

Feeding Horses on a Tight Budget

on economising without compromising

by Dr. Christine King

For me, there has been at least one silver lining to this latest economic collapse: It has prompted me to live more simply, tread more lightly on the earth, live more in balance with the natural flow and order of things.

Along these lines, there has never been a better time to review your horse's diet and see where you can improve on quality as well as on economy. Feeding your horse during these tough times need not compromise goodness for the sake of thriftiness.

"Eat simply, live well" is the central theme here. This article is about feeding a great, nature-inspired diet that fits the budget without short-changing the horse. To get right down to it, here is where your money is best spent:

1. Spend first and most on good quality grass hays.

Here's why: Horses do best when fed a diet that is as close as possible to what nature has provided for them. That means a wide variety of plants that changes with the season; *mostly grasses* but also some legumes and various other meadow and woodland plants. [See page 4 for more on the horse's natural diet.]

Hay is much more than fibre or filler. For herbivores such as horses, hay is *food*. And the truth is that good quality forages alone can meet almost all of the daily nutrient needs of the average nonpregnant adult horse—provided that enough is fed.

[See page 6 for info on hay stats.]

When buying hay:

** buy the best quality available*

Be sure to buy the best quality hay you can find. *Buying inferior quality hay is false economy.* The horse will need to eat more of it to meet even his basic needs for calories and protein, yet he'll still not get all that he needs in the way of other nutrients. Also, there tends to be more wastage than with good quality hay. Furthermore, feeding inferior quality hay increases the risk for colic.

It is far better overall to buy the best quality hay available and tailor the amount fed to the individual horse's needs: more for the thin ones, less for the fat ones. For carb-sensitive horses, either have the hay analyzed for its nonstructural carbohydrate (NSC) content or soak the hay well before feeding. (Contact me or your primary-care vet for more info.)

** buy as much variety as available*

Buy as many different types of hay as you can. The more variety there is in the horse's diet, the more likely it is that these forages will meet the horse's nutrient needs, and the less you'll need to spend on supplements. After all, one of the characteristics of the horse's natural diet is *variety*.

Along those lines, buy some alfalfa while you're at it. Not only does it add to the "variety quotient," it is rich in nutrients, particularly digestible fiber, protein, and minerals. A general guideline for most nonpregnant adult horses is to feed a ratio of 80:20 grass to alfalfa, or 80% grass hay and 20% alfalfa hay.

[See page 8 for tips on calculating how much hay to buy.]

However, no matter how good the hay and how many varieties you buy, any hay-based diet will be deficient in four things: salt, some trace minerals, some vitamins, and essential fatty acids.

The first one is easily addressed by making sure the horse has free access to a natural salt, such as Himalayan pink salt (my favorite), Redmond salt, or unprocessed sea salt. These natural salts are easy to find at natural food stores and on-line. The other three items are addressed below.

2. Spend next on a good quality, natural-source trace mineral supplement.

Here's why: Although needed in only tiny (trace) amounts, these minerals are *essential* for health. A hay-based diet will be marginal or frankly deficient in some trace minerals, unless the hay was grown in very well-tended soil. The same goes for a pasture-based diet, unless the soil has been regularly tended to replenish the minerals depleted through plant growth and grazing.

There are literally dozens of trace mineral supplements on the market. For the most part, they are man-made and comprise inorganic or, at best, chelated minerals. In general, the bioavailability of these forms of minerals is poor to moderate, which means that more may be pooped out than gets absorbed and used by the horse's body.

My preference is to feed a natural-source trace mineral supplement in which the minerals are primarily supplied in ionic, colloidal, or colloid-possible form. Here are two options:

** powdered clays*

These natural mineral deposits contain trace minerals in concentrations and forms that appear to be highly bioavailable and well utilized by both plants and animals. (I suspect, but have yet to confirm, that they also benefit horses by feeding their gut microbes.) Options include azomite, bentonite, montmorillonite, and zeolite, to name just a few. My preference is micronized (finely powdered) azomite.

** mineral-rich herbs*

Plants are meant to be the primary source of readily available minerals for horses and other herbivores, so feeding supplemental minerals in plant-form makes the most sense to me. (In fact, that is the basis for several of the herbal blends I make.)

Both of these trace mineral sources (clays and herbs) are natural, inexpensive, and well received by horses. But if you have a commercial trace mineral supplement already on hand, then use it up first. "Waste not, want not," as my mother would say.

3. Add a natural source of vitamins and essential fatty acids (EFAs) if the horse has little or no access to pasture.

Here's why: These essential yet sensitive nutrients are found in abundance in fresh plant material, but they are progressively lost or inactivated during hay making and storage. The antioxidant nutrients, in particular, are oxidized over time.

