

# Feeding on Race Day

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# R1

Racing  
Fact Sheet 1

Over the past decade, there has been extensive research into the metabolism and utilisation of energy sources in the muscles of exercising horses. Muscle biopsies taken before, during and after exercise from horses galloping on high speed treadmills, have monitored the depletion of energy reserves in the rump muscles. In conjunction with oxygen uptakes and blood analysis, these techniques have provided much more information on how horses use energy when racing.

A fit horse metabolises 80% of its muscle energy, stored as the carbohydrate glycogen, using oxygen or aerobic metabolism when galloping at maximum 'all-out' speed in races ranging from 1000 - 3200 metres.

These studies have shown that during a 3000 metre race, a galloping horse only uses around 7-10% of its total daily energy requirement in the actual race. However, the dominate energy source as glycogen (muscle sugar) has to be available in the muscle stores and at maximum storage capacity to ensure efficient aerobic metabolism in the short duration of a race.

## Reducing Gut Weight - Start 3 days before racing

Reducing gut weight increases the 'power to weight' ratio and can make a significant difference in races exceeding 1600 metres, as the horse expends less energy to carry the lighter gut content. The weight of the horse can be greatly influenced by its diet or pre-race feeding.

Performance in a race horse is more consistent when its body weight is maintained within 7-10kg of its last win. Overseas studies have shown that every 1kg of hay added to the diet adds an extra 3-4 kg of gut weight within 24 hours, contributed from fibre, saliva mixed into the feed and an amount of water held in the fibre content of the ration. Each 1kg of fibre holds up to 3kg of water.

Water held in the fibrous mass of the hindgut as the soluble fibres are digested, provides the reserve of fluid needed to replenish sweat, respiratory and loss of fluid through the kidneys and droppings each day. The hindgut of an average racehorse is about 100 litres in capacity, and contains approximately 60 litres of water held in the fibre and fluid contents.

The water content in the gut, which accounts for an average of 20% of the total fluid content of a horse's body, has a significant influence on the total body weight. Denying, rather than limiting water intake to reduce gut weight, is not recommended. Although a reduction in body weight has the advantage of increasing the power to weight ratio and overall competitiveness, water loss (dehydration) from blood and tissue fluid increases the risk of muscle cell damage and reduced stamina due to hampered electrolyte and increased resistance to tissue perfusion in the working muscles.

Many trainers consider a horse performs better if it is slightly dehydrated and therefore has a lower body weight, studies have shown that loss of more than 10kg weight, or a 2% dehydration in an average racehorse, can have a negative effect on its performance.

## Handy Hint

### Energy Boost

It is preferable to add extra cereal grain, such as 2-3 cups of cracked corn (maize) in the last 2-3 evening meals in the lead up to a race. In practice, this helps 'top-up the tanks' (muscle glycogen stores) without the side-effects of training a 'hot', hard to handle horse or one with 'cow pat' droppings if too much grain is provided during training or between races.

## Feeding Prior to Racing

It is essential that the dietary intake relative to the horse's needs and amount of exercise be maintained during the 2-3 days prior to racing, especially if the intensity of exercise is tapered off.

Oversupply of carbohydrate energy by grains relative to exercise can increase the risk of tying-up in sensitive horses. During training, this can be avoided by reducing grain to one third of its daily intake on the evening prior to, and during a rest day. However, obviously, this cannot be done just before racing.

**In the last 2 days prior to racing, increase the grain mix by 300g daily, spread over 2 feeds, and reduce the hay by 1/4 biscuit on each of the last 2 days, but not less than 2 kg in the ration. Theoretically, this would reduce gut weight by at least 2-3 kg, with the same amount of water intake. Maintain the higher grain and less hay on race day.**

There is no benefit in manipulating the diet to try to increase the energy storage in muscles by carbohydrate loading in preparation for racing, as it may lead to digestive upset and metabolic conditions by overloading carbohydrates into the large bowel, increasing the risk of hindgut acidosis (lactic acid). However, I find that feeding 3 cupsful of plain **cracked corn** in each of the three evening meals prior to a race, helps to improve the chances that a horse will run to the line, especially if it lacks a little energy in its diet in the lead up to the race and drops back at the finish.

## Feeding on Race Day

There are no established recommendations for feeding horses on race day. Generally, to limit added gut weight by consumption of food, a horse should be given its last grain based feed 6-8 hours before the start of a race. To ensure the horse remains settled and contented, and its digestive processes active until the time of the race, a limited amount (eg. quarter of a biscuit before leaving for the race track) of dampened lucerne hay may be provided 30mins before travelling to the racetrack. In horses which have a 'picky' appetite after a trial or race, then feeding 4 litres of dampened lucerne chaff, with an added amount of 3 scoopsful of **Kohnke's Own Gastro-Coat®** and 2 tablespoonsful of powdered limestone (Ag-Lime) as a small snack feed each morning 30 minutes prior to training and prior to leaving to travel to the races, will provide compounds to help salivation and natural buffering and protection of the stomach wall against acid 'burn' during a race which may aggravate an existing gastric ulcer. Routine feeding of this small feed before training can help maintain the appetite in long term training. It can be fed as a small snack given in the float prior to unloading at the track on race days and prior to loading the horse after a race so that it is more comfortable during the return trip to the home stables.

