TASTE PREFERENCES IN HORSES©

Dr J H Stewart BVSc BSc PhD MRCVS Dip BEP AAIM
Equine Veterinarian and Consultant Nutritionist

Taste does to some extent affect intake, however horses have a compulsive psychological and physiological need to chew and this comes from their unlikely evolution. The basic need to chew evolved as a result of the niche in the food chain that ancestral horses occupied, and it is more important than taste in stimulating feeding behaviour. Horses spend more time grazing than do any other domestic ungulate – up to 60% of each 24 hour cycle. Horses chew 30-50 times per minute, approximately 60,000 times a day. Horses that eat constantly maintain a higher stomach pH (lower acidity) and a lot of brain circuitry is devoted to chewing and mental welfare is compromised if chewing is limited.

Much of the evolution of the modern horse can be explained by diet and changes in diet. The purpose of evolution is not perfection in the long term, but survival in the short term. The primary purpose of eating is to meet energy requirements to survive. An animal the size of the horse was a prime candidate for extinction. Both size and fleetness of hoof were fortuitous side-effects of the ecological niche horses carved at the low end of the herbivore diet. To enter domestication successfully, animals had to be able to survive on a variety of foods. As Stephen Budiansky so beautifully describes in his outstanding book 'The Nature of Horses – THEIR EVOLUTION, INTELLIGENCE & BEHAVIOUR': '…we followed their initiative. However clever of us to recognise the potential under harness and saddle, it is due to the several million-year old choice of diet that we owe the gift of the modern horse…….'.

Horses can distinguish between sweet and bitter and this has survival value as many poisonous plants have a 'bitter' taste. However, to develop an aversion to a particular feed requires that the horse experience an unpleasant response within 30 minutes of consuming the food – making them at risk for chronic plant poisoning, especially if feed is limited and they are forced to graze dangerous species. When the preferences of horses for grains are measured, they prefer oats and corn to other grains and mixed sweetened grains most of all. Taste preferences and palatability are also affected by the physical nature and smell of the food. Whole oats and cottonseed are consumed more readily if first passed through a hammer mill and mixed with molasses. Texture and size also affect consumption – most horses more readily consume grain that has been cracked or rolled or mixed in such a way to reduce dust. Once a horse becomes accustomed to one particular type of feed they will often choose this in preference to newly introduced feeds.

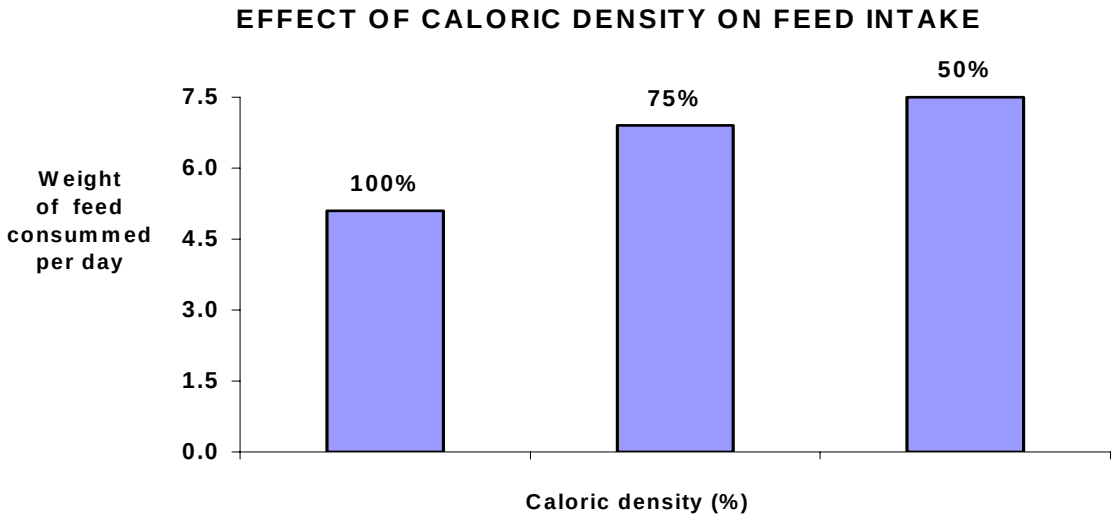
Other factors affecting preference include temperature, appearance, texture and any sound the feed makes when being prepared or during eating. Palatable flavourings can promote feed intake through taste receptors located in the oral cavity. Certain flavourings added to the diet of lactating sows increase piglet milk consumption. Horses show a predilection for a range of flavours, including apple, carrot, raisins, molasses, dark brown sugar, licorice, strawberry, kiwi fruit, grape, tropical punch, banana, vanilla, peppermint, cinnamon, corn syrup, honey, fresh grass, cider vinegar, sprouted grains, aniseed, yucca, garlic, salt, chocolate and sugar. Many horses show a preference for sugar and phosphorus – similar to our general liking of sugar, fat and salt. Flavourings are sometimes added to water to promote drinking - trial and error is necessary to determine which flavour an

individual horse prefers. Although many of us believe that horses have innate nutritional wisdom – ie they have specific appetites or cravings for nutrients that are deficient in their diets, the only nutrient for which mammals appear to have an increased preference when deficient, is salt.

