

VITAMIN SUPPLEMENTS

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Vitamins - What are they?

Vitamins are chemical compounds that are natural components of food. Found in minute quantities, they are essential for normal metabolism and health. They are divided into six groups (A, B, C, D, E and K). Within these six main groups are several different sub-types. Each group has its own set of functions and when severely deficient in the diet, display their own set of characteristic deficiency symptoms. The effect on metabolism is proportional to the level of deficiency so that when deficiency is mild, the symptoms are vague and non-specific, such as poor performance or compromised health.

Vitamins are generally not made in the body in sufficient amounts to meet requirements and so must be taken in as a dietary source.

The six groups of vitamins are divided into two basic types. The water-soluble vitamins (B and C) are not stored in the body and so any deficiency in these tends quickly to have an effect. The fat-soluble vitamins (A, D, E and K) are well stored in the liver and so daily intake is less critical.

Vitamins - What do they do?

Each vitamin has its own set of functions. Vitamin A is necessary for healthy skin and mucus membranes, ie the lining of the mouth, sinus and cloaca, etc. Vitamin B is actually a large group of 12 or more different compounds, eg thiamine (B1), riboflavin (B2), niacin (B3), choline (B4), pantothenic acid (B5), pyridoxine (B6), etc. They perform many vital functions. Being water-soluble, deficiency quickly develops if the birds are not eating. Vitamin C is a metabolic regulator. In most species of seed-eating birds, including pigeons, vitamin C is synthesized in the liver and there is no advantage in supplementation unless the bird becomes debilitated and is no longer able to make enough vitamin C, especially if the liver is damaged. Vitamin D is necessary for the absorption of calcium from the bowel into the body. Birds can make their own vitamin C if they have access to light. Vitamin E regulates many of the normal metabolic processes within the cell. Vitamin K is necessary for blood coagulation. It is found in green plants and can be produced by the normal bacteria in the birds' bowel. It is in fact quite difficult to produce a vitamin K deficiency unless antibiotics have been overused and have killed all of the bacteria in the bowel or birds are prevented from eating their own droppings or probiotics are not used.

Everything in balance

In addition to there being adequate levels of vitamins in the diet, it is important that they are not given in overdose. For example, overdose of vitamin A interferes with the absorption of vitamin E and vitamin D3. In extreme overdose, 20 - 100 times the recommended dose, vitamin A can cause weight loss, decreased food intake, inflammation of the mouth and eyelids and decreased bone strength.

It is also important that vitamins are given in the correct proportion relative to each other. The most obvious example of a vitamin interrelationship is the effect of the absorption of fat-soluble vitamins in which an excess of one will decrease the absorption of the others due to competition for absorption sites in the lining of the bowel. For this reason, it is necessary that all fat-soluble vitamins be balanced with respect to one another to ensure proper absorption of them all. Some vitamins interact directly in the

metabolism of certain compounds. This means that if there is a deficiency in one, this would lead to increased requirements for the others. Conversely increased supplementation in one can mean that one of the others is proportionately low and therefore deficient.

Vitamins cannot only interact with each other but also with other substances such as amino acids (the building blocks of proteins) and minerals. The most significant relationship between vitamins and minerals is the relationship between calcium, phosphorus and vitamin D3. It is obligatory for adequate vitamin D3 to be available for the proper absorption of both of these minerals to take place. Inadequate vitamin D3 levels in the body can lead to calcium deficiency symptoms in an otherwise calcium-adequate diet. Conversely, too much vitamin D3 can cause excessive absorption in a marginal diet. Another example is the relationship between vitamin E and selenium. These two do essentially the same job. If one is deficient, then the other can make up the difference. A similar thing happens with the vitamin niacin and the amino acid tryptophan. If there is a lot of tryptophan in the diet, then less niacin is required.

Vitamins are also affected by the levels of protein and fat in the diet and other dietary components. For example, a high-protein diet leads to increased requirements for some vitamins in the B group while a low fat /high starch diet leads to an increased demand for thiamine.

