TECHNICAL BULLETIN
Report 06-38

VIGORTONE®
A Leader In
Animal Nutrition Since 1912
1-800-553-1712 www.vigortone.com

Vitamin E In The Ruminant

Dairy cows and beef cows are both ruminants. Dairy cows are just under a lot more stress. This year our beef cows are going into winter stressed. Drought conditions have made our beef cows work harder to maintain body condition. Maybe we should look at the total nutrition program. Your area sales manager can evaluate your program and look for problem areas.

Since I (Steve Pemberton, D.V.M.) first came to Vigortone in 1992, I have been interested to vitamin E nutrition. There are a tremendous number of interactions between nutrition and immune function. These interactions range from detrimental effects of protein-energy malnutrition (drought) on the entire immune system to the effects of deficiencies in micronutrients have on certain aspects of the immune system.

NRC: The vitamin E requirement for beef cattle has not been established but is estimated to be between 15 and 60 IU/kg dry diet for young calves (300 lb calf eating eight pounds would need 120 to 480 IU vitamin E). Current dairy programs supplement vitamin E at 500-2,000 IU per cow per day.

What if the beef cow is stressed like the dairy cow?

Vitamin E functions as an antioxidant and immune system enhancer. Certain enzymes and even an animal's own immune system can overreact to cause excessive tissue damage, releasing free radicals. Free radicals are highly reactive molecules, and if left unchecked will destroy cellular membranes. Vitamin E helps to prevent this damage. Vitamin E prevents the dangerous molecules (peroxides) from being formed.

You can't look at vitamin E without discussing selenium. Selenium and vitamin E are both antioxidants because they both protect the membranes from oxidative damage. Vitamin E spares selenium by maintaining body selenium in an active form and prevents loss from the body and by preventing destruction of cell membranes, which inhibits the production of hydroperoxides. It is important to have selenium and vitamin E in the total diet.

Dairy researchers at The Ohio State University have established that supplementing vitamin E and selenium to dairy cows and heifers can decrease the incidence of mastitis by greater than 50% compared to unsupplemented control diets.

Smith and others established in 1984 that dairy cows supplemented with vitamin E at 740 mg/day during the dry period had a 37% lower incidence of mastitis after calving than control cows.

Supplementation of beef cows with 1,000 IU/day increased the concentration of vitamin E in colostrum, resulting in greater vitamin E concentrations in the plasma of calves at 48 hours after birth and a lower incidence of treatable scours compared to calves of dams fed 80 IU/day. A study with beef heifers (Laflamme and Hidiroglou, 1991) found a high correlation between serum concentrations of vitamin E and pregnancy rate.

One study examined the effects of supplementing beef calves prior to weaning with vitamin E, selenium, and copper. The researchers found that vitamin E supplementation prior to weaning improved weight gains through the receiving period but did not find any effects on immune function of any of the supplements

Our *Next Generation of Vigortone Minerals*, the **3V2** line, supplies 200 IU vitamin E per pound. At four ounce consumption, there is 50 IU of supplemental vitamin E per head per day.

(continued)

Daily requirements can be met if animals are fed fresh-cut feedstuffs. When feedstuffs are stored, the level of natural vitamin E present rapidly deteriorates.

What about immunity? Neutrophils (nonspecific phagocytic cells), are important in the control of intramammary infections in that they "eat" and kill invading bacteria. Neutrophils from vitamin E and selenium supplemented dairy cows were shown to have improved killing ability.

Vitamin E does not cross the placenta in any appreciable amounts; however, it is concentrated in colostrum. Supplemental vitamin E can greatly increase vitamin E in the colostrum. The importance of providing colostrum rich in vitamin E is essential as calves are born with low levels of the vitamin. Maternal concentrations of vitamin E typically decline just prior to calving. High-level supplementation of vitamin E prior to calving has been shown to maintain vitamin E concentrations during this critical period.

In the cow, vitamin E nutrition is most important during the last few months of gestation and during early lactation. Optimized vitamin E nutrition during this period will both bolster the immune system of the cows by aiding neutrophil function and decreasing mammary infections while ensuring delivery of vitamin E nutrition to the offspring.

Adding vitamin E to the Vigortone beef range mineral that best matches your feedstuffs could help prevent troubles this year.

Adding five pounds of **Vitamin E 20,000** to each 50 pounds of **Vigortone 3V2 S** would supplement your cows with 500 IU of vitamin E per head per day if the average mineral consumption was four ounces.

Starting this program 60 days before the first cow calves and continuing it for 100 days total, would only be a $1.00 investment per cow over your current program.

This program has been used in North Dakota for many years. With the price of medications and the value of calves today, it should be an economically viable option.

References:

Vitamin E supplementation for the ruminant,McDowell '94 western nutrition conference

http://www.cas.psu.edu/docs/CASDEPT/VET/vetex/rumi/07993.html

SMALL VITAMIN IMBALANCES CAN BE CRITICAL Blezinger Cattle Today

http://www.uky.edu/Ag/AnimalSciences/dairy/ruminantnutritionworkshop/rumnut021.pdf

Nutrient Requirements of Beef Cattle: Seventh Revised Edition: Update 2000

http://www.ansci.cornell.edu/plants/toxicagents/selenium/selenium.html

Trace Mineral Nutrition and Immune Competence in Cattle, Arthington Florida Ruminant Nutrition Symposium 2006