

Vitamin A for Beef Cattle
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Vitamin A needs special attention in beef cattle rations. Vitamin A is the vitamin of most practical importance in cattle feed. Vitamin A does not occur as such in plant material; however its precursors, carotenes and carotenoids, are present in plant in various forms. Few grains except yellow corn contain appreciable amounts of carotenoids. Carotene is rapidly destroyed by sunlight and air especially at higher temperatures. Ensiling effectively preserves carotene but its availability may be low. Green and yellow plants contain carotene which animals convert to vitamin A. The wall of the small intestine is the principal site for conversion of carotene to vitamin A.

Vitamin A is an important immune system nutrient. Vitamin A has a significant role in providing immunologic protections against viral, bacterial and protozoan infections. The function of virtually all immune cells (neutrophils, macrophages, NK cells, T and B lymphocytes etc.) are affected by vitamin A. Vitamin A is associated with the maintenance of the protective mucous membranes of the respiratory and digestive tracts. It is thought that a deficiency in vitamin A causes damage to these membranes which allows bacteria and viruses an opportunity for invasion. Overall vitamin A deficiency rather than vitamin A excess through supplementation has the most profound and significant effects on the immune system. It has been suggested that in cases of BRD a vitamin A injection to calves known to be deficient or marginal in vitamin A status would benefit the animal and its immune system by rapidly increasing body stores of vitamin A. It also functions in visual purple, a compound in the eye needed for sight when an animal adapts from light to dark. Vitamin A is also essential for proper kidney function and normal development of bones, teeth and nerve tissue.

Vitamin A deficiency results in tissue changes associated with vision, bone development, skin and the digestive tract. One of the first easily detected signs of vitamin A deficiency in cattle is night blindness. An easy way to check for this condition is to place an obstacle in the pathway of cattle and notice if they stumble over it at twilight. Other early signs are loss of appetite, rough hair coat, dull eyes, slowed gains and reduced feed efficiency. Diarrhea and pneumonia may be the first indicators, especially in young animals. Later developments include excessive watering of the eyes, staggering gait, lameness or stiffness in the knees and hock joints and swelling of the legs and brisket (and sometimes in the abdominal region). Feedlot cattle with advanced vitamin A deficiency often pant excessively at high temperatures and go into convulsions when excited. Signs of vitamin A deficiency in breeding herds include lowered fertility and calving percentage.

Vitamin A deficiency is most likely to occur when cattle are fed:

- High concentrate diets
- Bleached pasture or hay grown during drought conditions
- Feeds that have received excess exposure to sunlight, air and high temperature
- Feeds that have been heavily processed or mixed with oxidizing materials such as mineral.
- Feeds that have been stored for long period of time.

The most susceptible are newborn calves deprived of colostrum and cattle unable to establish or maintain liver stores because of environmental or dietary stresses. Cattle have from 70 to 90 percent of their total vitamin A stores in the liver. The remainder is deposited in fat and other organs. Yellow fat and yellow milk are due to the inability to convert all the carotene in the diet to vitamin A.

Beef cattle requirements for vitamin A are 2,200 IU/Kg dry feed for beef feedlot cattle; 2,800 IU/Kg dry feed for pregnant beef heifers and cows; and 3,900 IU/Kg dry feed for lactating cows and breeding bulls. It is advisable to supply incoming feeders or other cattle under extreme stress conditions with 500,000 to 1 million IU of vitamin A. This amount may be met by putting 50,000 IU of vitamin A per head daily in the feed. The vitamin A requirements of feedlot cattle can be met by feeding around 6 milligrams of carotene or 2,500 IU of vitamin A for each 100 pounds of body weight; or by supplying 1,000 to 1,500 IU of vitamin A per pound of feed.

The status of Vitamin A for a beef herd is something that is easily managed. Feeding animal's supplemental vitamin A or carotene is a routine practice for many producers. The importance of vitamin A for beef cattle health should not be overlooked.

References

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