

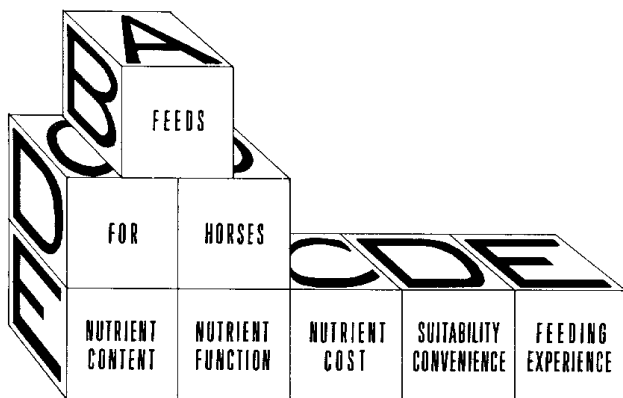
A great variety of feeds may be used satisfactorily for horses. In different parts of the world, horses are fed elephant grass, bamboo leaves, dried fish, turnips, beets, leaves of limes and grapevines, and lawn clippings. As a general rule, we should choose feeds that are suitable and readily available at the most economical cost. Therefore, we may say that the ABC's of choosing feeds for horses are based on knowledge of nutrient content and function of the horse, combined with experience of the horse owner.

In this lesson we learn about the content of energy, proteins, minerals, vitamins, and fiber or bulk contained in some of our most important feeds for horses. Also, we learn about correction factors to consider, such as quality, suitability, availability, cost, and convenience.

We gain experience by applying these ABC's to provide economical, satisfactory rations when we have a thorough understanding of the digestive system of the horse, the nutrients and their importance, and balancing rations for the horse.

TYPES OF FEEDS

We can conveniently classify feeds into three main types: (1) roughages, (2) concentrates, and (3) mixed feeds. *Roughages* include pasture forages, hays, silages, and byproduct feeds that contain a high percentage of fiber. *Concentrates* are the energy-rich grains and molasses, the protein- and energy-rich supplements and byproduct feeds, vitamin supplements, and mineral supplements. *Mixed feeds* may be either high or low in energy, protein, or fiber; or they may provide "complete" balanced rations.



ROUGHAGES

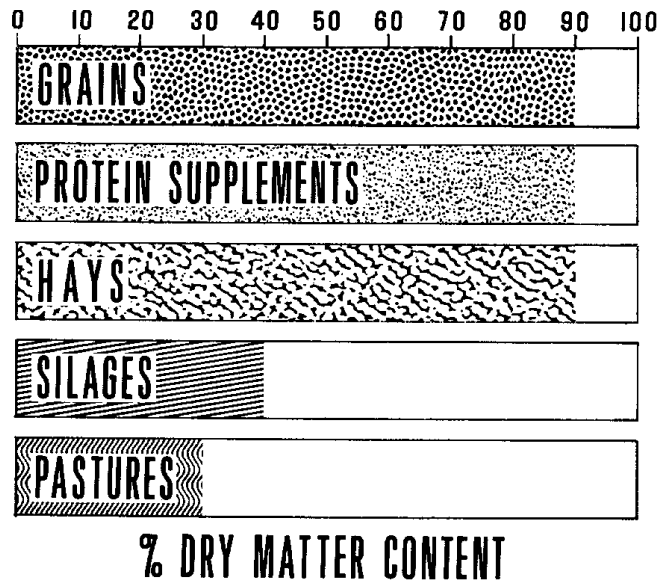
Wild horses live on roughage today as their ancestors did 55 million years ago when they were five-toed animals the size of a fox. Roughages are still important for active horses and may serve as the only feed for idle horses. Proper use of good quality roughages reduces the quantity of expensive concentrates needed and provides a plentiful supply of vitamins and minerals.

There are three main forms of roughages: (1) dry roughages, (2) silages, and (3) pastures. *Dry roughages* include hay, straw, and artificially dehydrated forages, which contain about 90 per cent of dry matter. *Silages* are formed from green forages such as grass, alfalfa, sorghum, and corn preserved in a silo at dry matter contents of 20 to 50 percent. Green, growing *pastures* provide forage that has a high water content and only 20 to 30 percent of dry matter.

There are two basic types of roughages: (1) grasses, and (2) legumes. The *grasses* are generally higher in fiber and dry matter than legumes. The *legumes* are generally higher in proteins, energy, vitamins, and minerals.

Soil fertility, soil type, and climate influence the productivity and nutrient content of the various grasses and legumes. But the most important factor affecting the nutrient composition of grasses and legumes is *stage of maturity*.

As a plant grows older, it becomes less leafy, more stemmy, more fibrous, and less digestible. Timothy hay cut before bloom has about 160 percent more digestible protein and 35 percent more TDN than mature timothy. Mineral and vitamin levels are also higher in immature grasses and legumes, whether these roughages are in the form of pastures, silage, or hay.



DRY ROUGHAGES

In general, the best hay for horses is a good quality grass legume mixed hay. A good quality pure legume or pure grass hay is satisfactory if it is fed properly.

