

Role of Vitamins and Provitamins



Fat soluble Vitamins

Vitamin A



For development maintaining and protecting skin and mucosa, health, growth, fertility, resistance to infection, growth and regulation of carbohydrate, protein and fat.



Deficiency symptoms are depression of growth, changes to skin, stillbirths, sterility, low fertility, Increase in diseases susceptibility.

Vitamin D3



Regulates calcium and phosphorus metabolism



Deficiency symptoms Rickets, bone and joint deficiencies, thin shell eggs, reduced growth and weakness.

25-hydroxy- vitamin D3 more active form of D3 and more available to pigs and poultry



Regulates calcium and phosphorus metabolism more efficiently



Deficiency symptoms rickets, bone and joint deficiencies, thin shell eggs, reduced growth and weakness.

Vitamin E



Regulation of carbohydrate and creatine metabolism, regulation of muscle tissues, increases immune response and prevention of liver necrosis and muscle degeneration also acts as a biological antioxidant.



Deficiency symptoms heart and muscle damage, fertility disorders eg hatchability or clinically by increased enzyme values of creatine and pyruvate kinase.



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Vitamin K



Influences protein synthesis, the clotting mechanism of blood and cellular metabolism



Deficiency symptoms are blood disorders such as excess bleeding especially the navel of young piglets and bleeding time, anaemia.

Water Soluble Vitamins

Vitamin B1



Influences carbohydrate metabolism required for the function of neural tissue and heart also required for fat absorption and enzyme activity.



Deficiency symptoms depression of growth eg stunting, disorders of the nervous system, anorexia, dysfunction of carbohydrate metabolism and water balance.

Vitamin B2



It acts as a coenzyme and is involved in the protein, fat and nucleic acid metabolisms. In sows has a positive effect on the reproduction cycle and in breeding hens leads to improved hatching rates and lower rearing losses.



Deficiency symptoms depression of growth, poor feed utilisation and diarrhoea. Poultry can be prone to curled toe paralysis.



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Vitamin B3-Niacinamide



Is the building block of the coenzymes which are involved in vital metabolism of carbohydrates, fats and proteins. Indispensable for the normal function of skin and digestive organs.



Deficiency symptoms are skin changes, disorders of the gut, retarded growth, poor feather growth, reduced egg laying and hatchability.

Vitamin B5-Pantothenic acid



Is a constituent of coenzyme A and regulates the metabolisms of proteins, carbohydrates and fats, is needed for pigmentation of hair and for resistance to infections.



Deficiency symptoms are changes in skin and mucosa. This can be loss of pigmentation, rough coat, poor plumage and loss of feathers. Retarded growth reduced methods to cope with stress poor hatchability and increased embryonic mortality.

Vitamin B6



Plays an important role in protein metabolism. It is also important for carbohydrate and fat metabolism, needed to breakdown tryptophan and the metabolism of various minerals.



Deficiency symptoms are retarded growth, stunting, liver and heart damage poor egg production and hatchability.

Vitamin B12



Essential for blood formation, growth and various metabolic processes. Required for protein metabolism and breakdown of amino acids.



Deficiency symptoms are growth disorders, poor feed utilisation, anaemia, poor plumage reduced fertility and higher embryonic mortality.



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Vitamin H-Biotin



Is need as a coenzyme in many metabolic processes play an important role in in the synthesis of fatty acids, in gluconeogenesis and indirectly protein.



Deficiency symptoms are retarded growth, fertility disorders poor plumage, skin inflammation of beak legs and toes of poultry. Poor hoof horn formation inflammation of hooves and fatty liver.

Vitamin B9 Folic acid



Required for a number of reactions in protein and nucleic acid metabolism. In combination with vitamins C and B12 is involved in the production of red blood cells and haemoglobin and promotion of antibody formation.



Deficiency symptoms are retarded growth, poor plumage, depigmentation, reduced hatchability and increased embryonic mortality in poultry. Anaemia, hair loss and reduced fertility in pigs is observed.

Vitamin C



Needed for tissue repair, acts as a natural antioxidant, increases the animals resistance to infections and heat stress. Promotes the formation of collagen bone cartilage and skin.



Deficiency symptoms are growth impairment, poor fertility, increased susceptibility to infections, reduced eggshell strength and thickness especially during heat stress.



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Betaine



Is a methyl donor group so can spare methionine and Choline. As an osmolyte it can control the amount of water in body fluids (e.g. blood). Poor control can lead to the osmotic damage of body cells.



Deficiency symptoms are unlikely but the use of betaine can spare the use of expensive amino acid methionine in the diet resulting in cost saving of the feed.

Choline



Is needed for the formation of lecithin for the transport and metabolism of fats through the liver. Along with methionine and betaine, choline acts as a methyl group donor. Choline can be synthesised if sufficient folic acid and vitamin B12 is present.



Deficiency symptoms are disturbed fat metabolism eg fatty liver syndrome. In young animals poor growth and increased mortality of chicks.

L-Carnitine



It plays a critical role in energy production, transporting long-chain fatty acids into the mitochondria so they can be oxidized to produce energy. It also transports the toxic compounds generated out of this process to prevent their accumulation.



Deficiency symptoms may cause muscle necrosis, hypoglycaemia, fatty liver, and muscle aches, fatigue, confusion, and cardiomyopathy.