In general, feeding is a default behaviour ie animals eat unless actively inhibited. As with most species, horses eat to maintain energy balance – so that the number of calories ingested equals or exceeds the number expended. Horses vary intake in response to caloric density. When grain was diluted with sawdust (indigestible fibre) ponies increased their intake, when the sawdust was removed, intake decreased. These intake changes occurred over a couple of days, indicating that horses did not detect the change in caloric intake on the basis of taste but in response to a signal from general body energy stores.

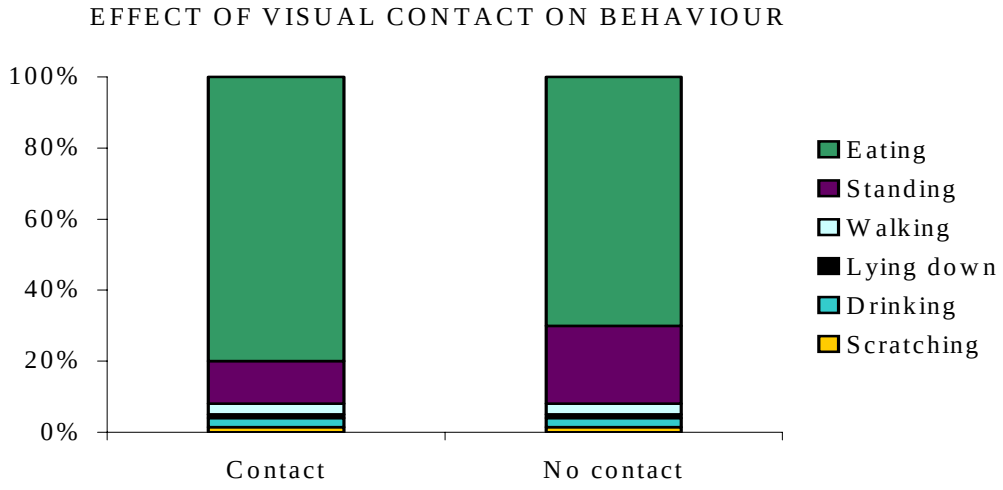
Feed intake is affected by body weight, stage of growth or pregnancy; activity level (1-3% of body weight); rate of digesta passage; energy density of feed; electrolyte imbalance; environmental temperature; general health; dental care; fatigue and the absence of other horses (social factors).

The signals that a horse should eat are related to environmental temperature and blood glucose and fat levels. Thermostatic controls vary inversely with environmental temperature. Horses spend more time eating when it is cold than when it is hot. In warmer weather, horses maintain body temperature by reducing caloric load – ie by eating less. After a short fast horse eat in proportion to the fall



in blood glucose levels, indicating that blood glucose controls short-term intake. Feeding is inhibited by rising blood sugar levels. Feeds high in fat take a longer time to affect blood hormone levels.

Social facilitation means that a horse tends to do what other horses in the group



are doing. For the same reason, a strange horse can cause other horses to become nervous (pack behaviour, shying), a feeding horse will encourage other horses to eat. The effect is small, but can be important. Visual contact is important for social facilitation to occur, so horses should be able to see one another eat.

Loss of appetite can be due to compromised ability to taste and smell, decreased ability to chew and digest, pain, fear, stress and a low gut pH – ie acid buildup. There are also central (ie sensors in the brain) that affect appetite. High grain diets increase the production of acids during caecal fermentation and these suppress appetite and promote copraphagy, bedding and wood-chewing. In high performance horses where the requirement for energy is enormous and loss of appetite a major problem, the temptation to reduce the roughage in the hope that the horse will eat all the concentrate, in fact compounds the problem of excess acid. In these cases, increasing the access to roughage often leads to a return of appetite for the concentrate. B vitamins, especially thiamin, can stimulate appetite and anorexia is the first sign of B-vitamin deficiency. B-group vitamins stimulate appetite by assisting in conversion to glucose of acids released during grain fermentation. This reduces acid buildup and removes the inhibitory affect of acids on appetite.

Depressants such as benzodiazepine and phenothiazine derivative tranquilizers stimulate feeding by removing other active inhibitors of feeding. The benzodiazepam tranquiliser, diazepam (Valium) is of particular value for stimulating feeding in anorexic horses.