## Handy Hint

Give 1 scoopful **Kohnke's Own Cell-Iron Supplets™** on each of the 2 nights before racing to help ensure an adequate supply of iron to assist in muscle myoglobin synthesis and oxygen transfer.

## Withhold Water

Although it is traditional to withhold water for up to 6 hours prior to racing to limit gut weight, under hot conditions water should be provided to replace sweat loss up until the time a horse is stabled at the racetrack. If a horse is 'nervy' and 'sweats up' during travelling, administering 50ml of rehydration fluid over the tongue before entering the track together with 1-2 litres of water to drink, will help to partly restore electrolyte and fluid levels within 15-20 minutes to reduce the risk of severe and performance limiting dehydration.

**Studies have indicated that a supplement of iron given within 17-24 hours before competition can help stamina and endurance. Although the extra boost of iron is**

unlikely to improve the red blood cells' haemoglobin content, it is more probable that iron containing enzymes and myoglobin pigment in muscle cells that aid oxygen delivery and aerobic energy production become more active and efficient in muscle metabolic processes.

## Supplement with Vitamin E

Vitamin E has been popular as a routine daily supplement in the diets of racing horses for many years. Vitamin E, along with the trace-mineral selenium, primarily act as antioxidants to prevent damage to the lipid (fat) membrane lining of muscle cells. The high level of oxygen availability and the heat produced during rapid muscular activity is thought to increase the risk of oxidation of polyunsaturated fatty acids in the muscle cell membranes, resulting in the formation of highly inflammatory and damaging 'superoxide' radicals or compounds. These affect the integrity of the muscle cells and decrease muscle power and stamina when combined with lactic acid and electrolyte changes during exercise. Although a daily dose of Vitamin E may not directly increase performance, it may have a benefit in improving efficiency of oxygen use and muscle metabolic "fitness", as well as reducing the risk of muscle damage when supplemented to racing horses. Many authorities consider that Vitamin E also has other effects during high intensity exercise, with a secondary role of ensuring optimum efficiency of aerobic glycolysis metabolism at peak exercise intensities.

### Handy Hint

A 'blinded' field study involving 250 carefully selected and matched racehorses in Germany indicated that supplementation with 1000iu Vitamin E daily may have benefit to optimise racing performance. 125 horses given 1000 IU Vitamin E daily placed in 48.8% of their race starts, as compared with 29.9% for 125 horses not given Vitamin E. Horses in this study that were supplemented with Vitamin E had a 14% chance of winning as compared to less than 10% for horses not receiving daily Vitamin E.

## Before Leaving to Race

If travelling for more than 1-1½ hours to the race, giving a small 500g (4 litres) feed of lucerne chaff, 3 scoopsful of **Kohnke's Own Gastro-Coat** and 2 tablespoonsful of fine limestone powder 30 mins before travelling may help to protect against gastric acid burn in horses with a history of 'picky eating' after a race or travelling. It also helps to give a 500g of dampened lucerne hay in a low feed bin on return from racing to facilitate airway drainage and help buffer gastric acid during the post race period before giving a full grain meal.

## Feeding After Racing

If a horse is continued to be worked normally after a race, the meal on the day after racing can contain up to 10% more grain than normally provided, with the bulk made up of good quality, dampened hay and chaff to replenish energy stores, restore intestinal motility and fluid retention in the hindgut. However, if a horse is given a rest or light workday, such as when turned-out for self-exercise at pasture, the grain content of the meals should be reduced by 50% until the horse returns to training.

## Post Race Muscle Recovery

Studies indicate that supplementation with Branched Chain Amino Acids (valine, leucine and isoleucine) within 30-60 minutes after racing (or fast exercise) will be preferentially taken up into the muscle cells due to high levels of circulating growth hormone released by hard physical exercise. Routine replenishment of BCAA's after racing (rather than prior to racing) may help in maintaining muscle bulk and strength in horses racing on a repeated basis.

Although a 60 mL tube of BCAA paste is a popular post-race supplement, supplementing with 100 grams (8 x 12g scoopsful of **Kohnke's Own Muscle XL®**, given as a water slurry over the tongue within 15-30 mins of racing provides more BCAA's, as well as the muscle recovery nutrients glutamine, 1500 IU vitamin E and organic zinc to assist muscle recovery. A 100 g supplement of **Muscle XL** costs around \$3.00, whereas 60 mL BCAA paste costs \$25-28, but **Muscle XL** provides many more beneficial nutrients.

### Handy Hint

A supplement of 15-30g (1-2 scoopsful) of **Kohnke's Own Cell-E PREMIUM®**, containing important antioxidants as vitamin E, vitamin C, vitamin A and organic selenium in a natural whey powder base, for 2 nights before racing (it can be mixed into the same feed in a separate area to **Kohnke's Own Cell-Iron Supplet™** pellets) to help provide optimum muscle membrane protection and improve oxygen use efficiency when racing.

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