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Lifestyle feeding: Can you manipulate your horse's diet to minimise the effects of its lifestyle?

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Teresa qualified from Cardiff University in 1985 with a BSc (Hons) in Applied Biology, during which she specialised in Human Nutrition and Biochemistry.

She graduated from Newcastle University with an MSc in Animal Nutrition in 1988. Teresa's MSc thesis work on 'Replacing Carbohydrates with Oil for Thoroughbred Horses' was presented at The First European Conference on Horse Nutrition in Germany, and she is also co-author on numerous research publications.

She has worked in the feed industry for 18 years for Belvoir Horse Feeds, Dengie and currently Dodson & Horrell Ltd. She is a frequent contributor to the English equine press, and has written over 2,000 articles. In addition Teresa is a guest lecturer on Equine & Veterinary degree courses as well as teaching CPD to practising vets. More recently Teresa completed her doctorate which was sponsored by D&H, entitled 'The development of quantifiable measurements to characterise the epidermal integrity of the equine hoof capsule'. Teresa currently manages the research programme for Dodson and Horrell as well as being responsible for the technical management of the Helpline and nutrition team.

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Summary

A review of equine digestive anatomy and physiology in the context of the latest scientific research in nutrition enables us to combine the best feeding practices and the latest science to minimise the risk of nutritionally related diseases. Horses are kept for a multiple of reasons from simply the fun of it and the interaction it gives us with such a special animal through to the high performance racehorse, eventer, endurance or dressage horse. This presentation will concentrate on those aspects of nutrition which have an impact on all horses regardless of their lifestyles.

Introduction

The dietary requirement which correlates most closely with the lifestyle of the horse and which is most variable is energy. The manipulation of the diet, the ingredients used and the nutrients it supplies is led predominantly by the need for energy. This manipulation often ignores the basic digestive physiology of the horse. How we manipulate energy effects the whole of the digestive system and impacts on both the horse's performance and health.

This paper discusses the latest thoughts on diet management and highlights practices which will enable the feeder to maximise energy inputs and mimic natural feeding behaviour.

Digestive anatomy and feeding practices

The foundation of all diets should be forage. When forage digestion is compromised by either the feeder or a problem with physiology, there is an impact on the health, performance and behaviour of the horse. All horses even those in hard work, should be fed a minimum of 50% forage by weight. Forage and concentrates are often manipulated inappropriately because of a misunderstanding of calories.

The beginning/the mouth

1. Teeth

Impaired mastication due to poor dentition will affect the ability of the gut to process fibre and thus reduce energy intake. Horses prone to impaction colics, young horses losing deciduous teeth and all old horses should have their faecal fibre length

monitored; an increase in fibre length should be used as an early warning sign of *potential impaction problems*. Normal horses masticate their fibre into very short lengths; 75% of hay particles in the horse's stomach are less than 1 mm across. Horses with poor dentition may spend more time eating, but often have longer fibre in their droppings, (3–4 mm), indicating a reduction in fibre digestibility. Recent research has shown that irregular dental care increased the risk of *simple colonic obstruction and distension colics*.

2. Chewing

Horses only produce saliva when physically chewing. Saliva production is dependent upon the type of feedstuff being consumed. Horses produce more saliva eating forage compared to some concentrates. *Saliva is a lubricant* and helps prevent *choke*. In addition, saliva contains bicarbonate ions, (50 mEq/l) whose concentration is directly proportional to the rate of saliva secretion, providing buffering in the upper part of the stomach (proximal/fundic region; saccus caecus). The low pH (high acid in the upper part of the stomach) of gastric contents of horses on low fibre diets could be a predisposing factor in the incidence of *gastric ulcers*. Moreover, inadequate fibre, is often associated with the development of *oral stereotypies*. Crib biting and wind sucking have also been identified as strong risk factors for simple colonic obstruction and distension colic. See Table 1.

The small intestine

Unless the horse is on more than 80% forage the small intestine is where the majority of dietary energy is digested and absorbed.

a) Oil, (a supply of fatty acids)

Fat is not a natural ingredient in the diet of a wild horse, grass contains only about 2% oil. In addition, fat provides more energy per kilogram than any other ingredient used in horse feeds. Common sources of this concentrated energy source include soya oil, rapeseed oil, codliver oil, linseed, soya and naked oats. High oil feeds should not be fed to horses prone to weight gain. Some fats are very high in omega 3 fatty acids, for example linseed and codliver, (incidentally grass also contains a good ratio of omega3:omega6 fatty acids but hay is very short in these essential fatty acids).

