



## MEDICAL TIPS

# FEEDING HORSES FOR SPORT

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By Dr. Emir M. Chaher DVM FEI-Vet, Portugal

### THE EQUINE ATHLETE:

Everybody knows that horses are much better athletes than humans. Horses outperform human athletes thanks to their greater aerobic capacity.

Horses can increase oxygen intake up to 110 times from rest to maximum physical effort, compared to only 13 to 23 times increase in humans. This results in superior athletic performance.

Horse's hearts also beat faster. At rest, a horse's heart beats at about 28 beats per minute (bpm) and can increase to up to 250 bpm – this is an 8-fold increase. The human athlete's heart rate at rest is about 45

bpm but can only increase to about 200 bpm – just a 4-fold increase. A faster heart rate results in an increased delivery of oxygen and nutrients to the body.

The horse muscles can take oxygen from blood more efficiently than human muscles can, and horses can also increase the number of red blood cells through the contraction of their spleens.

Still, intensive exercise in horses, particularly when performed in hot and humid conditions will result in the reduction of the energy reserves of glycogen in the liver and muscles, dehydration and electrolyte losses.

The prime sources for energy production in the exercising horse are carbohydrates and fats.

The degree at which each energy source is utilized depends on numerous factors, including the intensity and duration of exercise, the availability of these fuels, and the effect of hormones.

### ENERGY FOR MUSCULAR WORK:

Muscular contraction is a consequence of the transformation of chemical energy into mechanical energy. This conversion of chemical into mechanical energy and muscular movement requires





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the provision of adenosine triphosphate (ATP), which is utilised by muscles to contract. But ATP reserves in the muscles are very limited providing energy only for a few seconds.

ATP must be continuously produced to sustain muscle contraction. This regeneration of ATP is done by two metabolic ways:

- 1) Anaerobic (without oxygen)
- 2) Aerobic (oxidative)

The main energy sources in muscle cells are free fatty acids and glucose.

At the beginning of exercise energy is primarily obtained from the anaerobic pathways

and glycogen acts as the major fuel source, resulting in an accumulation of lactate.

However, within approximately 1 minute after the beginning of exercise, there is a change to aerobic metabolism, which is a more efficient way, but is also a slower process.

At low to moderate exercise, the use of fatty acids provides the major source of energy. At moderate to high aerobic exercise intensities, the use of fatty acids decreases and the use of carbohydrates accounts for more than 50% of the amount of energy utilized.

**SOURCES OF ENERGY:**

The major sources of fuels for energy production during

exercise are carbohydrates and fats and to a lesser extent proteins.

Fat reserves are the largest nutrient reserve while the carbohydrate reserves are limited.

Though most attention in sport horses' nutrition has been focused on glycogen stores, little attention has been given to muscle triglyceride (fats) or protein reserves.

**ENERGY FOR SPORT:**

The first source of energy in equine nutrition is soluble carbohydrates, also called sugars and starch. These are found mainly in grains, like oats and corn or molasses. When a horse eats soluble



Man vs Horse

carbohydrates, these are absorbed in the small intestine. The problem is that they can cause an increase in blood glucose and insulin and produce metabolic changes increasing the risk of tying up and gastric ulcers. Feeding too many soluble carbohydrates causes an overload of the small intestine, the starch that doesn't get digested and passes into the hindgut where it is fermented, causing diarrhoea, and even laminitis.

Securer energy sources are fats, being preferred as an energy source of the horse - training horses increases fitness, shifting naturally from using carbohydrates for energy to using fats for energy. Fats are also more energy concentrated. A small amount

of fat can contain a much larger amount of energy. Fats are also absorbed in the small intestine but do not cause a large metabolic disturbance, so they are safer than sugars and starches. Good sources of fats for horses are flaxseed and rice bran.

The source of that energy is as important as the amount.

**REFERENCES:**

-Gäbel, G., 2010. *Physiologische Grundlagen der körperlichen Belastung*. LBH: *Proceedings, 5. Leipziger Tierärztekongress, Band 1, 119-123.*

- Pagan J.D. 2005. *Advances in Equine Nutrition III*. Nottingham University Press, Hampshire, UK

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*About the Author:*

*Emir Chaher is clinical director of IberoVet – Equine Veterinary Services (Portugal). He graduated in 1997 from Buenos Aires University (Argentina), subsequently undertook postgraduate studies, lectured and worked at the Munich Veterinary School (Germany). He is an FEI Official Veterinary Delegate and his main areas of interest are orthopaedics, surgery and sport medicine.*

Tel: +351 912511550  
 Email: [chaher@iberovet.com](mailto:chaher@iberovet.com)  
 Facebook.com/IberoVetEquine