

Fish Feed



Eurofins Vitamin Competence Centre

The World of Fish Feed

It is well known that fishes contain a lot of healthy nutrients for the human body. Many people consume especially fatty fishes like salmon to increase the intake of vitamins through the daily diet. Today there are many different products containing fish on the market which increases the competition between producers. Therefore, there is increasing focus on quality of the products. Consumers have high demands to products and expect the products to comply with expectations.

The production of fish feed is not only subject to fish producers monitoring. They are also controlled by the local authorities in accordance to the current laws.

To produce fishes of high quality and with high safety we have to look at the feed for the different fishes.

The essential water-soluble nutritional factors for fishes are:

- Choline
- Inositol
- Vitamins

All the B-vitamins, though required only in small amounts in the diet, play major roles in growth, physiology and metabolism. Choline, inositol and ascorbic acid are required in appreciable quantities in the diet.

Fat-soluble vitamins A, D, E, and K differ from the water-soluble vitamins in their action. They are essential but also toxic, and the toxicity symptoms involving especially vitamin A and vitamin D are indistinguishable from deficiency symptoms for the vitamins. This really shows the importance of quality checking the fish feed, so that the safety of the farmed fish is met.

There are ten amino acids which are indispensable for fish because they are incapable of synthesizing these amino acids. They need to obtain these from the diet. The ten important amino acids are:

- Arginine
- Histidine
- Isoleucine
- Leucine
- Lysine
- Methionine
- Phenylalanine
- Threonine
- Tryptophane
- Valine



These amino acids and other nutrients like vitamins are important for the fishes to grow desirably, so with a complete and correct diet it will be possible to maintain a stable growth. Due to the importance of the diet we recommend that these diets are analysed and checked to obtain high quality and environmental safety. Analysing and checking the feed can also help decrease the feed cost.

Offers from the Vitamin Competence Centre

The methods for analysing fish feed for fat-soluble vitamins consist of saponification and extraction with ether or hexane followed by HPLC analysis and detection by DAD or FLD. This concerns the following vitamins:

- A, E, E-profile
- Beta-carotene
- K1
- D2 or D3

We are also able to determine vitamin K3. For this analysis we use GC-MS.

The methods for analysing fish feed for water-soluble vitamins consist of:

- **Enzymatic treatment followed by HPLC**
 - B1 (thiamine), B2 (riboflavin) are analysed in the same run
 - Niacin
 - B6 (pyridoxine)
 - C (ascorbic acid)
- **Microbiological analysis**
 - Pantothenic acid
 - Biotin
 - Folate
 - B12 (cyanocobalamin)

Biotin, vitamin B9 and B12 can also be analysed using the Biacore-method.

Offers from the Amino Acid Competence Centre

There are different methods for analysing amino acids. For determination of total amino acid content we use respectively acid- or oxidative hydrolysis. For determination of free amino acids we do not use hydrolysis. After pre-treatment of the samples (hydrolysis/no hydrolysis) it is analysed on an Amino Acid Analyzer, which is an ionchromatography with post-column derivatization using ninhydrine and visible detection. Tryptophane is however an exception. Samples containing tryptophane is treated with an alkaline hydrolysis and followed by analysis on a rp-HPLC with fluorescence detection.

Other important analysis within the fish feed branch

We do also analyse other parameters than vitamins and amino acids. The ones that can be of interest for the analysis of fish feed are:

- **Asta- and Canthaxanthin (colouring purposes)**
Asta- and canthaxanthin are analysed on one of our HPLC's using enzymatic release and extraction as pre-treatment.
- **Choline/Choline chloride**
Choline is analysed on our LC-MS using extraction and saponification as pre-treatment. It can also be analysed as free choline analysing directly on the extracts after dilution. When reporting results as choline chloride a calculation factor of 1,34 is used (choline x 1,34 = choline chloride).
- **Betaine**
Betaine is analysed on our LC-MS using extraction and saponification as pre-treatment. It can also be analysed as free betaine analysing directly on the extracts after dilution.
- **Myo inositol**
Myo-inositol is determined as free myo-inositol using isotope dilution gas chromatography with mass spectrometric detector (GC-MS).

What is important?

It is important to be aware of the possible difference between declared levels and analytical results. Declarations are very often based only on the added amount, while the analytical results are the total amount of vitamins, amino acids, etc. Therefore the analytical result will often be higher than the declaration. Another important issue is the fat content in the

Facts

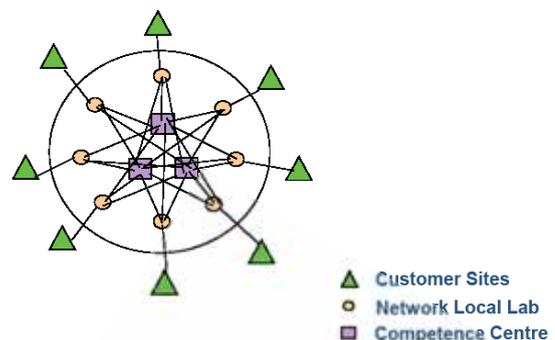
Our quality system is based on DS EN ISO IEC 17025. We use daily control including regular use of reference materials. We participate in proficiency tests being FAPAS, BIPEA, NIST, company specific trials etc. We are always open to customer visits and audits. We have up-to-date equipment and very good facilities and we use semi-automatic and separate production lines.

We provide high quality for you.

fish feed. The content of fat in fish feed can differ from approximately 10 % up to 40 % and this affect the analysis of especially the fat soluble vitamins. For the analysis of fat soluble vitamins a saponification is used to release the bounded vitamins. If there is too much fat present the saponification will not be complete, so for fish feed with very high level of fat we need to take a smaller sample size into work.

Consider using the Eurofins Vitamin and Amino Acid Competence Centre

The Eurofins group has built a specific network, by developing competence centres all over the world, to specialise in matrices, methods and at last but not least knowledge. The figure below illustrates how the Eurofins laboratory network is:



The Eurofins Vitamin and Amino Acid Competence Centre are dedicated to analyse vitamins, some vitamin-like nutrients and amino acids. This narrow and highly specialized focus enables us to provide a “State of the art” service for our customers helping them to:

- Ensure a safe product
- Improve quality
- Reduce costs
- Enhance branding

Concentrating all these testings at one single location enables us to provide our customers with reliable certification based on internationally recognised reference methods with very attractive turnaround times and at competitive prices. In addition to standard tests, at the customer’s request we offers, implementation, optimisation, and validation of customer specific methods.

Eurofins is not only a laboratory services provider. Our experts form a partnership with our customers and are pleased to discuss with you and advise on analytical strategies and choice of methods - this in addition to assistance and expertise in the interpretation of results obtained. Our knowledge and experience of legal regulations, product design, and quality management is also of value to our customers. Working closely with the customer is indeed our best guarantee of value for money.

Several reasons why you should use the Vitamin and Amino Acid Competence Centre are listed below.

We are number one in Europe

- We have the largest number of vitamin and amino acid analyses and they are all performed on one location in Europe. We have huge experience with fish feed concerning pre-treatment methods, analytical methods and matrices.

We have highly competitive pricing

- Our prices are very much competitive. For specific offers we recommend you to contact your local Eurofins Laboratory.

We offer low Turn-Around Time

- We can offer a low turn-around time and we can also negotiate customer specific turn-around times if needed, but it also depends on how many samples and parameters it concerns. For a specific turn-around time we recommend you to contact your local Eurofins Laboratory.

We provide high quality

- Our quality system is based on DS EN ISO IEC 17025. We use daily control including regular use of reference materials. We participate in proficiency tests being FAPAS, BIPEA, NIST etc.

