Mid-West Cattlemen News

How Important Are Vitamins?

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I have been asked this question a lot in the last few weeks, and rightfully so with the recent supply shortage (and price hike) in the vitamin A and E markets. Less than a month ago, we could exceed the entire cow's requirement of vitamins A, D and E for less than a penny per day in a free-choice mineral. Today, this same vitamin nutrition is costing the producer close to 2 pennies per head per day. This is all because of a manufacturing plant fire in Germany; talk about too many eggs in one basket! In all seriousness, this is a good time to evaluate what good vitamin nutrition looks like and evaluate what areas we can afford to save some money, and which areas skimping on supplemental vitamins will hurt performance.

For a basic overview, the microbial population in the rumen is capable of synthesizing water soluble vitamins, so for supplementation purposes we will discuss the fat soluble vitamins A, D and E which are required in the diet.

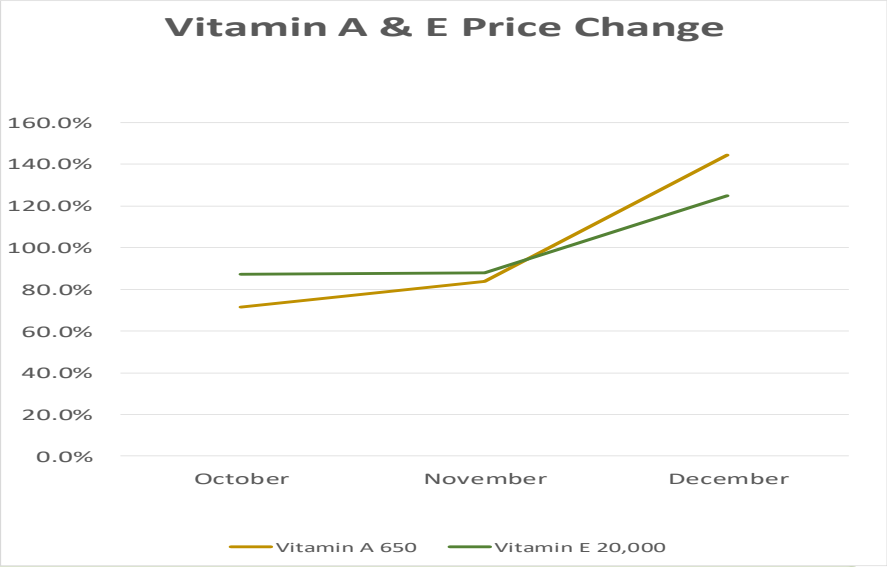
Vitamin A

Vitamin A has been the leader for price increases in your free-choice mineral. Unfortunately, it comes during the time of year when vitamin A supplementation is the most critical for cattle on a forage-based diet.

Vitamin A requirements of a cow nearly double as she transitions from mid-gestation to peak-lactation. For example, a 1300 lb. cow in mid-gestation will require around 30,000 IU of vitamin A per day. This same cow during peak lactation will require 50,000 IU's of vitamin A based on published vitamin requirements of cows. Supplemental vitamin A becomes extremely critical during the winter months when cattle are not receiving adequate amounts of vitamin A in stored forage.

Vegetative green forage is a great source of beta-carotene, which can be converted into vitamin A in the animal. Once this forage matures or is cut and baled, vitamin A activity is drastically reduced, which makes vitamin A supplementation necessary when stored forage is the primary diet. Vitamin A activity in forage is also reduced during droughts and degradation of vitamin A increases with exposure to heat and light.

Vitamin A has many biological functions in the animal including eye and skin health and reproduction. Vitamin A deficiency can cause night blindness, increased abortions, increased retained placentas and eventually lung and kidney damage. Additionally, we can never forget about the bull as vitamin A is extremely important in sperm motility



and testicular health!

When Vitamin A is not provided in adequate amounts in the forage, there are few dietary supplements available and synthetic vitamin A supplemented in mineral is still the most economical source we can provide. In some instances, vitamin A supplementation has been excessive because historically it has been cheap to oversupply the vitamin. During this supply shortage, I would suggest evaluating vitamin A supplementation in your herd and focus on meeting requirements until markets return to normal.

Vitamin E

Requirements of supplemental vitamin E are more difficult to define because it primarily functions as an antioxidant in the animal so the level of oxidative stress would change the animal's requirement of vitamin E. In general, with low-stress animals on pasture, supplemental vitamin E at 50 IU per head per day is plenty. In cattle with higher oxidative stress, like high risk sale barn cattle or calving cows, increased supplementation of vitamin E might be beneficial up to levels of 400 IU per head per day. In most situations, high levels of supplemental vitamin E is very expensive (especially with the current vitamin E market) and often not worth the added expense.

Vitamin E's activity as an antioxidant can be substituted for other antioxidants common in free-choice minerals. Selenium would be the primary nutrient substituted for vitamin E. Selenium too can function as an antioxidant during times of stress in the animal so consider a mineral than provides high levels of supplemental selenium which would be significantly cheaper than providing the same antioxidant capacity from vitamin E. The only caveat is maximum selenium supplementation is regulated by the FDA, so for example, the maximum selenium allowed in a 4 ounce free-choice mineral is 26.4 ppm. Other antioxidants are also available on the market that do a good job replacing vitamin E but often times it is impossible to see on a mineral tag so they are not widely used.

Vitamin E activity can also be fairly high in supplemental feeds so in times of tight supply, vitamin E could be a supplemental vitamin worth evaluating.

Vitamin D

Vitamin D is important in calcium and phosphorus absorption and metabolism in the animal. Vitamin D would be the least important supplemental vitamin in pasture cattle as it can be activated in the skin through sunlight exposure. Also, sun-dried forages can be a good source of vitamin D, so when making a mineral or feed purchasing decision, vitamin D should not be first on the list. Supplemental vitamin D becomes more important for cattle fed in confinement under roof with little sunlight exposure. In pasture cattle, supplemental vitamin D is a common practice during winter months when the photoperiod is shorter and is especially beneficial in cows lactating during winter months. Supplemental vitamin D is not required in large amounts but is included in most free choice minerals to improve utilization of calcium and phosphorus by the animal.

Vitamin Supplements

Vitamin nutrition is important in all classes of cattle. In grazing cattle vitamin A becomes the most important vitamin to supplement especially when feeding stored or dormant forages. The biggest challenge with vitamin supplementation is the short shelf life of vitamins especially during periods of heat and humidity. In general, make sure you are using a fresh mineral that will meet the animals needs, especially for vitamins A and E.

Vitamin Concentration Required for Lactating Cow

	Labeled Intake of Product			
	2 ounce	4 ounce	5 pound	10 pound
Vitamin A (IU/lb)	400,000	200,000	10,000	5,000
Vitamin E (IU/lb)	400	200	10	5
Vitamin D (IU/lb)	22,000	11,000	550	225

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