Grass hays such as timothy, oat, brome, bermuda, wheatgrass, native western mountain, etc. of equal quality have similar nutrient values. Prairie hay is much lower in protein than most other grass hays. The legume hays (alfalfa, soybean, peanut, lespedeza, and clovers) are generally higher in protein, energy, calcium, and phosphorus than grass hays. Mixtures of grasses and legumes are intermediate in nutrient content. Because the calcium level in legumes is about six times higher than the phosphorus level, a supplemental source of phosphorus might be needed to balance the Ca:P ratio in a ration high in legumes.

If we learn to identify the grasses and legumes by their leaves and blossoms, we can do a more intelligent job of buying. Also the head of grasses and the bud or bloom of legumes can tell us the state of maturity at which the hay was cut. Horses refuse and waste more late cut hay, which is already low in nutrient content.

Leafiness of hay is an important guide to feeding value because most of the nutrients are carried in the leaves. For hay to grade U.S. 1 or U.S. 2, 25-40 percent of its weight must be leaves. Leafiness is influenced by kind and species of forages, stage of maturity when cut, weather conditions while growing and while curing, and curing procedures. Leaves are shattered and lost when hay is raked or baled too dry.

Color of hay is another indication of quality and nutrient content. Good hay is a bright leafy green. Overly mature hay is pale, yellow, or brown. Hay that was rained on when it was nearly cured may be faded in color because of additional drying time and exposure to sunlight and air. This exposure destroys the carotene or vitamin A value. Heavy rain on nearly dry hay leaches carbohydrates or energy value from the hay

and also causes a loss of these nutrients from fermentation. Hay that is baled before it is dry enough will lose nutrients through fermentation or "heating" in the bale, which sometimes starts a fire from spontaneous combustion. Even if it does not start a fire, heat of fermentation is energy value lost and produces a dull, dark hay that is usually dusty with moldiness inside the bale. Such hay is unacceptable for horses; therefore open and examine several bales of a prospective purchase if there is any question about its quality. Tight, clumpy, misshapen bales are subject to suspicion.

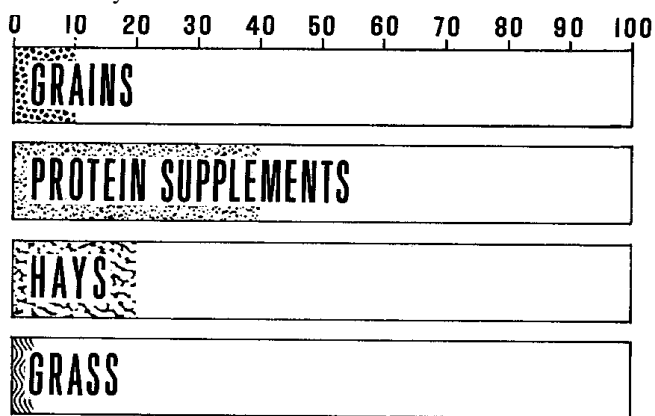
Odor of hay will vary according to species of grasses and legumes but should always be aromatic and pleasant. Lack of odor indicates over-maturity, bleaching, leaching, or old hay which probably has lost most of its vitamin A value. A stale, musty, unpleasant odor indicates that excessive fermentation has occurred.

Dust is objectionable in any feed for horses. It not only reduces the palatability of the feed, but also can cause heaves and other respiratory trouble. Good timothy tends to be most dust-free of the hays. Pure legume hays tend to be more dusty than grass or mixed hays. Dustiness can be reduced by sprinkling the hay or other feed with water or water and molasses just before it is fed.

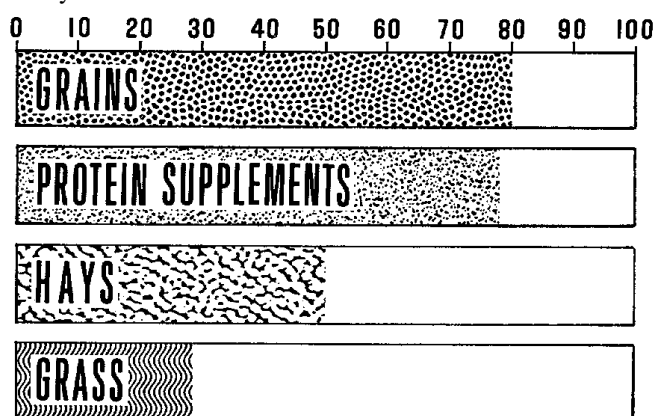
Dehydrated roughages such as alfalfa leaf meal or pellets are made by processing lush-growing, highly nutritious forage through a heated dryer called a dehydrator. These dehydrated meals or pellets are usually rich in vitamin A value, B vitamins, and high quality proteins. They are used mostly as vitamin and protein supplements, but their high fiber content classes them as roughages.