Here are my preferences for supplementing these nutrients:

** fresh plants from uncultivated meadows and/or woodlands*

This is the best, and least expensive, option. If your horse cannot be turned out to graze, then hand-graze him among the "weeds" each day. Even in built-up areas, you should be able to find some uncultivated places where your horse can browse. Note: for carb-sensitive individuals, time spent browsing may need to be limited.

[See page 10 for other feeding tips.]

** sunflower seeds (organic if possible)*

Flax and hemp seeds are both excellent sources of EFAs for horses, as are walnuts. However, they are more expensive and less practical to feed than sunflower seeds.

** a variety-rich blend of dried herbs*

Once again, plants are the best source of nutrients for horses. I make various herbal blends for this purpose, such as the *Spring-Summer* and *Autumn-Winter Meadow Blends*, and a powdered micronutrient blend called *Vitality*. The recipes for these blends are now available in my [herbal recipe book](#), so you can make them yourself if you feel so inclined.

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The horse's natural diet

No matter what the age, breed, occupation, or health status, horses do best when fed a diet that is as close as possible to what nature has provided for them. "As close as possible" will mean different things for different horses, but the fundamentals are the same for all. The basis of the horse's natural diet is *a wide variety of plants that changes with the season*:

- * mostly grasses
- * some legumes (clover, alfalfa, other little trefoils)
- * various other meadow and woodland plants

Horses grazing in a natural setting have been observed to select from over 40 different species of plants. The variety comes not just from the great range of plant species available, but also from the variations in plant types, parts (roots, stems, leaves, flowers, fruit, seeds), and nutrients (phytonutrients) with the different seasons.

In contrast, the typical domestic horse's diet is very limited in variety, particularly if the horse has little or no access to natural pastures, woodlands, or other uncultivated areas. Most horses are fed a single type of hay (e.g. orchard grass or timothy), day in, day out. While there may be a few other plants mixed in, the hay is predominantly a *monoculture*—a single species.

Not only is *variety* of phytonutrients lacking, so too is their *quality and quantity*, as processing and storage cause a decline in vital nutrients, particularly some vitamins and various other antioxidants.

Furthermore, even if the horse has access to pasture, many pastures are overgrazed, seeded with just a few human-selected plant species, or treated with herbicides, so they provide little variety of plant nutrients.

Why is variety so important?

Horses are designed to get all of their nutrient needs from plants and the soils in which they grow. But the twin keys here are *quality* and *variety*. The more variety of fresh, minimally processed foods from well-tended soils you feed, the less you'll need to rely on supplements to meet your horse's needs, and the healthier s/he will be.

That's because providing a variety of high quality foods makes it more likely that the horse will get all that her body needs in the way of primary nutrients and beneficial cofactors, such as vitamins, minerals, and antioxidant compounds, just from her food. All of these nutrients are essential for health, tissue repair, vitality, and longevity.

(Variety also has a *protective* influence in the diets of horses needing more calories than can be provided by the natural forage-based diet. For example, feeding a mix of whole grains, some oily seeds [e.g. sunflower seeds], and perhaps a little beet pulp if needed,

lessens the risks of feeding a high-carb diet in performance horses, youngsters, and broodmares.)

Obviously, horses can *survive* on the limited variety provided by the typical diet, but they do not *thrive* on this diet. Over time, various chronic health problems develop that we take for granted are simply caused by aging.

The truth is that these conditions are largely preventable with good management, which includes good nutrition. The same can be said for other common ailments, such as colic, heaves, laminitis, and exercise-related muscle disorders.

Most processed horse feeds are fortified with vitamins and minerals, and some products these days even contain extra antioxidant substances. However, in the vast majority of cases these processed foods and supplements use *synthetic vitamins* and *inorganic* or, at best, *chelated minerals*, for which bioavailability (absorption and utilization by the body) is poor to moderate. In contrast, the vitamins and minerals in plants generally are much more bioavailable.

While vitamins and minerals, and even antioxidants, can be added to the ration, the remarkable variety, complexity, and *synergy* of the substances contained in whole foods cannot be matched in a laboratory or factory.

For example, natural vitamin E is far more complex than just a mix of isolated tocopherols. And natural vitamin C is way more than just ascorbic acid. There are several cofactors associated with each of these apparently simple vitamins in their natural forms. These cofactors play essential roles in how the vitamin is taken in and functions in the body. Same, too, with minerals incorporated into plant molecules or suspended in plant cells in ionic or colloidal form.