Grain

Ideally a dry seed diet containing a wide variety of grains supplemented with grits and minerals should provide a balanced diet. Care needs, however, to be taken in selecting a grain blend. Not only are the quality and freshness of each grain type important but also the type of grain chosen and its proportion relative to other grains.

The fact is that most dry seed diets are quite low in various nutrients including vitamins, with actual levels being determined by factors such as the climatic conditions during growing and harvesting and also the soil that the grain is growing in. Without actual testing, the fancier cannot know if the birds have a subtle deficiency that might be affecting race form or health more generally.

Grain can contain a variety of potentially harmful substances including:

Anti-nutritional factors - Some substances contained in grain actually inhibit the release of nutrients to the bird. Some of these act by interfering with the action of digestive enzymes. A common one here inhibits the digestive enzyme trypsin, which digests protein. Although found in many grains, it is particularly high in legumes and in particular maple peas. Ingestion of a diet high in grains containing this enzyme inhibitor results in poor protein digestion because the trypsin is blocked. Other grain, in particular milo, contains tannin. Tannin makes milo brown and is bitter. This is why pigeons will not eat really brown milo. Tannin also blocks the action of digestive enzymes and incidentally also reduces the availability of iron and vitamin B12.

Vitamin antagonists - Some foods contain substances that actually break down vitamins that the diet might contain. An enzyme found in fish, called thiaminase, destroys thiamin (vitamin B1). Thiaminase is found in high levels in cod liver oil, which is still commonly used as a supplement by some fanciers. Although adding an oil to the birds' grain is a good way of increasing its energy content, pigeons never evolved to digest animal fats (particularly from a crushed fish's liver), and seed oils such as wheat germ oil, should always be used by preference.

Contaminant toxins - Apart from natural plant toxins, such as alkaloids and lectins, grain can also be contaminated by heavy metals (such as copper, used in many insecticide sprays), and fungal toxins.

Supplementation?

Confined birds such as stock birds are not given the opportunity to forage. Foraging allows a bird to feed selectively and to supplement its diet in the event of the nutritional balance of the diet being inadequate. The bird is therefore dependent on its owner to provide a complete and balanced diet. This places heavy responsibility on the provided diet to supply adequate vitamins in the correct balance with each other. All seeds vary in the level and variety of vitamins they contain. It is therefore inconceivable that a dry seed diet based on a small number of seed types would supply all of the birds' vitamin requirements. In the stock loft, it is important to remember that micronutrients and vitamins such as riboflavin, carry over into the egg. This is necessary for maximum hatchability and chick vitality. Of interest, the age of the stock bird appears to have an influence on the efficiency of carryover of vitamins into the egg and this might be part of the reason why some fanciers notice that most of their successful race birds are bred from their younger stock birds.

In addition to routine maintenance, birds in a number of disease situations benefit from additional supplementation. These include:

Diseases that damage the bowels, such as coccidiosis, reduce the absorption of nutrients

Damage to any tissues may increase requirements because of the need for healing

Activation of the immune response mechanism may also increase requirements, something of particular importance in recently weaned young birds

Some vitamins are stored in the liver and damage to this organ can reduce its ability to store and mobilize vitamins

Reduced feed intake due to disease tends to reduce the availability of vitamins at a time when demand is increasing

Vitamin demand increases generally through growth, breeding, stress, disease and old age

Supplement choice

Water-soluble vitamins are a convenient and effective way of improving the intake of important vitamins at particular times of increased demand. Different species require different levels of nutrients. Because of the problems associated with over- or under dosing and the need for all nutrients to be in the correct balance, it is most unwise to give pigeons a product made for another species or to not follow the manufacturer's dosing instructions. To do so is simply playing with fire and quite frankly makes no sense. To use a product designed for a horse or dog on a pigeon implies that these animals' metabolism is the same. This is plainly not true and to give a dog product to a bird immediately results in giving too much or too little of that nutrient. However, with the multivitamin / mineral supplements now available specifically for birds, their correct use can only help the birds, protecting them from a nutrient deficiency that may compromise their health and as a result their race performance. I usually recommend adding a complete multivitamin / mineral supplement to the water once or twice weekly as a matter of routine.