Aquarium Münster

*Fish like us*

# DR. GERALD BASSLEER

## FISH NUTRITION IN RELATION TO FISH HEALTH

www.aquarium-munster.com

D052023P

**Dr. Gerald Bassleer**

Dr. Gerald Bassleer is a well-known fish pathologist with worldwide reputation.

He has over 40 years of experience in the ornamental fish industry as biologist, fish pathobiologist, owner, director, CEO, wholesaler, importer/exporter of ornamental fish, fish health manager, trainer of aquarium staff, rapid application of microscopic research and diagnostic tools, consultant for several companies in different countries, author, speaker, developer of DR. BASSLEER BIOFISH FOOD, ex-President of OFI - Ornamental Fish International (2006 - 2016).

Over the years he gained a lot of knowledge on fish diseases, which he has written about in his 5 books on freshwater and marine fish diseases, including iOS and Android app Fish Diseases (see www.geraldbassleer.com).

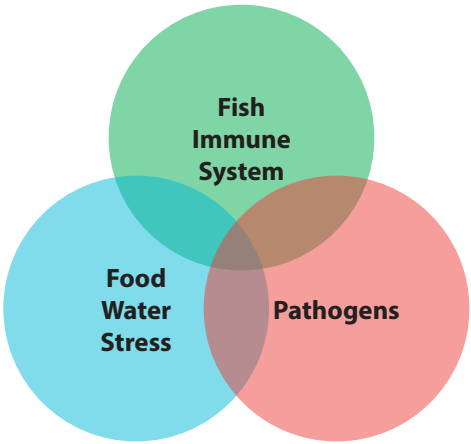
**Abstract**

In the following article his 40+ years of experience on feeding ornamental fish and fish health will be condensed without too much technical information. After we published this dossier in 2018, we now expanded our information with new facts and revision was performed by co-editor Berend Bassleer. At the end we wrote down a few Frequently Asked Questions that you might want to read first before you want to engulf yourselves with semi-scientific information?

In the early 1990's, in Bassleers' wholesale facility in Belgium, there was always one goal in mind: use a complete food for ornamental freshwater and marine fish to provide high quality fish within a 3 to 7 days period, depending on the origin (and quality) of the fish. During that period Bassleer learned that granulates are the safest and most economical fish food because of quality controlled production and the practical selection of size of granulates. The size selection of granulates matters, as the preference for sizing differs between different kind of fish. It is also the easiest way to feed all the fish in a tank and to prevent water pollution due to maximized feed intake, thus resulting in less waste.

Next to the essential basic ingredients in the food, Bassleer learned in the last 25 years that many other additional feed additives can play an important role to control the health of fish: to help the immune (defense) system of the fish, to assist in faster repair after damage, to prevent or control infections, etc. In general, with the recent studies and experience (especially in aquaculture) he learned to understand the health benefits of a functional fish food; a food that gives more benefits than just 'feeding fish'; a food that can be seen as a "nutricament" with products from nature, avoiding (or preventing) the use of medications. After all, a good food and feeding practice provides healthier fish and more successful fish keeping.

*Hippocrates already said 2000 years ago: 'Let the food be your medicine'*



**What can be different in a Fish Food?**

This is interesting content that our competitors would like to read, but to their dismay, only common sense is practiced after many years of trial and error while working with millions of ornamental fish and studying many scientific publications!

The main raw ingredient we recommend in its production is fresh wild Scandinavian fish (herring, mackerel, anchovy) which is rich in proteins and **essential Omega-3 DHA fatty acids**; besides, this food also contains fresh krill, as well as fish oils, cereals, yeasts and algae.

In general, the composition of a food for most of our aquarium fish (freshwater and marine) is ideal when it contains high percentage of digestible proteins, essential amino acids and fatty acids, vitamins A, B, C and D, trace elements and minerals. In this article we will not go into detail about the function of each essential food molecules. (The following reference is recommended: *Nutrition and Fish Health by Lim & Webster)*

More importantly however, Bassleer would like to share his experience as fish health specialist. During his many years of work on four continents as fish pathobiologist, he did not only look at feeding the fish with good ingredients but also at the health benefits the addition of beneficial natural products can offer.

As mentioned earlier: Bassleer prefers to feed granulated (pelleted) food, we will come back to its benefits later in this article. The production of granulate food is as follows: most ingredients are mixed and subsequently cold-pressed; afterwards the pellets are cooked for a very short time at 100 - 120 ˚C to eliminate potential viruses and bacteria. Only after the fish food has cooled down, but still humid, vitamins and food additives (e. g. algae, immune-stimulants, açai, herbs, aloe vera, garlic, etc.) are added so none of their exceptional nutritional values are lost.