Nature has already figured all of this out for the horse, and we would be wise to follow her lead. Time and time again in my practice I have seen chronic medical, performance, and even behavioral problems spontaneously resolve just by putting the horse onto a more natural diet. It's as Hippocrates is reported to have said: "*Let thy food be thy medicine, and thy medicine thy food.*"

(These concepts are explored further in the first chapter of [the anima Herbal Recipe Book](#).)

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Hay stats

Good quality grass hay is much more than fibre or filler. It is *food* for herbivores such as horses. The simple carbs, proteins, fats, vitamins, and minerals it contains are digested and absorbed in the upper part of the digestive tract. And then the fibre component is processed by the constellation of microbes in the large intestine.

The byproducts of this microbial breakdown of fibre further supply the horse with nutrients, most notably volatile fatty acids (VFAs), but also some vitamins, minerals, amino acids, and other nutrients.

The VFAs are an important *energy source* for horses, as VFAs are converted in the liver to glucose (which may then be stored as glycogen) and fats. Most adult horses should get at least 70% of their daily calorie needs from these VFAs - i.e. from the *fibre* component of their diets.

Also of importance in the colder months, the microbial breakdown of fibre in the large intestine produces *heat*, which helps the horse maintain his body temperature. In fact, more heat is generated by feeding hay than by feeding grain-based feeds.

Daily maintenance needs

When fed at a rate of around 2% of body weight per day (~20 lbs/day for the average 1,000-lb horse), good quality grass hay ably meets the adult horse's basic daily needs for the primary nutrients. Here's proof:

The table below notes some of the daily nutrient requirements for the average, non-pregnant adult horse in good body condition and weighing 1,000 lbs. The horse's daily maintenance requirements (the amount needed to maintain body condition in an inactive horse) are given along with the amount of each nutrient provided by 20 lbs of good quality grass hay (in this case, timothy).

Nutrient	Maintenance requirement	20 lbs grass hay
calories	15.0 Mcal/day	15.7 Mcal
protein	567 grams/day	655 grams
calcium	18 grams/day	34.6 grams
phosphorus	12.6 grams/day	16.4 grams

(Mcal = megacalories)

Now take a look at the daily nutrient requirements for the same adult horse who is in light work (e.g. pleasure riding, showing in equitation classes). Note that 20 lbs of good quality

grass hay meets all of the horse's needs for protein, calcium, and phosphorus, and there is only a small shortfall in calories.

Nutrient	Light work	20 lbs grass hay	shortfall
calories	18.0 Mcal/day	15.7 Mcal	2.3 Mcal
protein	629 grams/day	655 grams	none
calcium	27 grams/day	34.6 grams	none
phosphorus	16.2 grams/day	16.4 grams	none

That calorie shortfall can be made up by increasing the amount of grass hay by as little as 3 lbs per day, by adding a little alfalfa hay instead (a good idea anyway), or by adding a little grain (e.g. oats or barley).

However...

However, a hay-based diet will be lacking in certain essential nutrients, including some trace minerals, vitamins, antioxidants, and essential fatty acids. These nutrients must be supplied in some other way. (More on that in the main part of the article.)

I simply wanted to point out here that good quality grass hay can meet the horse's primary needs for calories, protein, fibre, and the major minerals - as long as the hay is fed in sufficient quantity.

For adult horses, "sufficient quantity" ranges from 1.5% of bodyweight per day (15 lbs of hay for a 1,000-lb horse) for the easy keepers and horses with some pasture access, to as much as 3% bodyweight per day (30 lbs of hay for a 1,000-lb horse) for the hard keepers or those with higher calorie needs.

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Calculating how much hay to buy

Probably the most basic guideline is to buy as much hay as you have room to store properly —i.e. out of the elements. That means under cover, off the ground, and out of direct sunlight. If you have enough space and you want to be sure you have enough hay to last for at least 6 months, here are some guidelines for figuring out how much hay to buy:

Use a feeding rate of 2% body weight (bwt) per day per horse

- for the average nonpregnant adult 1,000-lb horse in good body condition, that means ~ 20 lbs of hay per day if the horse has little or no pasture access and is not in regular work
- for easy keepers and for horses who have some pasture available, use a rate of 1.5% bwt/day, or 15 lbs of hay per day for a 1,000-lb horse
- for hard keepers and for horses in regular work, use a rate of 3% bwt/day, or 30 lbs of hay per day for a 1,000-lb horse with little or no pasture access

1 US ton = 2,000 lbs

- 1 ton of hay = 100 days' supply (a little over 3 months) for one 1,000-lb horse when fed at 2% bwt/day
- 2 tons = 200 days (6-7 months) for one horse, and so on
- multiply by the number of horses to be fed
- there's a simple formula at the bottom of the page to help you calculate your hay needs

