

NEW YORK STATE 4-H DAIRY GOAT PROJECT FACT SHEET #14

By Dr. E. A. B. Oltenacu
Revised April 1999 by Dr. tatiana Stanton
Cornell University, Ithaca , NY 14853



VITAMINS AND MINERALS FOR GOATS

Vitamins and minerals are usually present in very small amounts in feeds. Mammals do not need a large amount of them. However, they are extremely important to animal health. Too much or too little of them can make an animal sick.

Vitamin

A - is produced in the goat's body from beta-carotene which in turn is found in green plants. The goat stores vitamin A in its liver and fat and use this source if green feed is lacking. A goat is unlikely to suffer a vitamin A deficiency unless it goes without beta-carotene for a long time. Good green, leafy fresh hay is an excellent source of beta-carotene unlike older hay that has bleached out and yellowed with age. Vitamin A helps your goat to have good eyesight, be fertile, and fight infections. It also helps keep the surfaces of her skin and internal organs healthy.

B - unlike us, goats do not need to be fed the B vitamins. This is because microorganisms in the rumen can manufacture all of the B vitamins. However, if the goat gets a digestive problem like acidosis from eating too many concentrates, the healthy microorganisms that make Thiamine (Vitamin B₁) may be killed off. Thiamine is so important that if the goat is not quickly injected with it, she may suddenly appear blind and start to stagger, convulse, and die from a metabolic disease called polioencephalomalacia.

C - this vitamin is also made in the rumen of a ruminant like a goat!

D - this vitamin is produced in the skin of goats that are out in sunlight. It should be provided in the diet of goats that are kept indoors. Fresh, sun cured hay is an excellent source of vitamin D. Vitamin D is needed for proper bone growth and health. Ricketts in goat kids (weak, small bones resulting in a stunted, hunchback look) and brittle bones in adults are possible signs that vitamin D is lacking (deficient) in the diet. The goat needs the proper balance of the minerals, calcium and phosphorous, and adequate vitamin D in order to have healthy, strong bones.

E - works with the mineral, selenium, to allow normal growth. "White muscle" disease is a degeneration of the muscle tissue that affects young kids. It can be prevented or improved with vitamin E and selenium treatment.

K - is made by the microorganisms in the rumen. It is also plentiful in many feeds. It is needed to help blood to clot.

Minerals

Calcium (Ca) - is critical to the goat and must be supplied by her feed. Like other minerals rumen microorganisms cannot manufacture it. It has many uses in the body and is crucial for bone health and growth. Calcium is constantly being added to and removed from bones so it must always be present in the goat's diet. Legume hays like alfalfa are higher in Ca than grass hays like timothy.

Phosphorous (P) - is also important on a daily basis. It must be fed in the correct proportion to Ca in your goat's feed. The ratio of Ca to P should never drop below 1.2 : 1 and vitamin D must also be available. Calcium and P are very important for lactating does and growing kids. They require a Ca:P ratio of ~2:1 (two times as much Ca as P). Too much P compared to Ca can lead to urinary calculi in male

goats. Pregnant does should not be fed a Ca:P ratio that is very high in Ca as this can predispose them to a metabolic disease called milk fever. In contrast, a doe needs a high Ca to P ratio once she is milking. This is because she is excreting lots of Ca everyday in her milk. Most grains are high in P and low in Ca.

Sodium (Na) and Chlorine (Cl) together make common table salt. Salt is an important supplement for goats, although just like humans some goats will eat more salt than they really need. Salt is important for many bodily functions.

Potassium (K) - is present in good, fresh forages so you usually don't have to add it to goat feed.

Iron (Fe) and Copper (Cu) are important ingredients in blood. A lack of either can lead to anemia. Usually the small amounts of these minerals present in a goat's regular diet are enough. Therefore, deficiencies are rare except occasionally in those goat kids that are fed exclusively on milk for a prolonged time. This is because milk is lacking in iron. If needed, iron can be given in an injectable form. Some soils are very deficient in Cu. Goats grazing on these soils may become anemic and have dull, washed out coats. These goats may benefit from Cu in their trace mineral blocks. However, too much copper can easily poison sheep and goat kids especially if they are getting very little molybdenum (another mineral) in their diet. Avoid giving these animals a salt block containing Cu that has been made for horses or dairy cattle. It may contain too much Cu. Instead give them a sheep trace mineral block. Adult lactating goats have a greater tolerance for Cu and can generally tolerate a cattle block.

Iodine (I) is deficient in some soils in the US. It is needed by the thyroid gland which produces hormones to help regulate the body. Iodized salt can be fed in deficient areas.

Sulfur (S) is an ingredient or component of many proteins. Rumen microorganisms need it to build proteins. Most feeds contain sulfur but if you are feeding urea or some other non-protein nitrogen source, you may not be providing enough sulfur to your goat.

Magnesium (Mg) - there is usually enough Mg in goat feeds. However, lush, fast growing, green pastures that have been heavily fertilized with Nitrogen and K or are high in nitrates because of cool, wet, overcast conditions can become very deficient in Mg. This can lead to a condition in goats called grass tetany or grass staggers. The goat will become very excited and may convulse and die. Grass tetany is treated with intravenous injections of Ca and Mg. Too much Mg can predispose a wether to urinary calculi.

Selenium (Se) - most soils in NY are lacking in Selenium. Selenium and vitamin E work together to prevent nutritional muscular dystrophy (commonly called white muscle disease), retained placentas and to reduce susceptibility to worms and disease.

Zinc (Zn), Manganese (Mn), Fluoride (F) and Cobalt (Co) are all needed in trace (very tiny) amounts by goats and are usually sufficient in a regular diet. However, Co is deficient in many soils of central NY. Cobalt may need to be added to the goat's diet in her salt or concentrate. Without Co, the rumen microorganisms cannot make the B vitamins, vitamin C or vitamin K.

Suggested Activities

- 1) Check with your county Cornell Cooperative Extension office to find out what mineral deficiencies are common in soils in your area. Come up with ways to supplement these minerals in a goat's diet without providing too much of any of these minerals.
- 2) Make an informal display board of the vitamin and mineral content of the feeds you give your goat.
- 3) Find the labels from various trace mineral salt blocks and loose salt mixes and compare the differences in the amounts of various important minerals listed on the labels.
- 4) Plan a feed ration with the proper Ca:P ratio to help prevent milk fever in a lactating doe.