On the other hand, it is of utmost importance that a food has enhanced palatability, meaning that many fish, coming from a wide variety of circumstances (e. g. wild vs bred); can eat and digest our fish food.

Bassleer has payed a lot of attention that the fish (especially wild fish) 'smell/taste' the granulates very quickly!

Through his 40 years of experience working between millions of fish, he learned to understand the biggest problems that most of our ornamental fish encounter stress factors like handling, packing, shipping, acclimatization, netting, mixing of species, etc. Therefore, it is firstly important to create a good environment (good water and filtration) and minimize the stress for the fish! A poorly managed fish will have no benefits by feeding it a good food!

The second most important subject is to select good quality food with fish and shrimp (mostly Scandinavian) that preferentially contains additional natural products to produce functional feed that helps in the prevention of bacterial, viral, fungal and parasitic infections or faster repair/recovery after disease, as well as aiding in faster growth and better coloration of the fish.

At the same time the fish food should try to optimize digestive and metabolic efficiency, thus creating less waste, which is important as this leads to less pollution of the aquarium water.

The investment in good food results in less problems with fish, less diseases, reduced use of medications (especially antibiotics), less work, reduced costs, etc. But most importantly: higher quality of fish and higher survival rate. From his personal experience he has seen companies going out of business because they never wanted to invest in good quality food, but rather spent lots of money on medication, water changes, excessive working hours. This combined with high losses, complaints (DOA's) from customers, etc. of course results in losses for the company.

In the end, choosing a high-quality food leads to longer and healthier lives of our fish!

**What about functional fish food for the health of fish?**

Wikipedia: "*Functional food is a food given an additional function (often one related to health-promotion or disease prevention) by adding new ingredients or more of existing ingredients.*"

As explained above, DR. BASSLEER BIOFISH FOOD is specialized in using natural food additives for the wellbeing of our fish! This has become an important issue in 21st century as the use of antibiotics and other medications will eventually become very restricted.

Bassleer's fish food is made functional by coating natural products around each granulate, after production of the granulate, so the quality of beneficial ingredients is guaranteed!

These natural products have a functional purpose with health benefits for the fish, that we divide in different categories: probiotics, prebiotics and phytobiotics.

## 1 Probiotics

Probiotics are living microorganisms that provide health benefits when consumed, generally by improving or restoring the gut flora. Bassleer recommends the use of *Pedioccocus acidilactici* since it has been proven to have great success on health and growth of fish! (Reference: *Nobel prize laureate Élie Metchnikoff & Beneficial effect of yoghurt! In recent years also 'Yakult' for humans.*) Because probiotics requires live bacteria, this fits right in the production process of DR. BASSLEER BIOFISH FOOD, as bacteria are coated on the granulates only after the production of the pellets and thus remain alive.

Those beneficial bacteria, introduced by eating the food, change the content of the intestinal flora in a positive way. The intestinal flora has a great impact on the resistance against infections whereas a weak gut flora creates a weak defense against infections. Since 2014 many positive scientific reports have been published. (If interested in scientific publications visit www.aquarium-munster.com/en/links/science/)

The probiotics are incorporated in our fish food can be fed permanently without any negative impact on the fish.

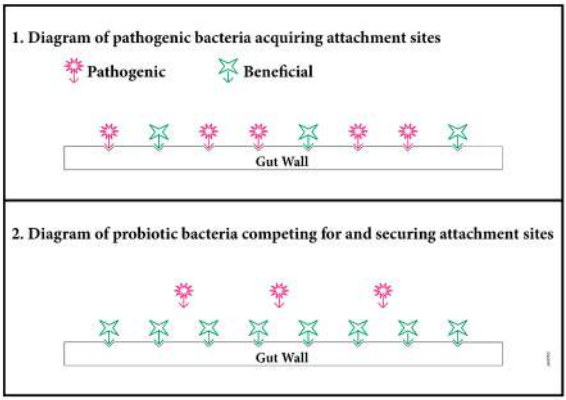


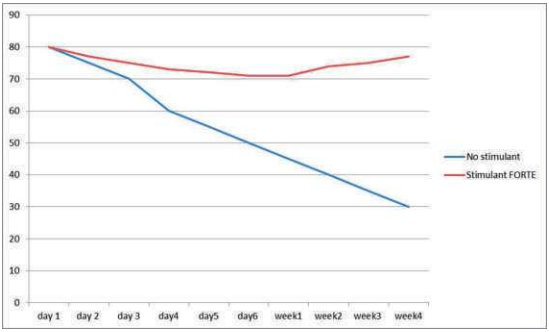

Illustration:
Plenty of beneficial probiotic bacteria are giving no chance to the pathogenic bacteria to invade into the gut wall.