Dirt-eating is a curious behaviour that has been linked to dietary mineral deficiencies. However, the latest thinking is that the horse is searching for the micro-organisms that live around the root zone of plants. Current research is uncovering a wealth of information on the benefits of these to the gut flora of the horse. Stabled and yarded horses, with little access to grazing often consume dirt – looking for soil microflora, not minerals. If cut grass is provided, it would be more beneficial and natural to provide the whole plant – grass, roots and soil! A recently developed phytocomplex of soil-derived humates is showing very promising results in a range of performance-related problems.

Dirt-eating is another sign of a dietary imbalance. However, the latest thinking is that the horse is searching for the micro-organisms and nutrients that live around the root zone of plants. Called ‘humates’ or ‘phytocomplexes’, current research is uncovering a wealth of information on the benefits of these to the gut flora of the horse. Humates are fossilized plant material originating from a period which pre-dates dinosaurs. They contain a dense mineral component, are an integral part of soil humus, and play an important role in the living organism. Modern farming practices have stripped the soil of its humus, and no replacements have been used. These special humic substances, also commonly called humic acids and fulvic acids, are extremely low in cultivated soils and as a result, animals and man are not receiving adequate amounts in their normal diet.

Humates are a natural componenet of the intestinal tract of man and animals. They are natural to the food chain and play a role in the promoting nutrients bioavailability, mineral absorption and nourishing intestinal microflora. Humates have long been used as folk remedies for a variety of illnesses, and have been favoured by the Chinese to feed and nurture highly productive soils in their sustainable agricultural system which has existed harmonously for over three thousand years. In modern times, humates are attracting a great deal of interest and research as powerful detoxifying agents that can enormously benefit soil

health and animal health. They can be applied to soils to help restore the soil mircroflora and they also have a wide range of benefits when added to animal feeds.

The presence of humates in the diet has been observed to increase feed conversion efficiency and balance intestinal microflora. The presence of humates in the intestinal tract inhibits pathogenic bacterial and fungal growth. They also improve protein digestion and calcium and trace element utilisation. Research has also shown that humates enable a protective film to form on the mucous epithelium of the intestinal tact, protecting against infections and toxins, and helping to prevent the excessive loss of water via the intestine. They also stimulate the immune system receptors in the lining of the intestinal tract keeping them primed against diseases of the gut.

Some recent research has demonstrated that humates in the intestinal tract also block or reduce the production of stress causing hormones. Animals being fed these substances have been observed to remain calm when subjected to stressful events. Humates have been found to work with DNA and cell division, preventing cellular mutation during reproduction. Some technical papers have indicated the potential of humates in cancer research with humans. They have also been noted for their anti-inflammatory properties, and have been shown to bond with collagen fibres to aid in the repair of damaged tendons and bones.

Humates are strong chelators, and are unique in their chelating ability. Life sustaining minerals, when chelated with humates are readily absorbed by the cell and organism. This is an integral part of their important role in the intestinal tract of animals and man, because they make efficient absorption of these essential minerals possbile. Some trainers of racehorses in Australia and New Zealand have been discovering the value of adding humates to the diets of their intensively housed racing animals, and observing the increased level of health and performance that then follows. This is due to the stabilizing and harmonizing of the intestinal environment, allowing better utilization of the many modern scientifically balanced diets that have been formulated to provide the full spectrum of nutrients, but the horse was unable to absorb them without the presence of humates. Humates are strong chelators, and are unique in their chelating ability. Life sustaining minerals, when chelated with humates are readily absorbed by the cell and organism. This is an integral part of their important role in the intestinal tract of animals and man, because they make efficient absorption of these essential minerals possbile. Some trainers of racehorses in Australia and New Zealand have been discovering the value of adding humates to the diets of their intensively housed racing animals, and observing the increased level of health and performance that then follows. This is due to the stabilizing and harmonizing of the intestinal environment, allowing better utilization of the many modern scientifically balanced diets that have been formulated to provide the full spectrum of nutrients, but the horse was unable to absorb them without the presence of humates.

Stabled and yarded horses, with little access to grazing often consume dirt – looking for humectins, not minerals. If cut grass is provided, it would be more beneficial and natural to provide the whole plant – grass, roots and soil! However, a recently developed Equine phytocomplex (EPC) makes humates available to horses. This intestinal support system contains humates and other acids, microflora and minerals that enhance digestion, appetite and energy intake.

Horses eat to maintain energy levels, not eat to maintain mineral levels. For example, horses on a calcium-deficient diet will not voluntarily consume more calcium than those on a calcium-sufficient diet. The significance of this is that

horses cannot be expected to choose the correct vitamin and mineral mixture from the dietary ‘smorgasboard’. The correct nutrients must be provided in the proper proportions and imbalances can arise if a very palatable supplement is consumed to excess.