

## Basic Feed Requirements

By Ingolf Bender



### Ingolf Bender

Advising biologist and author for Kosmos, long standing health practitioner and ethnologist; rider; keeps a herd of mares on his farm; leads a hippological research station; tries a lot of new things and builds almost everything related to horse husbandry himself; since 1976 he has been closely connected with the Kosmos publishing house in Stuttgart as an author and published/publishes several books nationally and internationally; advises horse owners and is an esteemed expert even at international seminars. His main focus is keeping horses according to their nature (especially sport horses). He tries constantly to find practical solutions that work in less than ideal locales and are not too

costly to implement. The dedicated vegetarian is active across the country as an equine assessor for PETA Germany e.V. (his specialty is among others the husbandry of circus horses).

### Nothing 'runs' without fuel – not even a horse!

When you start looking into feeding horses, feeds in general and ration design, you should have a pretty clear idea what an organism does with food. That may sound trivial but many people do not really know the facts. It is easy for cars – you put in fuel and off it goes. With a horse you put in 'fuel', but things are a lot more complicated with a live organism than modern technology. Billions of different and varied cells within the horse's body have to be nourished, so that all complex processes that make up a live organism can run; otherwise cells die, shrivel up, starve, and the organism fades. The basis for all life is the exchange of materials, scientifically called 'metabolism'. Metabolism describes the goal oriented conversion and dismantling, i.e. an 'exchange' of one material (e.g. grass and hay) into its base components (e.g. carbohydrates as fuel, proteins as building blocks, minerals and vitamins as catalysts).

For metabolism to be efficient, proper starting materials have to be available: those are the select feeds, i.e. specialized equine rations. Only after the exchange of materials has occurred, the body can utilize the components contained in food for its own life processes. And only if the base material – the feed – is biologically appropriate and the metabolic system is healthy.

### **'Nutrition' and 'nutrients' – is there a difference?**

Nutrition is the generic term for all food. Horses require nutrition to replenish their energy and stock up on essential (i.e. cannot do without) nutrients. Food comprises of organic materials, such as grass, hay, oats, vitamins, and inorganic materials, such as minerals, that enter the body via the digestive organs. In general, nutrients are all of the components in food, but specifically we only talk of nutrients as those components that are useful for the body.

We can distinguish them according to their function:

- Base nutrients are those components in food the body requires to maintain itself and build new structures (- metabolic food requirements), and to fuel those chemical processes that transform energy (- energetic food requirements).
- Minerals and agents contained in food, supplement the basic nutrients. Minerals (so called functional nutrition) are divided into quantity and trace elements – depending on the amounts the body requires. Vitamins are special agents of nutrition; some are contained in food, others have to be produced (synthesized) by a healthy organism.
- Fibre is that part of the food that is only partially or sometimes not at all digested but is still of great supporting importance to the digestive processes.
- Aromatic and flavour agents are chemical compounds in food that influence the intake and digestion of the food.

### **Pay attention to basic requirements when it comes to feed!**

First of all horses are by nature true herbivores (= eaters of plants with one exception: a mare's milk that nurses her foal is an animal product). For this herbivorous lifestyle horses are well equipped. Nature provided them with organs specialized to the task, e.g. grinding teeth that push up from the jaws as they wear, and an exceptionally long intestinal tract with a large appendix, the bacterial fermentation chamber for plant food with a lot of raw fibres. They also possess special food instincts and the capacity to learn when it comes to the search for food and water.

They are different from other typical pets in many ways. Remember that horses and especially

the northern type, such as the Icelandic, are truly ascetic: they move a lot and eat relatively little. Deficiencies within their nutrition are often 'normal' for them over periods of time. Nature provided them with genetically anchored equine survival strategies (e.g. depositing of fat and cycles of less activity in winter). Acute overfeeding leads to more or less obvious signs of illness (edemas among others) and obesity, but also to for example feed related laminitis. This happens because extreme and acute overfeeding does not occur in nature and horses don't have 'remedy' strategies; those are also not required in nature. These types of food related health defects are clearly 'civilization illnesses' for our domesticated horses. Horses as herbivores (in contrast to for example dogs) are also 'steady eaters' who – in nature - might wander around for 16 hours, searching for food and chewing. Our domesticated horses have this tendency to be 'steady eaters' of fibrous plant materials and seeds that require a lot of chewing, as part of their genetic make-up as well and they follow its pull.

For this reason the respective glands produce digestive juices – including hydrochloric acid - almost constantly. In nature horses search for food for hours, eat small portions on an ongoing basis, and food passes through the (relatively small) stomach continuously; long digestive breaks (more than four hours) are very rare. This means that horses should never be kept without chewable roughage for very long because this may result in too much acid in the stomach (digestive juices on 'idle') and possibly in ulcers.

The daily ration should be divided in such a way that horses have to chew a minimum of about five or six hours (over a minimum of three or better, five meals). Independent of the pure nutritional value or a sense of fullness in the stomach, the chewing time is one of the factors that determines the sense of being satiated for horses. This seems to be rarely known.

