SPOTLIGHT ON PROTEIN

A fear of excessive protein in horse diets has crept into the conscience of horsemen over the years. Two decades ago protein was considered the most important component of feed, but now it seems to be dreaded. Part of this doubt stems from the flock of problems assumed to be caused by protein. The resulting "protein phobia" has sprung from a misunderstanding of the true working of protein in the horse's body.

Knowledge of this vital nutrient by horsemen will alleviate unfounded fears and will allow for educated selection of appropriate protein feedstuffs in the diets of horses.

Protein- What's It Good For?

The word protein is derived from the Greek word meaning "of prime importance." Once water and fat are removed from the body, 80% of what is left is protein. For a 1000-pound horse, that equates to about 240 pounds of protein.

Proteins are complex molecules made up of small building blocks called amino acids. An amino acid is composed of an amino group (that contains nitrogen), an organic acid group, and a side chain. The structure of the side chain determines the unique properties of an amino acid. Twenty-two amino acids have been identified. In various combinations, these amino acids form thousands of proteins.

Proteins in horse feeds are broken down by the gastrointestinal tract into individual amino acids for absorption into the bloodstream. Once they arrive at their target organs, amino acids reassemble and become important components of body processes both large and small.

Not Intended as an Energy Source

The protein percentage on the feed tag is not an indication of the amount of energy (or calories) in the feed. The primary reason for inclusion of protein in a feed is for tissue generation or renewal, not as a source of calories.

It is, however, important to match the percentage of protein in the feed to the requirements of the horse. A 14% concentrate would be more suitable for a growing horse or a pregnant mare than a mature horse performing little to no work. Feeds formulated for pregnant mares or growing horses contain more protein than other feeds because these horses must not only replace everyday protein losses but must have enough of the nutrient available for developing tissues.

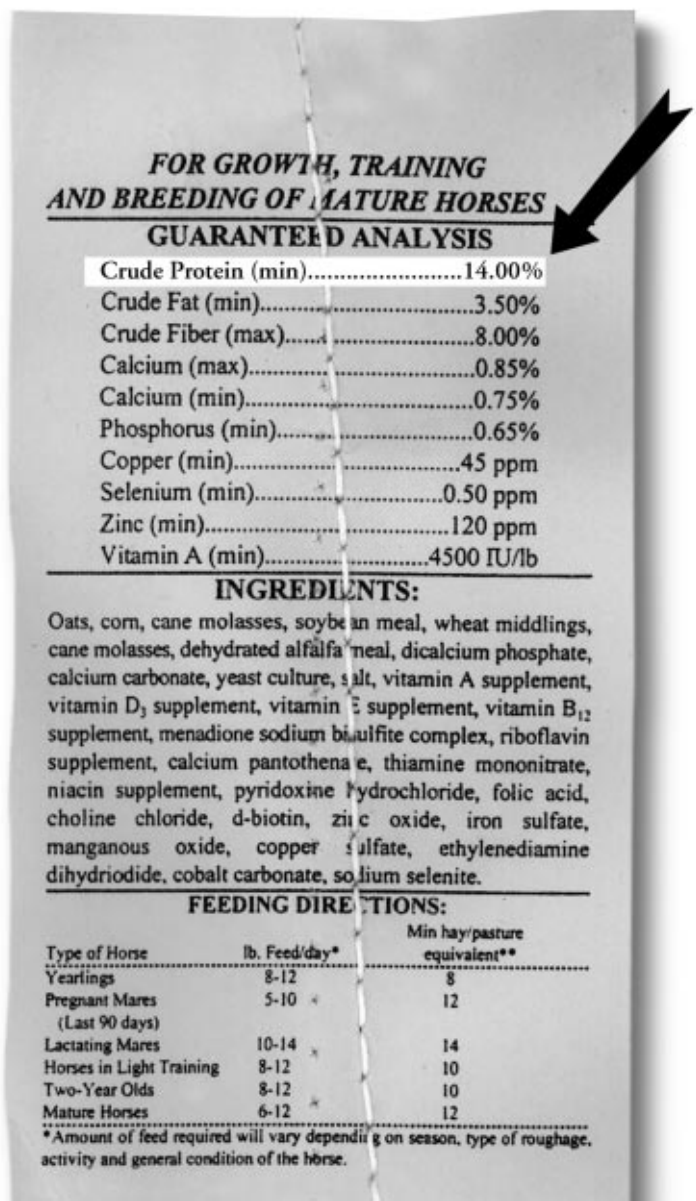
Protein can be used as a source of calories, but the body's mechanism for converting protein to usable energy is inefficient and can produce excessive internal heat. If a diet is overabundant in protein, the horse will store it as glycogen or fat.

Excessive protein in the diet is in no way harmful to the horse when it's in the body. When nitrogen, in the form of urea, is excreted into the environment by way of urine it may cause a problem. Urea interacts with common stall-floor microorganisms and becomes ammonia. Long-term exposure to ammonia due to inadequate stablekeeping or poor ventilation can permanently damage the lung tissue of horses, particularly young ones.

Excess dietary protein has been criticized for causing health problems in horses including developmental orthopedic disease (DOD) and tying up. In both cases research has shown no direct link of excessive protein to these disorders.

Not Enough Protein?

Horses maintain a tremendous reserve of protein in the form of muscle. When insufficient protein is consumed, the body will mobilize amino acids from muscle and use them to keep body processes running smoothly.



