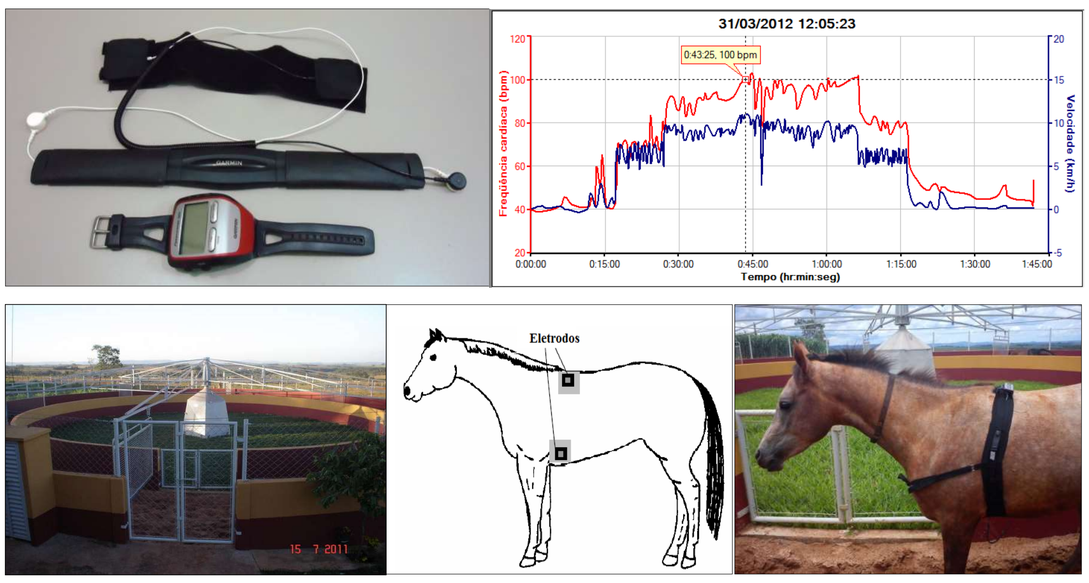

Figure 1: Digital heart monitor adapted for horses and walker

Results and discussion

- Time interaction was observed treatment (p=0.05), where the animals supplemented with gamma-oryzanol showed lower HR 20 minutes after the end of training, compared to the control group.
- The animals had lower basal HR over time, which can be explained by the effects of physical conditioning.
- In submaximal exercise, HR becomes smaller with the progression of training and increased aerobic capacity (OHMURA et al., 2002) and fatigue is mainly associated with intramuscular glycogen depletion and oxidative stress (RIVERO & PIERCY, 2011). In the current study, we consider that one or some of the various properties of gamma-oryzanol can postpone fatigue in these animals over time.

Table 1:Average heart rate (HR, in bpm), standard error of the mean (SEM) and p-value for control and gama groups

Variables	Treatment		SEM	P value		
	Control	Gama		treatment	time	interaction
HR baseline	41,80 ± 5,76	40,37 ± 5,49	0,67	0,61	0,001*	0,84
HR maximum	154,86 ± 31,34	147,09 ± 35,37	3,99	0,45	0,48	0,17
HR ultimate	63,79 ± 21,07	66,94 ± 24,94	2,79	0,52	0,003*	0,07*
10´after	48,52 ± 9,44	50,54 ± 15,13	1,53	0,67	< 0,0001*	0,73
20´after	46,21 ± 9,48	46,03 ± 10,75	1,22	0,92	0,009*	0,05*

*p<0,10

Conclusion

Supplementation with gamma-oryzanol of horses undergoing aerobic activity is beneficial and may reduce heart rate recovery of animals over time.

References

- HODGSON, D. R., DAVIS, R.E., McCONAGHY, F.F. Thermoregulation in the horse in response to exercise. **British Veterinary Journal**, v.150, p. 35-42, 1994.
- LINDINGER, M. I.; Exercise in the heat: thermoregulatory limitations to performance in humans and horse. **Canadian Journal of Applied Physiology**, v.24, p.135-146, 1999.
- OHMURA, H.; HIRAGA, A.; MATSUI, A.; AIDA, H.; INOUE, Y.; SAKAMOTO, K.; TOMITA, M., ASAI, Y. Changes in running velocity at heart rate 200 beats/min (V200) in young Thoroughbred horses undergoing conventional endurance training. **Equine Veterinary Journal,** v.34, p.634-635, 2002.
- RIVERO, J. L., PIERCY, R. J. Muscle physiology: responses to exercise and training. *IN*: HINCHCLIFF, K. W.; GEOR, R. J.; KANEPS, A. J. **Equine Exercise Physiology – The Science of Exercise in the Athletic Horse**. Ed. Saunders Elsevier, p. 274-300, 2011.
- TRILK, J. L. A lactate-guided conditioning program to improve endurance performance. **Equine Veterinary Journal,** Supl. 34, p.122-125, 2002.

FAPESP Processo n° 2009/16569-7