Buy both grass hays and alfalfa hay

- it's generally best to buy grass hays and alfalfa hay separately (i.e. in separate bales), rather than buying hay that is a mix of grass and alfalfa
- grasses and alfalfa have somewhat different growing requirements, so what benefits one may not be as good for the other
- to get the most nutritional bang for your buck, it's usually best to buy alfalfa that was grown separately, and buy the premium grade

Plan on feeding these hays in a ratio of ~ 80:20

- i.e. 80% grasses and 20% alfalfa
- or, to put it another way, feed 1 lb alfalfa for every 4 lbs grass hay

- I'll often advise feeding less alfalfa than that, but not less than ~10% of the total hay ration (2 lbs of alfalfa per day for the average 1000-lb horse)
- also look into buying the alfalfa component as pellets; it may be more cost-effective than buying alfalfa by the bale, as you can literally measure out the alfalfa pellets by the pound (1 lb = a little over 2 cups)

Quick calculation for one horse:

$$(\text{rate} \times \text{bwt} \times \text{days}) \div 2,000 = \underline{\hspace{2cm}} \text{ tons}$$

rate = feeding rate, e.g. 1.5% (0.015), 2% (0.02), 3% (0.03); use the *decimal* number rather than the percentage (i.e. use 0.02 instead of 2%)

bwt = the horse's estimated bodyweight, in pounds

days = the number of days' supply of hay you want to buy (to keep it simple, round out 1 month to be 30 days)

Multiply those three numbers and then divide the total by 2,000 to get the number of tons of hay you'll need to buy.

For example, for a 6-months supply (180 days) of hay to feed the average-size adult horse (1,000 lbs) at a rate of 2% bwt/day (0.02), you'll need to buy about 2 tons of hay:

$$(0.02 \times 1,000 \text{ lbs} \times 180 \text{ days}) \div 2,000 = 1.8 \text{ tons}$$

For multiple horses with approximately the same needs, simply multiply the number of tons by the number of horses you're feeding.

For multiple horses being fed different amounts, you may want to consider doing separate calculations if the horses' needs are very different (e.g. small ponies, large horses, very easy keepers, very hard keepers).

And then pad the total a bit. Just as when you're giving a party, it's better to have some leftovers than to run out of food!

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Other feeding tips

Here are some other recommendations for optimizing your horse's health and well-being, while ensuring that you spend wisely:

Feed some fresh plant material every day, as much as is available or advisable.

Factor in the content of simple carbs (starches and simple sugars) for all foods when dealing with a horse or pony who is overweight, laminitis-prone, or otherwise carb-sensitive.

Fresh plant material can safely be fed to carb-sensitive individuals; in fact, in my opinion it is essential to their recovery and long-term health. However, it must be done carefully. Contact me or your primary-care veterinarian for specific recommendations.

Also factor in good pasture management. That includes preventing your pastures from being cut up by horses' hooves when the ground is very wet or the grass is very dry or frozen.

Feed primarily raw foods.

Highly processed and refined foods, especially those in which heat was used (including most pelleted feeds), generally are less nutritious than the constituent foods in their raw state. They can also be less safe.

Horses are designed to live on plant materials in their unadulterated state—raw and, depending on the season, fresh or dried. In my experience, feeding domestic horses following the same principle yields the best results.

Add calorie-dense foods *only if needed*.

Base the horse's diet on forages (pasture, hay) and add the more calorie-dense foods *only if needed* for work, pregnancy, lactation, growth, or recovery from serious debility. As an equine nutritionist and vet once said to me, "*Grain should be fed only as a supplement.*"

In case you missed it earlier, when fed at a rate of ~2% of body weight per day, good quality grass hay easily meets the average adult horse's basic calorie, protein, and major mineral requirements. [It's on page 6.]

For horses in work, feeding as much hay as the horse will eat and adding a little grain (e.g. plain oats or barley) usually is enough to meet the calorie shortfall in all but intensively exercising horses.

Because it is the healthiest way to feed any horse, the best strategy I've found is to base the horse's diet on good quality forages (pasture and/or hays) and feed anything else only as a

supplement: *only when necessary, only as much as necessary, and for only as long as necessary.*

Minimize wastage and satisfy hunger—and reduce boredom—by feeding the total daily hay ration divided over at least 3 feedings.

By nature, horses are grazing animals; they spend much of the day and night browsing for food. Domesticated horses with limited pasture access do best when we aim to simulate grazing with our feeding strategies - as the old adage goes, "feed little and often."

Follow appropriate parasite control and dental care programs so that the horse gets the most out of the food he eats.

Minimize competition for food by managing group-fed horses appropriately. If necessary, feed underweight horses and those "low on the pecking order" separately.

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