### **Nutritional requirements – dependent on many factors!**

A horse's nutritional requirement is very specific to the individual, but can be scientifically generalized according to categories that are based on the horse's usage:

- Maintenance requirement is that amount of feed an adult horse needs to maintain all of its bodily functions and remain in equilibrium.
- Performance requirement in contrast is that amount of feed a horse requires to perform specific activities. Performance requirement should always be seen as a total requirement, i.e. it includes the maintenance requirement as well as additional activities. When the total requirement for all additional activities, e.g. reproduction (= a stud's mating labour), gravidity (= a mare in foal), lactation (= milk production and nursing of a foal), or muscle activity (= riding,

driving, logging, etc.) are covered, the body remains in equilibrium, i.e. in whatever condition it began the extra activity. During the activities growth and fattening, the body increases its mass if the feed covers these specialized activities.

### **The requirements for**

- digestible energy and digestible raw protein, minerals
- trace elements and vitamins

can be gathered from a number of tables (see Bender, I: Praxishandbuch Pferdefütterung, Kosmos-Verlag, 4. Auflage, Stuttgart 2011).

These categories are modified via individual additions or subtractions, as well as changes in the ration composition based on age or specific situations. Breed and environment are the main factors often influencing the need to adjust energy components or minerals of the rations.

### **Generic requirements for an Icelandic horse:**

Generally speaking it can be assumed that a mature Icelandic horse, used for pleasure riding and without any greater need for sport performance, needs about 1.5 kg of hay per 100 kg of body mass (weight is described as 'live mass' LM) in winter, and not only 1 kg, as sometimes seen in tables.

For a horse with a mass of 400 kg this means about 6 kg of hay plus minerals, as well as extra hay when there are strong winds, temperatures below freezing and if the horse is kept outside. These rations are maintenance requirements only. Additional food is necessary depending on the performance requirements. For example: per one hour trail ride at mostly walk and a little bit of trot and tolt, 1.5 kg of hay and possibly some grain should be added. In addition to the previously described daily hay ration (if divided into three feedings, the horse will be busy eating for about 4.2 – 5.5 hours, depending on the hay structure) it would not hurt to add some feed straw to increase the chewing time. Keep in mind: when Icelandic horses are kept outside in winter, they are allowed to be a bit 'chubby', and one should not be too stingy with the feed. They will be able to better withstand bad weather such as rain, heavy winds and icy conditions. In spring, they can be brought back into shape by increasing their training and a more rationed feeding program.

### **Overview of types of fodder**

Fodder for horses contains plant, mineral and (as an exception) animal (such as milk) products. The table shows an overview of the most important types

### The most important feed materials

Type of feed	Description	Features/Recommendation
<b>Pasture</b>	Natural permanent pasture of grasses, herbs and legumes	Base feed during the main season (grazing). When used as cut feed, always store in the shade and for not too long since heating is a problem (= danger of colic). Never feed grass cuttings.
<b>Grass Hay</b>	Hay from ungrazed pastures as well as partially grazed pastures	Base feed in off season or during times of special sports conditioning or when pasture is sparse. Hay from horse pastures should never be fed since there is the danger of parasitic infection. Second cut hay is often too fine and not well liked.
<b>Field Hay</b>	Hay from high density hays, planted rye-grass	Base feed with high energy (sugar) contents, used for so-called sport horses. Otherwise it should only be used if it was not fertilized too much and was cut late in the season with a lot of raw fibre content.
<b>Haylage</b>	Hydroxypropionic acid grass preserves (= 'demi hay' = silage that was cured longer) harvested from hay fields or pasture	Base feed with a dry weight ratio of about 50% (ideally: feed about 1.3 kg of haylage plus 0.4 kg of straw instead of 1 kg of hay). Recommended especially for horses that are allergic to hay. Silage used for cattle, with a dry weight ratio of less than 40% is not recommended because of the danger of diarrhoea, and should only be used in small amounts. The same is true for material that is mouldy or smells musty.
<b>Straw</b>	Barley, wheat or oat straw	Substitutes and complements any base feed. Also used for bedding and – at the same time – allows for a great increase in chewing time if the quality is good (yellowish, low dust, no mold, fresh)

		'strewed' smell, not stale).
<b>Oats</b>	Agricultural grain fodder	Established concentrated ration.
<b>Mixed Ration</b>	Industrial feed with a variety of components, in pellet form, flakes, etc.	Established concentrated ration, commercially available, enriched with minerals and vitamins and put together according to use.
<b>Vitamins and Minerals</b>	In powder, pellet or flake form, to supplement the base feed	A necessary addition to prevent deficiencies (year round, about 60g for a medium-sized horse per day). Not necessary if several kg of an industrial ration is fed daily that already contains vitamins and minerals.
<b>Salt block</b>	10 kg block of sodiumchlorid (NaCl – regular table salt)	Necessary, year-round supplement prevents electrolyte deficiencies. Give when horses have access to pasture since grass is deficient in sodium. In addition, give loose salt to horses that sweat a lot.

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