## 2 Prebiotics

Prebiotics are substances that induce the growth or activity of microorganisms (e. g, bacteria) that contribute to the well-being of their host. The most common example is in the gastrointestinal tract, where prebiotics can alter the composition of organisms in the gut microbiome.

Commonly used in aquaculture and the ornamental fish industry are yeast extracts (from *Saccharomyces cerevisiae*) which contain a high content of beta-glucans. These beta-glucans have immune-enhancing properties, reported in many fish species. Beta-glucans may be used as an alternative

to antibiotics and vaccines for protecting fish against microorganisms, or micro parasitic disease. Beta-glucan products have been in practical use for many years in animal feeds in a variety of sectors to improve health of aquaculture species, pets and farm animals. Pretreatment increases survival rates with enhanced phagocytes (macrophages) function and the inhibition of cellular injury. An overall enhancement of immune response can be achieved using beta-glucans. This may in turn allow fish the opportunity to effectively combat disease. Using beta-glucans as a dietary supplement carries the potential to significantly impact the quality of health as well as longevity. (Plenty of reference studies available at www.aquarium-munster.com/en/links/science/)





DR. BASSLEER BIOFISH FOOD FORTE contains, in addition to beta-glucans, bioflavonoids and vitamin C (from citrus fruits) which work synergistically with the beta-glucans, resulting in even better defense and repair mechanisms in fish.

Bassleer recommends this kind of immune-stimulant food during acclimation, before shipping, after unpacking, after stress situations and during disease/treatment. DR. BASSLEER BIOFISH FOOD FORTE has been a success for more than 20 years now with proven results (see graph)!

### 3 Phytobiotics

In Bassleers experience, through trial and error and by exchange of data with experts in the aquaculture, he found that using different kind of fresh plant (phyto) materials can be used as natural medicines for fish. They cannot be regarded as medicines but rather an aid during treatments by relieving the fish of infections or making the colonization of the bacteria/virus more difficult, but also by inducing a faster recovery after disease. (For scientific studies visit www.aquarium-munster.com/en/links/science/)

Listed below is an extensive list of phyto material added to some of DR. BASSLEER BIOFISH FOOD and its added benefits:

- Chlorella (from the freshwater micro algae *Chlorella pyrenoidosa*)
  Rich in carotenoids, with chlorophyll and unsaturated fatty acids providing better regeneration; better digested, less polluting and 10 x more nutritional than *Spirulina* (which is not an algae, by the way)
- Garlic (*Allium sativum)*
  With active ingredient allicin, ajoene, manganese, vitamin B6 and rich source of trace elements: help in control of intestinal problems
- *Moringa oliveira*
  Leaves from the Moringa miracle-tree are extremely rich in nutrients with 18 valuable amino-acids and a lot of anti-oxidants
- Grapefruit Seed Extract
  Has an anti-septic effect, good for intestinal control in combination with *Moringa*
- *Aloe vera*
  With acemannan that enhances the immune system, detoxification, aid for repair due to valuable enzymes, amino acids, bioflavonoids, vitamins, etc.
- Herbal
  Mix of *Thymus* (thyme), *Mentha* (peppermint), *Artemisia* (mugwort) and *Stellaria* (chickweed). The mix of these herbs provides an antiseptically and stimulation effect; good for skinny fish to gain more weight)
- Açai berries from *Euterpe oleracea* (palmtree)
  Provides a natural, intense coloration of the fish as well as being an extra source of energy for the fish.
- *Sophora flavescens* (ingredient matrine and oxymatrine)
  These alkaloids stimulate the mucus of skin and gills and lead to more protection. it acts as a repellent to support a treatment against *Ichthyophthirius*, *Neoichthyophthirius*, *Cryptocaryon* and *Oodinium*
- Lapacho (bark extract of lapacho tree *Tabebuia impetiginosa*)
  Contains various naphthoquinone derivatives, benzofurans and a special combination and concentration of mineral salts and trace elements. Recommended to use during parasitic infection with *Spironucleus* (formerly known as *Hexamita*) and Hole-in-the-Head Syndrome (HLLS)
- Pumpkin seed extract (*Curcubita*)
  Contains tocopherols and carotenoids that have an anti-inflammatory effect. The amino acids cucurbitin and citrulline promote intestinal health. Especially during a treatment against intestinal worms.
- Fucoidan (sulfated polysaccharide from Kelp, *Laminaria japonica*) is beneficial for gastrointestinal health, effective as antioxidant and has antibacterial efficacy.