SILAGES

Good quality silages are a suitable replacement for up to half of the hay or pasture allowance. Remember that about three pounds of silage are equivalent to one pound of hay



PROTEIN % IN HORSE FEEDS



TOTAL DIGESTIBLE NUTRIENTS IN HORSE FEEDS (%)

because of the difference in dry matter content. However, spoiled, moldy, or frozen silages cause digestive upsets in horses. Silage that contains dead rats, birds, etc. can cause fatal botulism poisoning in horses.

PASTURES

Pastures can reduce feed costs and provide plenty of vitamins and good quality proteins. They are important for mares and foals, and night pastures especially are good for pleasure horses. However, an exercise lot with a few blades of grass is not a pasture. Such a lot or an overgrazed pasture of short forage can be a serious source of internal parasite infestation.

Horses should be rotated to "fresh" pasture every two weeks if possible. This will reduce internal parasite infestation and also increase the productivity of pastures, particularly if the pastures are small.

Understocked, overgrown, coarse, and unpalatable pastures are sometimes clipped to freshen them up during the growing season.

Pasture forages are quite laxative in early spring. Legumes are more laxative than grasses. Therefore, laxative feeds such as linseed oil meal or wheat bran should be removed from the ration when horses first go on pasture, and their daily time on pasture should be short at first.

CONCENTRATES

Corn, oats, barley, and milo (sorghum grain) are the most important energy-rich grains. They contain about 70 to 80 percent of TDN (total digestible nutrients) including 7 to 10 percent of digestible protein. Wheat bran, rice bran, wheat middlings, rye middlings, and rice polish are byproduct feeds from the grain milling industry. The brans are somewhat laxative and bulky and usually contain about 65 percent of TDN of which 8.5 to 14 percent is digestible protein. Soybean oil meal, cottonseed oil meal, peanut oil meal, and linseed oil meal are called "protein supplements." They have about 75 to 80 percent TDN and 30 to 46 percent digestible protein. Mineral concentrates include: salt, or sodium chloride (NaCl); iodized salt (NaCl plus iodine); ground limestone, which supplies calcium (Ca); steamed bonemeal and dicalcium phosphate for calcium and phosphorus; and others. All of the vitamins can be obtained in concentrated form, singly and in various combinations.

Corn is similar to the other grains in nutrient content but is the richest in TDN and the lowest in protein, fiber, calcium, and phosphorus. Corn is the most readily available and most economical grain in most sections of the country. It can be used to full advantage if its deficiencies are offset by (1) good quality legume or grass-legume hay or pasture, (2) a suitable grain milling byproduct feed, or (3) a protein supplement. It

is used in most mixed feeds and also as ear corn, shelled corn, or cracked corn. Cracking improves its digestibility, but finely ground corn is more apt to cause colic unless it is mixed with a bulky feed.

Oats are somewhat higher in protein than corn, much higher in fiber and much more bulky, and about 15 percent lower in energy. Nutrient content of oats varies considerably according to proportion of fibrous hull to nutritious grain. Rolled or crimped oats is more digestible than whole oats. Oats with a grass hay such as timothy may be inadequate; some grass-legume roughage along with some corn or barley will assure a more complete ration. Oats are usually the most expensive feed grain in terms of cost per unit of nutrient. However it is the safest and easiest to feed and goes well with other grains that tend to cause colic.

Barley rolled or ground medium fine is worth about 10 percent more per pound than crushed oats. Since barley may cause colic if fed alone, it should be mixed with at least 15 percent bran or 25 percent oats.

Milo (grain sorghum), like barley, should be crushed or ground and fed with bran or oats. It then has TDN and protein values intermediate between barley and corn.

Molasses is a concentrated appetizer and dust settler. It is sticky, sweet, and smells good. It contains 54 percent of TDN, very little minerals, no fiber, and no digestible protein. Unit cost of TDN is usually as high or higher than the cost of the same amount of energy as grain. However, either cane or sugar beet molasses is nearly always included at levels of 5 to 15 percent in commercially mixed rations.

Protein Supplements. A protein-rich supplement is needed when: (1) the roughage being fed is of poor quality, or (2) the pregnant or lactating mare or young stock requires extra protein to balance the ration. High protein feeds that are commonly used for horses are: soybean oil meal, linseed oil meal, cottonseed oil meal, and peanut oil meal. Protein quantity and quality in soybean and peanut oil meals is higher than in linseed and cottonseed oil meals. Linseed oil meal is the lowest of these in protein and usually is not the most economical source of protein, but it is used for its laxative quality and to improve the luster and bloom of hair coats. Although these protein supplements are high in energy value also, feeding excessive amounts is useless, expensive, and causes digestive upsets.

Byproduct feeds. Certain byproducts from the milling industry are useful, economical horse feeds. Wheat bran and rice bran are highly palatable and slightly laxative, therefore they improve rations of grass hay and corn, barley, or milo. The brans are especially good sources of two B vitamins, thiamine and niacin, and supply fair amounts of protein and energy. Wheat middlings, rye middlings, and rice polish are lower in fiber and higher in energy than the brans; they may cause colic and other digestive upsets if they comprise more than 25 percent of the concentrate ration.