Vitamins

Vitamins are organic chemical compounds required by the body for vital metabolic and physiological functions. Some are produced in the body while others are obtained through food or the environment.

They are necessary for growth, health, feed conversion, reproduction and physical performance. The requirements by the body for vitamins will be affected by age, work load, illness and injury and reproductive status. Vitamin levels in the body can be classified as minimal, optimal or suboptimal.

Minimum levels are those that correct or prevent signs of deficiencies; optimal levels are those that achieve best performance as measured by health, exercise tolerance, good fertility and growth. Suboptimal levels are the most common and lead to nonspecific issues such as reduced work tolerance, a weaker immune system, poorer fertility and growth rates. They are often not recognized until vitamin supplementation is added to the diet and the results can be dramatic.

The need for vitamin supplementation depends upon the season, the quality of the diet, the length of exposure to the sun, the health of the microbes in the gut, and the rate of absorption by the body. A nonworking horse grazing high quality pasture and with exposure to the sun would have little or no need for vitamin supplementation. Most horses do not have access to these conditions year round so vitamin supplementation does become important. Grain has a low vitamin content compared to the green leaves of grasses. Seasonal conditions therefore produce a fluctuating supply of vitamins. There can be destruction of vitamins in feed due to high temperature pelleting and the growth of fungi, mould and yeasts in hay can also destroy vitamins. Absorption of vitamins from the gut wall can be compromised by parasitic damage and insufficient fat in the diet will reduce fat soluble vitamin absorption.

Vitamins are classified as either fat soluble (Vitamin A, D, E, K) or water soluble (B group vitamins, C). The target tissues of the fat soluble vitamins are skin, bones, muscle and blood. Fat soluble vitamins require fat in the diet in order to be absorbed and they are stored in the body in the liver and fatty tissue. Most of these are ingested through food or made by exposure to the sun. The B group vitamins are used for the metabolism of fats, protein and carbohydrates into energy and tissue. Water soluble vitamins are not stored in the body and excess is excreted through urine. Most of these vitamins are manufactured in the body and a healthy horse with a healthy gut will manufacture sufficient amounts of these for daily requirements.

Vitamin A is required for vision, mucus tissue integrity, and immunity. Vitamin A is stored in the liver and can be depleted within eight weeks of being fed hay and no other source of Vitamin A. Green grass is essential as a source of Vitamin A; therefore supplementation with Vitamin A is necessary for most horses under most management conditions to make up the shortfall when green grass is not available as part of the diet. This is the reason that Vitamin A is in the Equilibrium and LexveT range of products.

Vitamin D is required for the maintenance of the calcium: phosphorus ratio in bones. Horses with at least twenty to thirty minutes exposure each day to sunlight will produce an adequate amount of Vitamin D to meet their needs. It is stored in the liver and fat tissue to be drawn upon when there is little or no exposure to the sun. Vitamin D supplementation may be needed in areas of extreme seasonal changes e.g. Northern Europe in winter or if a horse is confined to a stable for an extended period of time. Vitamin D is not added to the Equilibrium and LexveT range of products as the vast majority of horses do not require it. Vitamin D is also found in sun-cured forage.

Vitamin E is needed as an antioxidant, to maintain

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cell membranes and for respiration within the cell. It is found in green grass and supplementation is needed when horses do not have access to pasture for the bulk of their diet. It would appear that Vitamin E requirements increase as exercise levels increase. It is also stored in the liver and fatty tissues to be a reserve when green grass is not available. Vitamin E is part of the Equilibrium/ LexveT supplement range for this reason and also to help owners maximise their horses' physical performances.

Vitamin K is needed for blood clotting and bone metabolism and is manufactured in the gut by microbes. It is also present in forage. There appears to be no need to supplement Vitamin K in the diet of horses.

The Vitamin B group of vitamins is a complex of chemicals that all play a vital role in metabolism. Vitamin B1 (Thiamine) is important for normal heart and nervous system function. It combines with phosphorus to play a role in fat, protein and carbohydrate metabolism which is essential for growth, a normal appetite and digestion. It also influences and modifies nervous behaviour. Thiamine needs increase in horses in work and they could be at risk of not manufacturing enough themselves. This is the reason Thiamine is added to the Equilibrium and LexveT range of products.

Vitamin B2 (Riboflavin) is needed to help muscle cells produce energy. It activates Vitamin B6 and helps to make Vitamin B3. The health of the lining of the mucus membranes of the digestive tract also depends upon riboflavin and it helps in the absorption of iron and vitamin B6.

Vitamin B3 (Niacin) is needed for the oxidation of fatty acids to energy.

Vitamin B5 (Pantothenic Acid) is needed for fat, protein and carbohydrate metabolism and the manufacture of steroid hormones, lipids, neurotransmitters and haemoglobin.

Vitamin B6 is needed for blood vessels and red blood cells.

Vitamin B8 Foliate is needed for protein metabolism especially that of red blood cells.

Vitamin B9 (Folic Acid) has many different functions at the cellular level. It is needed for red cell production, energy production and protein synthesis. It is vital for normal cell division and replication especially of the nervous system in the foetus. It has many vital tasks and its requirements increase with reproduction, growth, stress, illness, and heavy workloads. To help the horse have enough folic acid in its body it is added to the Equilibrium and LexveT range of supplements.

Vitamin B12 is needed for healthy red blood cells.

Biotin is necessary for protein metabolism and may play a part in hoof wall integrity. Our experience is that hoof wall strength is the result of many different vitamins and minerals working together synergistically and not just biotin alone. Horses on a roughage based diet and a healthy digestive system manufacture sufficient levels of biotin in their gut.

Generally speaking, a horse on a good quality diet with access to green pasture and sunlight and supplemented with minerals will manufacture and ingest most of the vitamins it needs. The B group vitamin needs are met by and large through microbial digestion in the gut and only folic acid and thiamine need supplementing in small amounts for horses with high workloads or other stressors.

Vitamin C is an antioxidant and is needed for the conversion of Vitamin D3 to calcitriol which is needed for bone calcification. It is manufactured in the liver from glucose (unlike humans who need to obtain it from food) and sufficient is made each day for the horses needs.

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