**DR. BASSLEER BIOFISH FOOD is granulated from a number of reasons that makes it stand out against frozen, fresh or flake food:**

1 Granulated food can be processed in such way that it guarantees no loss of quality of the ingredients.

2 The ingredients (fish, shrimp, vegetables, etc.) are selected and prepared without a risk of introducing (transmitting) diseases. There is a big risk to introduce unnecessary potential harmful bacteria or parasites when feeding frozen or live food (see further).

3 The process of granulated food allows to coat each single pellet with natural additives. Their beneficial ingredients are not harmed by temperature and remain fully active.

4 Granulated food can be produced in different pellet sizes, well adapted to the different sizes of the mouths of our aquarium fish.

Pellet size S
0.2 - 0.5 mm
for fish < 2 cm

Pellet size M
0.5 - 0.8 mm
for fish > 1 cm

Pellet size L
0.8 - 1.2 mm
for fish > 5 cm

Pellet size XL
1.2 - 1.6 mm
for fish > 10 cm

Pellet size XXL
2.8 - 3.2 mm
for fish > 15 cm

Pellet size 3XL
6.5 mm
for fish > 20 cm

5 The granulates remain stable in the water for many hours: not falling apart thus not polluting the water while still ready to eat for the 'slow' eaters.

6 For most fish we prefer a sinking granulate food: slowest sinking smaller granulates and faster sinking larger granulates. Adapted for the different fish ages, sizes and behavior.

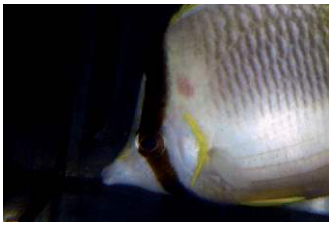
7 Due to high nutritional content, the quantity of food to be used is much less in comparison with non-granulated fish food.

8 The cost of feeding granulate food is lower than most ordinary flake, frozen or live feed.

**Which problems of fish health can be prevented with food?**

1 Overfeeding is problem number one for many hobbyists

a) Many people give too much cheap or inadequate food trying to satisfy the appetite of the fish.
b) Some people believe that fish are always hungry because they are 'begging' for food. This is only conditioned behavior of the fish like Pavlov's dog.
c) Overfeeding results in unhealthy, obese fish that eventually become sick (usually red wounds like on this fat Butterfly fish or fatty deposits on finbase of *Apistogramma*; see following picture)




Please just feed once or at most twice a day with a high-quality food, do not save on fish food. It is a small expense after all in the grand scheme of maintaining a healthy aquarium.

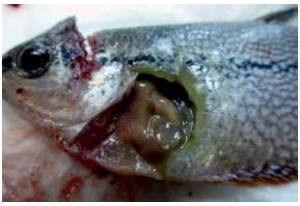
2 Lack of good feeding practice because of

a) Competition between the species or mix with other fish (e. g. Clown loach mixed with other fast-eating fish like Barbs, Marine Goby out-competed for food) resulting in some fish getting all the food and others nothing.
b) The fish is unable to reach (or eat) the food. (e. g. Pleco used as 'cleaner fish' not getting any food)



This can be prevented, as explained above, by using good granulated food as it allows access to the food to all the fish, including the slow and more difficult eaters.

3 The use of poor food quality, made with poor ingredients, results in food that is low in nutritional value. This is a common problem seen in wild fish as they often lack good food sources. As such; fish become skinny and highly susceptible for diseases. There is no instant cure for this, except prevention by feeding with a good quality fish food, thus reducing the daily losses in shops and wholesalers. See 2 examples in the following pictures of Pearl Gourami and marine Butterfly with pale, fatty organs.



4 Introduction of pathogens through live or frozen food
Several studies have shown that pathogenic bacteria can be introduced by feeding live or frozen fish food. This of course does not mean that feeding live or frozen food is bad practice. Rather, solely feeding live or frozen food is. As such, Bassleer recommends limiting this practice and see it as an addition to a good feeding practice with granulates.. It is also recommended to obtain these types of food from a reputable source and sterilize before feeding by heating it in the microwave for three to five minutes. (2019 Study in Taiwan has shown total loss of breeding stock of Emperor fish due to bacteria from live and frozen fish food).

