

What to look for when you think your cows and calves need fat-soluble vitamin supplementation...

Husbandry and feeding practices dramatically influences vitamin supplementation needs. Beef and dairy cattle typically require fat-soluble vitamins A and E, because, unlike vitamin D, neither A or E can be synthesized by cattle. However, as sun exposure declines, vitamin D may also need to be supplemented. B-vitamins are not generally required for animals with functioning rumens because ruminal synthesis usually provides adequate B-vitamins.



Needs for fat-soluble vitamin supplementation for gestating beef cows depends primarily on time of year and forage availability. Cows and calves grazing lush pasture don't need vitamin supplementation since the forages generally provide adequate quantities, especially beta-carotene (source of vitamin A) and alpha-tocopherol (vitamin E). Not so for cattle grazing dormant pastures, corn stalks, or consuming low-quality hay. They need

supplemental fat-soluble vitamins, especially vitamin E since there are no body stores of that critically important vitamin.

Importance of vitamin A

Classical vitamin A clinical deficiencies include many disorders in cattle. Night blindness, premature abortions, retained placenta, and mastitis are recognized to be caused by vitamin A deficiency. Sub-clinical deficiencies are more difficult to diagnose. Vitamin A-deficient cattle have been shown to have impaired immunity.

Unlike vitamin E, vitamin A can be stored in the liver. Approximately 90% of the body's vitamin A is stored in the liver. What's more, it can take from 2 to 4 months to deplete the liver vitamin A stores.

Daily requirements of vitamin A for beef cows range from 36,000 to 50,400 I.U. per day and for dairy cows the range is from 80,300 I.U. for dry cows to 75,000 I.U. per day for lactating cows.

Importance of vitamin E

Vitamin E is the latest vitamin to be recognized as a required vitamin for beef cattle (NRC, 2016). Previous to the 2016 NRC, vitamin A and vitamin D requirements were published in previous publications, but not vitamin E.

Confinement feeding of stored roughages and winter intake of dormant grasses has emphasized the importance of vitamin E supplementation.

Vitamin E is not stored in specific tissues like vitamin A, therefore once an animal is removed from feedstuffs containing adequate vitamin E, its vitamin E status will decline very rapidly. This is why when cattle are removed for access to lush, green forages, vitamin E deficiencies can arise much quicker than vitamin A, simply due to lack of body stores.

Vitamin E deficiencies can be very difficult to recognize due to the complex nature of those deficiencies. Weak muscle function (muscular degeneration), cardiac muscle degeneration (cardiomyopathy). Deficiencies in cows include abortions, retained placenta and impaired immune function.

The more pronounced vitamin E deficiencies generally occur in newborn and young calves born in early spring. Lack of suckling ability and lack of vigor are two classic signs. Recent finding by researchers from Iowa and Canada has implicated vitamin E and vitamin A deficiencies. Another deficiency symptom includes diarrhea.



Although vitamin E and selenium are related as to how they impact animals, selenium cannot replace a vitamin E deficiency. Most of the recent research has discounted the impact of selenium deficiency in weak calf syndrome.

Newborn calves obtain fat-soluble vitamins from colostrum. Generally colostrum contains 6-8 times more vitamin A and vitamin E than does milk, primarily due to the high fat content. The challenge is whether or not colostrum contains adequate vitamin E and vitamin A to meet newborn calves' needs. Since the cow does not synthesize vitamin A and vitamin E, the only method to fortify colostrum with the vitamins is for the cow to

consume adequate amounts in her diet. Intake is fine as long as the cow is grazing lush pasture, but not so with stored roughages. She needs supplementation of vitamin E as well as vitamin A.

The Beef NRC (2016) recommends 438 I.U. vitamin E per day for both gestating and lactating beef cows. The NRC for Dairy (2001) requirement is 1168 I.U. vitamin E daily for gestating and lactating cows.

12:12 BREEDER MINERAL

FOR BEEF CATTLE ON PASTURE

GUARANTEED ANALYSIS

Calcium, not less than	11.00%
Calcium, not more than	13.00%
Phosphorus, not less than	12.00%
Salt, not less than	10.00%
Salt, not more than	12.00%
Potassium, not less than	0.80%
Magnesium, not less than	1.00%
Manganese, not less than	2500.0 ppm
Zinc, not less than	4500.0 ppm
Copper, not less than	2000.0 ppm
Selenium, not less than	30.0 ppm
Iodine, not less than	75 ppm
Cobalt, not less than	40ppm
Vitamin A, not less than	150,000 I.U. / lb
Vitamin D3, not less than	25,000 I.U. / lb
Vitamin E, not less than	110 I.U. / lb

- PROVIDES A 1:1 CALCIUM TO PHOSPHORUS-RATIO
- FORTIFIED WITH 150,000 UNITS OF VITAMIN A PER POUND
- ALL SULFATE TRACE MINERALS - NO OXIDES
- STIMULATES GROWTH
- ENHANCES REPRODUCTION
- HIGHLY PALATABLE

What to look for in a mineral/vitamin supplement?

Most mineral supplements contain adequate vitamin A and vitamin D and little or no vitamin E (See tag). Since vitamin E has been finally recognized by NRC as a “required” nutrient, gestating cattle on poor quality roughages or crop residues need vitamin A and vitamin E supplementation. NRC recommended vitamin E levels for gestating beef cows is 438 I.U. per day and for vitamin A, 36,000 I.U. daily. For lactating beef cows, the vitamin E requirement of 438 I.U. does not change but goes up to 50,400 I.U. vitamin A per day. Assuming a ¼ lb intake of the 12:12 Breeder Mineral, the vitamin A intake would be 37,500 I.U. per day, vitamin D intake would be 6,250 I.U. and vitamin E intake would be 28 I.U. per day. That vitamin E intake is not close to the NRC requirement of 438 I.U. vitamin E per day.

Injecting fat-soluble vitamins is an alternative to oral supplementation, especially for newborn beef and dairy calves.

Injecting newborn calves with vitamins A, D and E will dramatically enhance fat-soluble vitamin status. VITAL E-Newborn delivers up to 2500 I.U. vitamin E, 250,000 I.U. vitamin A and 250,000 I.U. vitamin D in a single injection. University and field studies have shown that an injection of these fat-soluble vitamins will dramatically enhance serum status.

For cows, a 10 mL injection of VITAL E-Repro will provide 3000 I.U. vitamin E, 2,000,000 I.U. vitamin A and 1,000,000 I.U. vitamin D.

Before purchasing an injectable products, be sure that the products are bioavailable, in that after injection, serum status goes up. Another critical issue with vitamin A is that the most biologically source of injectable vitamin A is retinyl palmitate. Competitive products contain retinyl propionate, which shows no effectiveness.

Fat-soluble vitamin needs for beef and dairy cows is more than simply supplementing vitamin A. Vitamin E is probably more important due to it's not being stored in tissues for future use like vitamin A is.