NUTRITION FOR THE SPORT HORSE
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Key Points

- For all sport horses, forage is the foundation component of the ration. The ration should provide a minimum of 1.5% of BW as forage (dry matter basis).
- Ideally, starch intake should be no more than 2 g/kg BW per day. This goal is best achieved by use of a combination of high-quality (nutritional value) forage and feeds that contain a mix of energy-providing ingredients (vegetable oil, digestible fibers, and starch/sugar).
- The addition of specialized dietary supplements to sport horse diets is commonplace but marketing claims are rarely supported by scientific evidence.

Although nutrition per se will not improve the intrinsic athletic ability of a horse, poor nutritional management can impose limits on an animal’s ability to perform due to, for example, loss of body condition and muscle mass in the face of inadequate dietary energy and/or protein. For any equine athlete, the main considerations in ration formulation and nutritional management are: 1) provision of adequate fiber (roughage) to maintain normal digestive function (‘forage first’); 2) the targeting of an overall energy density that will allow energy requirements to be met (and bodyweight [BW] and conditioned maintained) at typical fed intakes; 3) provision of the optimal amounts of energy substrates and other essential nutrients (i.e., protein, minerals and vitamins); and 4) application of competition feeding strategies appropriate to the athletic task.

Several factors affect the digestible energy (DE) requirements of performance horses, including training load, the demands of travel and competition, and intrinsic individual variation. The DE needs of high-level performance horses are more than twice that of maintenance in some circumstances, and feeding practices to meet these high caloric demands can increase risk of adverse health consequences. As non-ruminant herbivores, horses are adapted to the consumption of forage-based rations, with microbial fermentation of fiber carbohydrates in the hindgut providing energy in the form of volatile fatty acids. Although forage is the foundation of any horse diet, in general a forage-only diet will not meet the DE requirements of most high-level sport horses due to the relatively low energy content of forages and the physical limitations to feed intake (typical daily dry matter [DM] intake in performance horses is 2.0-2.7% BW). Consequently, additional calories in the form of ‘concentrate feeds’ (e.g. grains or sweet feeds) are usually added to the ration. Some trainers favor restriction of forage intake (<1% BW/day) due to the concern that higher fiber diets will impair performance because of increased gut fill and bodyweight (for every kg of hay, about 2-2.5 kg of water is consumed with a high proportion retained as hindgut fill). However, forage-restricted diets may increase risk of gastrointestinal dysfunction (e.g. gastric ulcers) and behavioral problems and most nutritionists recommend a minimum forage provision of 1.5% BW (as DM) daily. Early maturity hays should be chosen due to higher digestibility and energy content and lower impact on gut fill when compared to more mature hays.

Starch-rich feeds (e.g. oats, corn, or commercial sweet feeds) have been a traditional source of additional calories in performance horse diets, with grain intakes in excess of 8-10 kg/day observed in racehorse populations. Epidemiological studies have identified the level of grain feeding as a risk factor for colic and, more recently, an association between starch feeding
(>2 g starch/kg BW/day) and squamous gastric ulcers has been demonstrated. One recommendation is to feed no more than 1 g starch/kg BW per meal (and 2 g/kg BW per day) for avoidance of starch-associated digestive disturbances but these goals are difficult to achieve in practice – for a 500-kg horse, this equates to only 1.25 kg oats (40% starch) or 0.8 kg corn (60% starch) per meal and only 2.5 kg and 1.6 kg, respectively, per day. A more practical approach is to use concentrate feeds with a wider variety of energy-providing ingredients, including vegetable oils and highly digestible fibers (beet pulp, soy hulls). Vegetable oils provide 2.5-3 times the energy of cereal grains and horses can safely consume up to 1 ml/kg BW/day (1 standard cup = 250 ml) after adaptation. Many commercial feeds for performance horses contain added vegetable oil (up to 10-12% DM) as well as digestible fiber sources. Inclusion of these alternative energy sources facilitates a reduction of the level of starch feeding without compromising the caloric density of the ration.

The proportions of hay vs. concentrate feed in the ration will depend on several factors (e.g. total DE required to maintain BW and condition, the quality [=nutritional value] of the hay, whether or not the horse has access to pasture grazing, etc.) but should be governed by the forage minimum described above. As a simple example, take a 500-kg horse with daily DE needs of 28 Mcal. The feeding of mixed grass hay with a DE content of 2.3 Mcal DE/kg DM at 1.5% BW (7.5 kg or 16.5 lb) will provide about 17.3 Mcal, leaving a deficit of 10.7 Mcal. Approximately 3.4 kg (7.4 lb) of a commercial performance feed (3.2 Mcal/kg) will cover this deficit – and can be safely fed as two meals per day. Total daily feed intake is 2.2% which is a realistic level for most horses in training. More or less feed will be required for hays with, respectively, lower or higher DE content when compared to the example used here. The adequacy of caloric (DE) intake over time is best judged by regular assessment of body condition score.

Most if not all performance horses are fed some type of ‘supplement’ in addition to forage and feed. The use of supplements designed to restore nutritional balance to the diet (e.g. the feeding of a vitamin-mineral mix in the face of marginal to poor quality forage and/or a straight grain such as oats; the use of electrolytes to replace sweat losses in hot conditions) is rationale. More controversial, however, is the use of compounds or plant material that provide one or more nutrients in a specific preparation (e.g. amino acids in gelatin) or one or more non-nutritional factors (e.g. flavonoids) in order to support metabolic processes (e.g. anti-oxidative capacity) or provide some other purported benefit. There can be considerable misinformation and hype associated with some supplements, and this makes it very difficult for owners/feeders to make informed decisions regarding the ‘value’ of a particular supplement. In most situations, marketing claims are not supported by scientific evidence.

It is generally accepted that competition-like bouts of exercise should be delayed for a period of time post-feeding; however, there is still considerable debate regarding the length of this interval, i.e. 2, 3, 4 or 6 h. Feed withholding for 12 h or longer before exercise is certainly not recommended for several reasons – potential increase in risk for gastric ulceration, behavioral abnormalities, tendency to ingest poorly digestible fiber if bedded on straw during feed withholding, etc. This authors’ recommendation is to allow consumption of small forage meals (1-2 kg) in the 1-3 h period before competition exercise. Grain-based meals that promote a substantial insulin response are not recommended within this time period. The observation that alfalfa hay may decrease the incidence and severity of gastric ulcers in horses in training suggests that it may be helpful if this forage is alfalfa or 50:50 grass:alfalfa. With respect to water and electrolyte balance during exercise, the preferential timing of exercise is around 2 h after electrolyte administration but this may need to be adjusted to the individual animal.