

The role & importance of **VITAMIN B** in ruminants

B-vitamins is a group of water-soluble vitamins that are not stored in the body and requires constant supply.¹ B-Vitamin molecules are synthesized by healthy ruminal bacteria.² The various

B-vitamins include Vitamin B1 (Thiamine), Vitamin B2 (Riboflavin), Vitamin B3 (Niacin), Vitamin B5 (Pantothenic acid), Vitamin B6 (Pyridoxine), Vitamin B7 (Biotin), Vitamin B9 (Folic acid), Vitamin B12 (Cyanocobalamin). B-Vitamins play an important role in various metabolic- and synthetization processes throughout the body and include the following:^{1,2}. Co-factors for carbohydrates metabolism (Kreb's Cycle) - conversion of blood sugar (glucose) into biological energy, gluconeogenesis, protein and fat metabolism, formation of sterols (cholesterol and 7-dehydrocholesterol), formation of fatty acids and formation of keto acids such as pyruvic acid, energy to the brain and transmission of nerve impulses, function of the heart muscles, maintenance of smooth and skeletal muscles, mucus membrane health, formation of red blood cells and white blood cells, formation of DNA (cell recovery) and skin and hoof formation. Some B-vitamins may under certain circumstances become limiting and may lead to vitamin B deficiencies.³ The trace mineral cobalt is an essential component of vitamin B12, and deficiencies of cobalt may lead to vitamin B12 deficiency.⁴

Some vitamin B deficiencies can manifest as serious clinical conditions. Vitamin B1 (Thiamine) deficiency is a typical example of a B-vitamin that can result in a life-threatening condition called cerebro-cortical necrosis (CCN) or polienccephalomalacia

(PEM). When high concentrate diets or diets containing high sulphur content is fed it, leads to the production of thiaminase, an enzyme that breaks down vitamin B1. The result is vitamin B1 deficiency and irreversible lesions in the cortex of the cerebrum of the brain develops. Clinical signs that may be noticed

include dullness, inappetence, circling, head pressing, hypersensitivity, excessive salivation, incoordination, blindness, and eventual death.³ Treatment of early clinical cases and prevention of further cases from developing consist of the administration of appropriate doses of injectable vitamin B1.



Ruminants in the sub-tropical regions of Africa are commonly affected by internal parasites like roundworms and liver fluke that consume blood and blood proteins. High internal parasite infestations may lead to anaemia (low red blood cell counts). High tick burdens may also cause anaemia and production losses. Tick-borne diseases like redwater and anaplasmosis causes fever and anaemia in affected animals. The supplementation of B-vitamins as a complex may be beneficial to the recovery of these affected animals by supporting the important metabolic processes responsible for red- and white blood cell production as well as the energy generating processes of the body. B-Vitamins can be supplemented through oral supplementation or injectable formulations.

References:

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