**All these "bad feeding practices" lead to failing organs and a lowered immune response to disease: the fish becomes weak, get infected/diseased more quickly, which are difficult to cure. Some blame it on a bad medication, but it all falls back on a failing nutritional approach resulting in weak fish that are unable to defend themselves from infections.**

**Is feeding high quality food expensive?**

Bassleer's aim is to make the consumer aware his/her investment in fish food is but a very small expenditure in comparison to the benefits of having healthier fish, resulting in a reduced usage of medications, reduced losses, better water, longer living fish, etc.

The price of food mainly depends on its ingredients: it is obviously cheaper to produce food with low quality proteins, a high content of cereals and a low content of fish oils rather than producing a high quality food which is produced using fresh wild marine fish as a main ingredient, which is naturally rich in healthy, good digestible fish oils with a high content of Omega-3 fatty acids. But the price of a high-quality food does not necessarily mean that the feeding of the fish is more expensive, since the amount of food to be used depends on the nutritional density and digestibility of the food itself. In this regards it is

cheaper to feed with a high-quality fish food as the digestibility of carbohydrates is only 40 % whilst that of proteins and Omega-3 fatty acids from fresh fish is over 90 %. This, and the fact that fish oils' energy value is more than twice than that of carbohydrates, means that you will save around 50 - 60 % of costs if you use pellets with high energy value and digestibility instead of conventional foods. Therefore, the cost of feeding your fish with a high-quality food is considerably lower than using other food of poorer quality.

In addition to a higher digestibility and usefulness of this kind of food, the pollution of the aquarium water will be noticeably reduced, thus requiring less frequent water changes. Finally fish will be healthier and stronger, less prone to catch diseases, leading to a longer life of our fish.

**What about food safety? Animal welfare? Environmental and ecological care?**

**Our fish food complies with many recommended standards and certfication programs:**

1 **Standards of Bio safety and sustainable and animal welfare: GLOBAL G.A.P.**

The GLOBAL G.A.P. certification is primarily designed to reassure consumers about how food is produced on the farm. The GLOBAL G.A.P. standard is composed of more than 200 requirements on organisation and control measures related to quality and food safety. But it also covers concerns about minimizing environmental impacts of farming operations, reducing the use of chemical inputs, ensuring a responsible approach to worker health and safety as well as animal welfare. (https://www.globalgap.org/uk_en)

2 **Marine Stewardship Council (MSC):**

The mission is to use an ecolabel and fishery certification program to contribute to the health of the world's oceans by recognising and rewarding sustainable fishing practices, influencing the choices people make when buying seafood and working with their partners to transform the seafood market to a sustainable basis. (www.msc.org)

3 **The Marine Ingredients Organization Responsibility Supply: IFFO RS**

IFFO is the international non-profit organization that represents and promotes the fishmeal, fish oil and wider marine ingredients industry worldwide. Globally respected and it regularly represents the industry at international forums, as well as holding observer status at the UN Food and Agriculture Organization (FAO) and the EU Commission and Parliament. With its independent third-party audit and certification programme, IFFO RS allows producers of marine ingredients to demonstrate that their raw materials are responsibly sourced and responsibly produced. (http://www.iffors.com)

**4 Pro Terra Foundation**

A non-profit organisation that advances and promotes sustainability at all levels of the feed and food production system. A commitment to traceability and for corporate social responsibility as well as the potential detrimental impact of herbicide-resistant, genetically modified crops on eco-systems and biodiversity. (https://www.proterrafoundation.org/)

**5 ISO 22000**

Basic ingredients of DR. BASSLEER BIOFISH FOOD have certified ISO 22000 production

**6 Food Safety Veterinary Control by FAVV**

The FAVV/FASFC (governmental Belgian Food Safety Authority) is an executive body which has jurisdiction over the entire territory of Belgium. In accordance with its legal obligations the FAVV is responsible for laying down, implementing and enforcing measures related to food safety, animal health and plant protection..(http://www.favv-afsca.fgov.be/about)

**Frequently Asked Questions (FAQ's):**

**How long can we keep DR. BASSLEER BIOFISH FOOD?**
Our high-quality production and packaging guarantees the quality for a minimum of two years after production if kept closed. If the can is opened, kept dry, cool and closed after use, it should be used for maximum 6 months.

