

Nutrition 101: Vitamins

By Lark Burnham, Ph.D.
Ruminant nutrition

Like all mammals, alpacas and llamas need vitamins. However, unless adult animals have been off-feed, the diet does not need to contain all of the vitamins.

Definition

Vitamins are complex organic molecules that are needed in minute quantities. In general, they are categorized as either fat- (vitamins A, D, E, and K) or water-soluble (B vitamins). Although extensive research has been conducted in most livestock species, no definitive work has been done in camelids (NRC, 2006). Therefore, the functions, deficiency and toxicity symptoms listed for cattle will be described here.

In general, adult ruminants/pseudo-ruminants with healthy rumens do not require many vitamin supplements. Rumen microbes usually produce enough B-vitamins, as well as the fat-soluble vitamin K, to meet or surpass requirement.

Crias receive sufficient vitamins via the milk. Mature alpacas that have been sick and off-feed need supplementation of both fat- and water-soluble vitamins. Although some pellet formulations contain undisclosed amounts of many

vitamins, mineral mixes, and vitamin paste usually only supply fat soluble vitamins and maybe B12. A guaranteed quantity of both fat- and water-soluble vitamins can be found in some brands of probiotic paste and drench. Check the label.

Be aware that vitamin availability can be significantly reduced by heat, lengthy storage, mixing with minerals, the process of pelleting and rancid fat. Check product expiration dates on vitamin paste and mineral mixes, and store in a cool place.

Be aware that vitamin availability can be significantly reduced by heat, lengthy storage, mixing with minerals, the process of pelleting and rancid fat.

Recommended levels for vitamins are not given here. Need for supplementation is determined by evaluation of hay/pasture and grain supplement (pellets). Because many B-vitamins are involved with energy metabolism, symptoms of their deficiency are often nonspecific and may suggest any number of problems. Specific symptoms are listed for the vitamins discussed below.

Vitamin A

Vitamin A is essential for growth, health, and life. Unlike many vitamins, it is not synthesized by microorganisms. Deficiency of vitamin A can lead to blindness, and defects in bone growth, reproduction, growth, and epithelial cells, as well as increased incidence of bacterial, protozoal, and viral infections.

Unlike many of the water soluble vitamins, vitamin A can be toxic. The possibility of toxicity is remote (McDowell, 1989), and would require a ruminant to ingest thirty times the required amount. Symptoms of toxicity include skeletal malformation, spontaneous fractures, and internal hemorrhaging.

Vitamin E

Another fat-soluble vitamin that usually needs to be supplemented is E.

This vitamin protects the integrity of cell membranes, prevents platelet aggregation (clotting), and is involved in immunity. Symptoms of deficiency include muscular dystrophy (white muscle disease), degeneration of skeletal and cardiac muscle, generalized weakness, stiffness, and sudden death. Vitamin E is relatively nontoxic.

Vitamin D

Vitamin D is known as the "sunshine vitamin" for good reason. Sunlight activates precursors carried in the bloodstream. Dense fleece can sometimes interfere with precursor activation.

This vitamin is essential for maintaining blood calcium and phosphorus at levels that support normal bone mineralization, as well immunology. Deficiency symptoms include: rickets (decreased concentration of calcium and phosphorus in cartilage and bone), growth inhibition, weight loss, reduced or lost appetite, and even congenital deformations in extremely deficient dams.

Animals that are on pasture during the summer months do not require vitamin D

supplementation. Like vitamin A, toxicity is rare.

Summary

Small amounts of both fat- and water-soluble vitamins are required for normal growth and functioning of all animals. Microorganisms in the healthy, mature rumen usually produce required amounts of B-vitamins and vitamin K. Vitamins are not a panacea of health, they can prevent many serious problems, but misuse can sometimes lead to others.

References

McDowell, Lee Russell. 1989. *Vitamins in animal nutrition*. Academic Press.

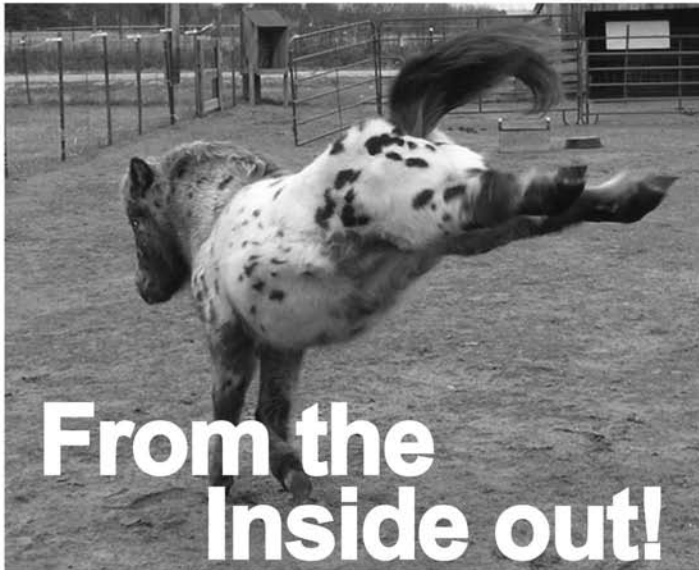
National Research Council. 2006. *Nutrient requirements of small*

ruminants: sheep, goats, cervids, and New World camelids. The National Academies Press, Washington, D. C.

About the Author:

Lark Burnham received a B.S. in Animal Science (1979) from Kansas State University and an M.S. in non-ruminant nutrition (1995) from Kansas State University, Manhattan, and a Ph.D. Doctorate in ruminant nutrition (2004) from Texas Tech University, Lubbock. Her special interests are comparative nutrition, the role of the micro flora in all mammals, fiber digestion, and probiotics. Lark currently works for Natur's Way, Inc., Horton, KS which produces MSE probiotics.

MSE Cares for ALL Animals



From the
Inside out!



MSE

Has been shown to improve
Growth performance
Feed efficiency
Fiber quality

Natur's Way, Inc.
Horton, KS (800) 615-0299
www.naturs-way.com

Photo courtesy of Geri Becker, Soggy Bottom Ranch, WI.