FOR GROWTH, TRAINING AND BREEDING OF MATURE HORSES

GUARANTEED ANALYSIS

Crude Protein (min)	14.00%
Crude Fat (min)	3.50%
Crude Fiber (max)	8.00%
Calcium (max)	0.85%
Calcium (min)	0.75%
Phosphorus (min)	0.65%
Copper (min)	45 ppm
Selenium (min)	0.50 ppm
Zinc (min)	120 ppm
Vitamin A (min)	4500 IU/lb

INGREDIENTS:

Oats, corn, cane molasses, soybean meal, wheat middlings, cane molasses, dehydrated alfalfa meal, dicalcium phosphate, calcium carbonate, yeast culture, salt, vitamin A supplement, vitamin D_3 supplement, vitamin E supplement, vitamin B_{12} supplement, menadione sodium bisulfite complex, riboflavin supplement, calcium pantothenate, thiamine mononitrate, niacin supplement, pyridoxine hydrochloride, folic acid, choline chloride, d-biotin, zinc oxide, iron sulfate, manganous oxide, copper sulfate, ethylenediamine dihydriodide, cobalt carbonate, sodium selenite.

FEEDING DIRECTIONS:

Type of Horse	lb. Feed/day*	Min hay/pasture equivalent**
Yearlings	8-12	8
Pregnant Mares (Last 90 days)	5-10	12
Lactating Mares	10-14	14
Horses in Light Training	8-12	10
Two-Year Olds	8-12	10
Mature Horses	6-12	12

*Amount of feed required will vary depending on season, type of roughage, activity and general condition of the horse.

In some areas of the world, particularly third-world countries such as those in Asia and Africa, protein malnutrition among horses is a common occurrence. Farmers in these nations can rarely afford to buy feed for their horses, so the horses become dependent on scant, poor-quality forage. A protein-deficient horse is not only skinny but lacks muscle tissue and definition.

In the United States, protein deficiency is seen most frequently in cases of neglect, particularly in young and old horses that are left to fend for themselves. Minor protein deficiency can be subtle and expressed as merely a lack of muscle development comparable to the amount of work the horse is getting or even a lack of energy and willingness to work. Subtle deficiencies such as this usually surface in easy keepers that are receiving little more than inferior hay.

Protein Content of the Diet

When assessing diets, many horse owners rely too heavily upon the protein content of the concentrate without taking into consideration the protein content of the forage the horse is eating. On average, the majority of a horse's protein requirement is being met by the forage portion of the diet. The amount in the concentrate may not be adding any more than 10 or 20% to fulfilling this requirement.

PASTURE GRASSES

Horseman are often surprised to learn that spring grass can have a protein content as high as 26% on a dry matter basis. Intakes of pasture are often over 20 pounds a day on a dry matter basis, which would indicate that horses may be receiving as much as five pounds of protein per day from pasture alone. When this is considered, the slight difference found between a 10% and a 12% protein feed seems insignificant.

The protein content of pasture grasses fluctuates according to plant type and season. Grass tested for protein content in the dead of winter when very little green is left can still contain as much as 12% protein on a dry matter basis.

The area of the country may also influence protein content of fresh grass. Grasses that grow well in summer climates tend to be lower in protein in the early stages of growth, ranging from 8% to 14%.

As high as the protein may be in pasture grasses, it is rarely blamed for making a horse excitable. This is not to say, however, that horses do not become high-strung on pasture alone. These times usually coincide when sugar content is elevated in grasses. The consensus among researchers is that the sugar is making the horse reactive, not the protein.

HAYS

The protein content of hays varies widely, from 4% to 22%, and depends largely on type and stage of maturity when harvested. Legume hays such as alfalfa and clover will be higher in protein than the majority of grass hays.

Stage of maturity is an important factor in considering protein content of hay. This is particularly true of grass hays. A mature timothy hay (seed heads visible) may have 5-7% protein, but a young, leafy orchard grass may have 14% protein.

Mixed hays also have variable amounts of protein based on plant proportion. If the mix contains significant alfalfa, for example, protein content will be higher.

COMMERCIAL CONCENTRATES

The amount of protein in commercial concentrates is listed on the feed tag as a percentage, not as an absolute amount, thus the level of protein a horse will receive from a feed is dependent on the quantity fed. For instance, if five pounds of a 10% protein feed is fed, the horse will consume one-half pound of protein (5 pounds X 10% = 0.5 pound). If the horse is fed 10 pounds of this feed, the horse will consume one pound of protein (10 pounds x 10% = 1 pound).

There is little difference in a 10% or 12% feed if a horse is consuming the minimal recommended amount. A horse that receives four pounds of a 10% feed will be ingesting 0.4 pound of protein. The same amount of a 12% feed affords the horse 0.48 pound of protein.

Low-intake feeds are much higher in protein. If the percentage of protein in these feeds were low, requirements would not be met. For instance, a horse that eats one pound of a 25% supplement pellet will receive 0.25 pound of protein. This is significantly less than the amount of protein a horse may get from hay (20 pounds of timothy hay with 5% protein equals one pound of protein), but does help meet the requirements of the horse. The protein in the supplement pellet may include amino acids not found in the hay, making it a suitable complementary feed. The supplement pellet would supply more protein than one pound of a 10% protein feed (0.1 pound).

Low-intake feeds are usually more expensive because of the high concentration of protein. Protein is, after all, one of the most expensive nutrients in any feedstuff.

Conclusion

There is no need to fear protein in horse feeds. Horses must consume protein in order to replace that which is used in normal body processes. When choosing a feed, remember that protein content on feed tags is listed as a percentage, and amount of feed consumed will ultimately determine how much protein is fed.

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