**My fish won't eat granulates. What can I do?**
Fish are like little children. They prefer the 'candy or sausage' like mosquito larvae, live food, etc. We advise to give nothing else but DR. BASSLEER BIOFISH FOOD for 7 days and then it will work. You can even try first with our DR. BASSLEER BIOFISH FOOD CAVAR or DR. BASSLEER BIOFISH FOOD GARLIC which have the best palatability!

**My cichlids seem to spit out the granulates. Does that mean they don't like granulates?**
This is a normal 'healthy and happy' feeding behavior for cichlids and you will eventually see that the food will be gone!

**You have so many kinds of fish food. When shall I use what kind of DR. BASSLEER BIOFISH FOOD?**

For an optimal nutrition, not only the nutritional quality but also the versatility of the diet is crucial. Variety makes the difference. Even in nature, a fish does not find the same food every day. An optimal diet consists of a varying feeding with different varieties of high-quality food. Our fish food is suitable for all fish. As such, we recommend to give several kind of our food so your fish obtain a good diversity (REGULAR, ALOE, GARLIC, AÇAI, GREEN, etc.). Some fish prefer more vegetables so you can give extra DR. BASSLEER BIOFISH GREEN, HERBAL or CHLORELLA. When your fish are sick, we have specific food that help the fish to defend or repair during disease: for example MATRINE in case of "White Spot Disease", LAPACHO in case of Spironucleus (ex-Hexamita) and HLLE. These specific food should be given at least 10 days in a row, and meanwhile no other food to maximize its efficacy! For more information please visit *https://www.aquarium-munster.com/en/products/food/* or *https://www.bassleer.com/vissen/biofish-food/.*

**I have different sizes and different kinds of fish in my aquarium: smaller fish, bigger fish and bottom fish. Does one size of pellet fit it all?**

DR. BASSLEER BIOFISH FOOD is available in 6 different sizes of pellets. You can select according to the size of the fish in your tank. The smaller fish will love the Baby or Medium food that floats and sink very slowly, while the bottom-dwellers and bigger fish need larger pellets that sink faster to the bottom.

**How much food should I give to my fish?**

The normal rule is 1 % of the total body weight of your fish per day. But we know that this is not practical for you. We advise to feed once or twice per day the quantity that your fish can eat in approx. 3 minutes. It is better to feed too little than too much. Also try to feed in the morning and early evening, but not in the late evening since fish have a biorhythm that needs to be respected (Reference: Chrononutrion, Aquatic Animal Nutrition, Steinberger, 2019).

**I am a professional breeder, importer, exporter or shop. Which type of food can you advise me to use?**

Exclusive for the commercial breeding and farming of ornamental fish we have developed DR. BASSLEER BIOFISH FOOD PROFESSIONAL CARE and DR. BASSLEER BIOFISH FOOD PROFESSIONAL TREAT. Both contain the probiotica *Pediococcus acidilactici*, as all our other types of food.
BASSLEER BIOFISH FOOD PROFESSIONAL CARE, a special blend of three phytobiotics with FORTE, AÇAI and CHLORELLA to boost the immune system for prevention, quarantine, maintenance and preparation for shipment.
DR. BASSLEER BIOFISH FOOD PROFESSIONAL TREAT with GARLIC, ALOE and 4 herbs for sick fish or during treatment.

## REFERENCES


- https://www.aquarium-munster.com/en/links/science/
- https://www.aquarium-munster.com/en/products/food/
- http://www.bassleer.com/vissen/biofish-food/
- Aquatic Animal Medicine by Steinberger (2019)
- Nutrition and Fish Health by Chhorn Lim & Carl Webster (2001)
- Fish Medicine by Stoskopf (1993)
- The New illustrated Guide to fish diseases by Gerald Bassleer (2006)
- The practical guide to fish diseases by Gerald Bassleer (2011)
- Diseases in marine aquarium fish by Gerald Bassleer (new edition 2019)


# AQUARIUM MÜNSTER -
## FISH LIKE US

DR. BASSLEER BIOFISH FOOD is internationally distributed by Aquarium Münster.

Fish like Aquarium Münster which is no surprise, as the wellbeing of fish is being cared for with great commitment by the third generation.

Efficient remedies against diseases which were not curable for a long time have been developed and the living conditions for healthy fish have been greatly improved. Foods, remedies and care products are the focus today. With these products we can assist aquarists and garden pond owners all over the world.

Aquarium Münster Pahlsmeier GmbH
Galgheide 8
D-48291 Telgte (Germany)

Tel +49 2504 9304-0
Fax +49 2504 9304-20

www.aquarium-munster.com
info@aquarium-munster.com