Fat/oil is digested in the small intestine very efficiently by the horse especially considering that he does not have a gall bladder. However because of the way the

TABLE 1: Maintaining forage intakes in the leisure and performance horse to maximise natural eating behaviour and minimise disruption to the gut

	Leisure horse	Performance horse
Problem	Solutions	Solutions
Restricting forage to control energy intake	Grazing and forage often restricted in overweight/ laminitics. Consider soaking hay for 12 h. Feed oat/barley straw. Forage should be fed at minimum 2% BW	Forage often over restricted as perceived to be low in energy. All performance horses should be fed 50% forage by weight. Use high energy forage fed at minimum 1.25% BW Use high energy chaffs such as alfalfa and grass Use high energy concentrates as main energy supply
Not eating forage ie hay	Involve qualified equine dental technician. Check for diastemas, (fibre stuck between teeth, in gums). Use hay replacers, talk to a nutritionist	Check forage: concentrate ratio Consider B vitamin supplementation Involve vet, consider gastric ulcers Consider using high energy, high fibre concentrates
Gastric ulcers	Likely in horse/ponies on restricted forage eg laminitics and/or Bute. Must maintain bulk but reduce calories. Consider anti-oxidants	85–90% racehorses suffer; 65–75% sports horses Increase forage intake Feed concentrates in smaller meals more frequently. Feed a small forage meal 2 h before exercise
Choke	Feed a low energy chaff or fibre 'bucket' feed	Feed high energy chaff with concentrates particularly if feeding pellets

horse and ourselves 'burn' fat as an energy source in the cells of our bodies, it means that oil is considered a slow releasing source of energy. Racehorses are unlikely to need much fat in their diet as they need fast releasing energy supplies.

b) Starch, (storage carbohydrate, a supply of glucose)

Starch is the storage energy of plants and is found in seed heads of all mature grasses and cultivated crops eg oats and wheat. Although the horse can eat large amounts of starch, it is vitally important that the total amount is fed in small meals so that as much

starch as possible is digested in the small intestine. Undigested starch in the hind gut is dangerous. Starch should be broken down to glucose in the small intestine. It is possible to measure the amount of glucose coming from the starch by measuring the glycaemic response to the food. The glycaemic response is a measure of the amount of glucose appearing in the bloodstream after a meal of starch. A food with a high glycaemic response, (nearly all the starch broken down to glucose) means little or no undigested starch reaches the hind gut.

Starch is broken down quickly by enzymes in the small intestine and is higher in energy compared to fibre but lower in energy compared to fat or oil. Starch is therefore considered medium energy, but fast releasing.

Food *per se* cannot change a horse's character; however, you may well exaggerate the natural metabolism/character of your horse by feeding too much energy or the wrong type of energy. So if you feed a naturally excitable Thoroughbred lots of fast releasing energy, keep him stabled and don't exercise him enough, then he will become more manic. A laid back horse fed too much energy will simply get fat and then more lazy.

Energy from food

Calories, (energy) are provided by all feeds. Forage feeds, (high fibre) tend to be the lowest in calories; oil and starch based feeds tend to be highest in energy. However you do also need to take into account the amount of calories you are feeding. Thus you could feed a very small amount of a high energy feed or a larger amount of a low energy feed and provide the same amount of calories in each instance. Remember not to forget the contribution of hay, grass and haylage, they often provide more calories than the bucket feed. Because the horse is a trickle feeder, food provides more than calories and it is vital that you remember the horse's psychological need to chew. Do not cut back on bulk, cut back on calories if your horse needs to lose weight. Hay soaked for 12 h loses most of its energy, meaning you can feed more of it, just remember to top up the protein and vitamin and minerals. Two biscuits a day with your coffee over and above your calorie requirements means that you put on over 0.5 stone in 6 months....the same principle applies to your horse. Choose feeds formulated for his workload and monitor his weight. You are responsible for his welfare, don't let him down.

Case histories will be used to illustrate the correlations between energy manipulation and lifestyle. For a list of references please contact the author.