

Additives Factsheet



Due to the new FEDIAF legislation regarding the labelling of Pet Foods, manufacturers are now required to include information about the additives (such as certain vitamins, minerals and trace elements) that are included in the formulation. We are legally required to list the names and quantities of all of the additives that have a maximum limit.

You may wonder why fish need some of these additives, so here we have compiled a list of the additives used in our foods, and the nutritional benefits that they have for fish.

Vitamins

Vitamins are organic compounds required in the diet of all animals, in relatively small quantities for growth, health, and function. Although the requirements for vitamins are small, deficiencies of these micronutrients can cause symptoms ranging from poor appetite to severe tissue deformities.

Vitamin A

- Vitamin A (also known as retinol) is a fat-soluble vitamin important in vision and bone development.
- Retinol combines with a protein, opsin, to form rhodopsin, which is the compound involved in the photochemical reaction in the retina of the eye in the process of vision.
- Vitamin A is also used for maintenance of mucosal membranes that line many body organs; the gastrointestinal tract, the respiratory tract, and the eye.
- Vitamin A deficiency causes epithelial (skin) cells to fail, which reduces resistance to infection. It also causes poor growth rates in fish, along with poor skin colour, eye problems, fin, skin and kidney haemorrhages, and deformed gills.

Vitamin E

- A major function of vitamin E is its role as a metabolic antioxidant with a specific role in preventing oxidation of unsaturated phospholipids in cellular membranes. It is often referred to as a free radical scavenger.
- Deficiency symptoms include muscular dystrophy, reduced fertility and reproduction rates, and haemorrhages caused by increased permeability of capillaries.



Vitamin D₃

- Fish deficient in Vitamin D₃ have a reduced growth rate.
- It is believed that Vitamin D₃ is important in the absorption of calcium and phosphorous, which are essential in the healthy growth of the skeleton.

Vitamin C

- Most animals can synthesise vitamin C in sufficient quantity for normal growth, but a few, including humans, fishes and many birds, cannot. It must, therefore, be provided in the diet.
- Many of the vitamin C deficiency signs in fish are related to malsynthesis of collagen, which is a component of bone, gill operculum, support cartilage, blood vessels, skin, fins, and wound scar tissue.
- Vitamin C also has other metabolic roles including bone calcification.
- Curvature of the spine is a prominent sign of vitamin C deficiency in fishes, in addition to external and internal haemorrhages, erosion of the fins, distorted gill filaments, and reduced rate of wound healing.
- Vitamin C is also essential for a properly functioning immune system.



Other Additives

In addition to vitamins, a number of trace elements and minerals are included in our fish foods.

Copper Sulphate (as Cupric Sulphate Pentahydrate)

- Copper is involved with iron absorption and metabolism, and therefore haemoglobin synthesis and red blood cell production and maintenance. When the diet is deficient in copper, iron levels in body tissue decrease.
- It is also essential in bone development and collagen synthesis.
- Copper is an essential component of numerous oxidation-reduction enzyme systems.

Cobalt (as Cobalt Carbonate Monohydrate)

- Cobalt is an integral component of vitamin B12, and as such is essential for red blood cell formation and the maintenance of healthy nerve tissues.

Manganese (as Manganous Oxide or Manganous Sulphate Monohydrate)

- Manganese is a cofactor or component of several key enzyme systems, and as such, is essential for bone formation, the regeneration of red blood cells, carbohydrate metabolism and the reproductive cycle.



Zinc (as Zinc Oxide or Zinc Sulphate Monohydrate)

- As an active component or cofactor in many enzyme systems, zinc is essential for lipid, protein and carbohydrate metabolism; being particularly active in the synthesis and metabolism of nucleic acids (RNA) and proteins.
- Zinc is believed to play a role in the action of hormones such as insulin and glucagon.
- It also plays a positive role in wound healing.

Iodine (as Calcium Iodate Anhydrous)

- Iodine is an integral component of the thyroid hormones, and as such is essential for regulating the metabolic rate of all body processes.
- Iodine deficiency causes hyperplasia of the thyroid gland, or goiter, in fishes.

Iron (as Ferrous Sulphate Monohydrate)

- Iron is an integral component of the respiratory pigments haemoglobin and myoglobin.
- It is also an essential component of various enzyme systems and as such, is essential for oxygen and electron transport within the body.

Selenium (as Sodium Selenite)

- Selenium is an Antioxidant: It is an essential component of the enzyme glutathione peroxidase, which reduces hydroperoxides, and as such protects cellular tissues and membranes against oxidative damage.
- Selenium has been identified as a cofactor in glucose metabolism.
- It has also been suggested that selenium influences the absorption and retention of vitamin E.
- Selenium deficiency can cause reduced growth rates and muscular dystrophy.



Analytical Constituents

Crude Protein

Amino acids, linked together with peptide bonds, are the structural components of proteins. Proteins are usually made up of chains of 22 to 26 different amino acids. Protein is essential for healthy growth and development in fish.

Hydrolysed fish protein and other high quality ingredients that go into King British Fish Foods provide fish with the required essential amino acids. 'Essential' in this context means that the fish cannot synthesise the acids themselves, and therefore rely on their diet to provide them. The ten required by fish are provided by King British fish foods:

- ① Arginine, ② Methionine, ③ Histidine, ④ Phenylalanine, ⑤ Isoleucine, ⑥ Threonine, ⑦ Lysine, ⑧ Tryptophan, ⑨ Leucine, ⑩ Valine.

Different fish types have different protein requirements. Young fish tend to require higher levels of protein than older fish, so as fish get older their protein requirements decrease. In general, dietary protein requirements can vary from 25 to 50%.

Fish use protein efficiently as a source of energy, however excessive protein in the diet can actually cause reduced growth rates.

Fat Content

Fish require fat in their diet as an energy source and also as a critical 'building block' for certain physical structures.

Fats (known as lipids or phospholipids), are used for long-term energy requirements during periods of extensive exercise or during periods of inadequate food and energy intake.

In addition, fats are important for the integrity of cell membranes; for the development of brain and nerve tissues; for several hormone systems and they are essential in reproduction.

Fats come in many forms, the most important for fish being the essential fatty acids including poly unsaturated fatty acids (PUFAs).

Fats are also important because they are the carriers of fat-soluble vitamins such as Vitamins A, D₃ and E.

Crude Fibre

Fibre refers to indigestible plant matter such as cellulose, hemicellulose, lignin, pentosans, and other plant components that are indigestible to most monogastric animals, including fish.

Fibre has no functional value in fish food except to control the rate of movement through the digestive tract - dietary fibre has been shown to improve gastric evacuation time.

Small amounts of supplemental cellulose can increase growth and the efficiency of protein utilization. However, higher concentrations (>8%) can cause growth to slow.

Crude Ash

Ash is simply the sum of all the dietary minerals in the food.

