# The Veterinary Link

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## Vitamin A

Although I usually emphasize energy and protein intake when planning winter cow nutrition, ensuring adequate vitamin A intake is also important. Vitamin A is the vitamin most likely to be deficient in cattle diets and is the only vitamin with a well-defined requirement. It is important for vision, bone formation, growth, reproduction, and skin and other tissue health.

Cattle convert yellow and green pigments (carotene) in plants into vitamin A. Carotene is in all green plants and is plentiful in fresh, leafy forage but not found in high concentrations in many concentrate feeds. Cattle can store excess vitamin A in the liver for two to four months. This storage can serve as a source when feeds are deficient. Because of this ability, cattle on green pasture can often store sufficient reserves to help meet their needs during the winter, when rations may be deficient.

Large losses of carotene take place in the curing and storage of roughages. Hays that are cut in the bloom stage or earlier and cured without exposure to rain or excessive sun retain most of their original carotene content, while hay cut in the seed stage and exposed to rain or to extended periods of sunshine lose most of the carotene content.

Hay rapidly cured with a dryer only has a slight loss of carotene. The degree of greenness in roughage is a pretty good indicator of its carotene content. Both carotene and vitamin A are destroyed by oxidation, which can occur during feed storage.

The stability of supplemental vitamin A has been increased by modern milling practices such as covering minute droplets of vitamin A with gelatin or wax or by adding an antioxidant to the feed.

Vitamin A deficiency is most likely to occur when cattle are consuming a high-concentrate diet, grazing dormant pasture or eating hay grown during drought conditions, eating feeds that have been stored for long periods of time, or when consuming a protein-deficient diet that is also low in vitamin A. Deficiencies can be corrected by increasing carotene intake by adding fresh, leafy, high-quality forages to the diet; by supplying vitamin A supplements in the feed; or by injection of vitamin A preparations.

### Vitamin A deficiency signs

The classic sign of vitamin A deficiency in cattle is night blindness (difficulty seeing in dim light) with total and permanent blindness possible in younger animals, and blindness in calves born to deficient dams. Excessive tearing (watery eyes) in cattle also occurs.

Vitamin A deficiency can also be identified in animals with rough, dry and faded hair coats; overgrown hooves that are dry and brittle; and hooves with multiple vertical cracks. Vitamin A deficiency has also been identified as a cause of infertility in both females (delayed or lack of ovulation, silent heat and early fetal loss) and bulls (abnormal semen).

In addition, because vitamin A is important for the normal function of the tissues lining the respiratory tract, digestive tract and the urinary tract; pneumonia, diarrhea and urinary tract stones are also seen in cattle with vitamin A deficiency.

Although clearly identifiable cases of vitamin A deficiency are not particularly common, herds that do not reach their potential reproductive performance, growth rate and health because of limited vitamin A in the diet are seen.

Because the vitamin A activity in typical beef cattle rations is very unpredictable, the total requirement is usually added to the diet as a stabilized vitamin A product. Vitamin A palmitate and vitamin A acetate added to the feed provide inexpensive supplementary sources. Vitamin A can also be given as an injection, with the vitamin being stored in the liver for a number of weeks.

Vitamin A requirements for cattle range from 2,000 international units (IU) to 8,000 IU per 100 pounds (lb.) of body weight. Growing cattle, lactating cows and bulls require higher levels of vitamin A than mature dry cows. Vitamin A is very safe to use in cattle feed because toxicity is extremely rare.

In the winter months when most cow herds are receiving rations composed of dormant or stored forages, vitamin A supplementation is one of the first items to consider when planning an appropriate diet.