

Sustainable resources secure the future of aquaculture

The use of natural animal proteins in fish feed to develop a more environmentally responsible and ecologically sustainable aquaculture

Summary of a scientific opinion



This summary is based on E/05/027-Rev. 1, Scientific Opinion on the current and potential use of blood products and blood meal in aquafeed. The report was prepared for European Animal Protein Association, Brussels, Belgium by Albert G.J. Tacon Ph.D., University of Hawaii, Honolulu, HI 96822 USA, www.hawaii.edu/HIMB/Faculty/tacon.html, atacon@hawaii.edu, Honolulu, 3 October 2005

The full scientific report is available upon request at European Animal Protein Association (EAPA)
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A sustainable resource to help aquaculture grow

Fish farming, or aquaculture, is a success story and is supplying a growing proportion of the fish we eat. Farmed fish and shellfish do not have a specific dietary requirement for a particular ingredient or food source. Just like humans they have specific dietary requirements for essential nutrients but it does not matter where those nutrients come from — fish, meat or plant.

At present global aquaculture depends on marine fishery resources to provide fishmeal and fish oil as raw materials to use in fish feeds. There is an urgent need to reduce this dependency by using more sustainable resources whose production can keep pace with the growth of aquaculture.

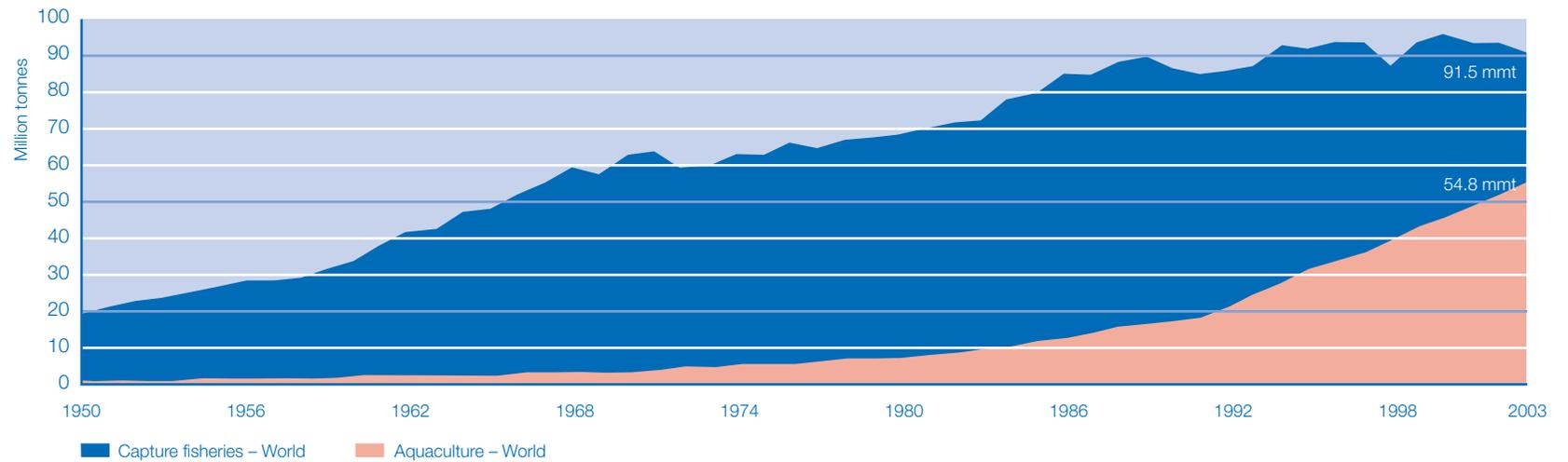
Also there is a need to reduce the levels of unwanted substances in feed that come from these marine resources, for example by introducing alternative raw materials.

Terrestrial animal by-products such as haemoglobin powder and blood meal represent a large, mostly untapped source of animal protein and lipids that can be used in fish feeds to supplement fishmeal and fish oil and they are virtually free of unwanted substances.

Research and a 25 year of track record prove they are safe and can be used with no loss in growth, feed performance or negative effects on fish or human health.

There are no legal restrictions but constraints have been imposed by major European retailers, on the basis of perceived consumer fears and demands regarding feed safety. The sustainability of aquaculture would benefit, as would consumers, if retailers were to review their position on these nutritious feed ingredients.

Contribution of aquaculture to total world fisheries landings (FAO, 2005a)



Estimated Global use and demand for fishmeal and fish oil 2002 – 2012

Total global estimates	2002	2003	2005	2010	2012
Total aquafeed production	17,880	19,474	20,958	27,744	31,747
<i>IFFO estimate</i>	15,794	–	–	–	35,095
Total estimated fish meal used	2,696	2,936	2,666	2,478	2,577
<i>IFFO estimate</i>	2,873	–	–	–	3,019
Total estimated fish oil used	758.3	802.0	551.8	534.1	664.8
<i>IFFO estimate</i>	791	–	–	–	848
Total fishmeal + fish oil used	3,454	3,738	3,218	3,012	3,242
<i>IFFO calculated this paper</i>	3,664	–	–	–	3,867
Equivalent pelagics used	13,816	14,952	12,871	12,048	12,967
<i>Equivalent pelagics used (CF 5)²</i>	17,270	18,690	16,089	15,060	16,209

¹ Source: IFFO, International Fishmeal and Fishoil Organization

² Using a mean fish meal + fish oil to wet pelagic conversion ratio of 1:4 and 1:5 respectively.

Forecasts for the use of fishmeal

	2000	2005	2010
Aquaculture	35%	45%	56%
Poultry/Pigs	53%	41%	32%

Source: IFFO, International Fishmeal and Fishoil Organization

Forecasts for the use of fishoil

	2000	2005	2010
Aquaculture	54%	77%	97%
Industry	10%	12%	0%
Human foods	34%	9%	1%
Pharmaceuticals	2%	2%	2%

Source: IFFO, International Fishmeal and Fishoil Organization

A food success story

In recent decades the number of fish being provided by aquaculture has shot up — over 80 times more fish now than 50 years ago. In the nineteen fifties aquaculture consisted mainly of small-scale farming operations for domestic consumption. Today it is multi-billion dollar industry supplying one of nature's healthiest foods.

Farmed fish and their feed

Over 90% of total aquaculture production was in the Asia Pacific region in 2003. China alone produced over 70% of the global total. Western European aquaculture provided 3.57%.

The farming systems used to produce fish and shellfish can be divided into three basic categories — extensive, semi-intensive and intensive. The feeding method employed depends on the species being farmed and the system being used.

Feeding methods range from low cost supplementary feeds, which simply add to what the fish find for themselves, to the nutritionally-rich compound fish feeds used in large-scale commercial farming operations

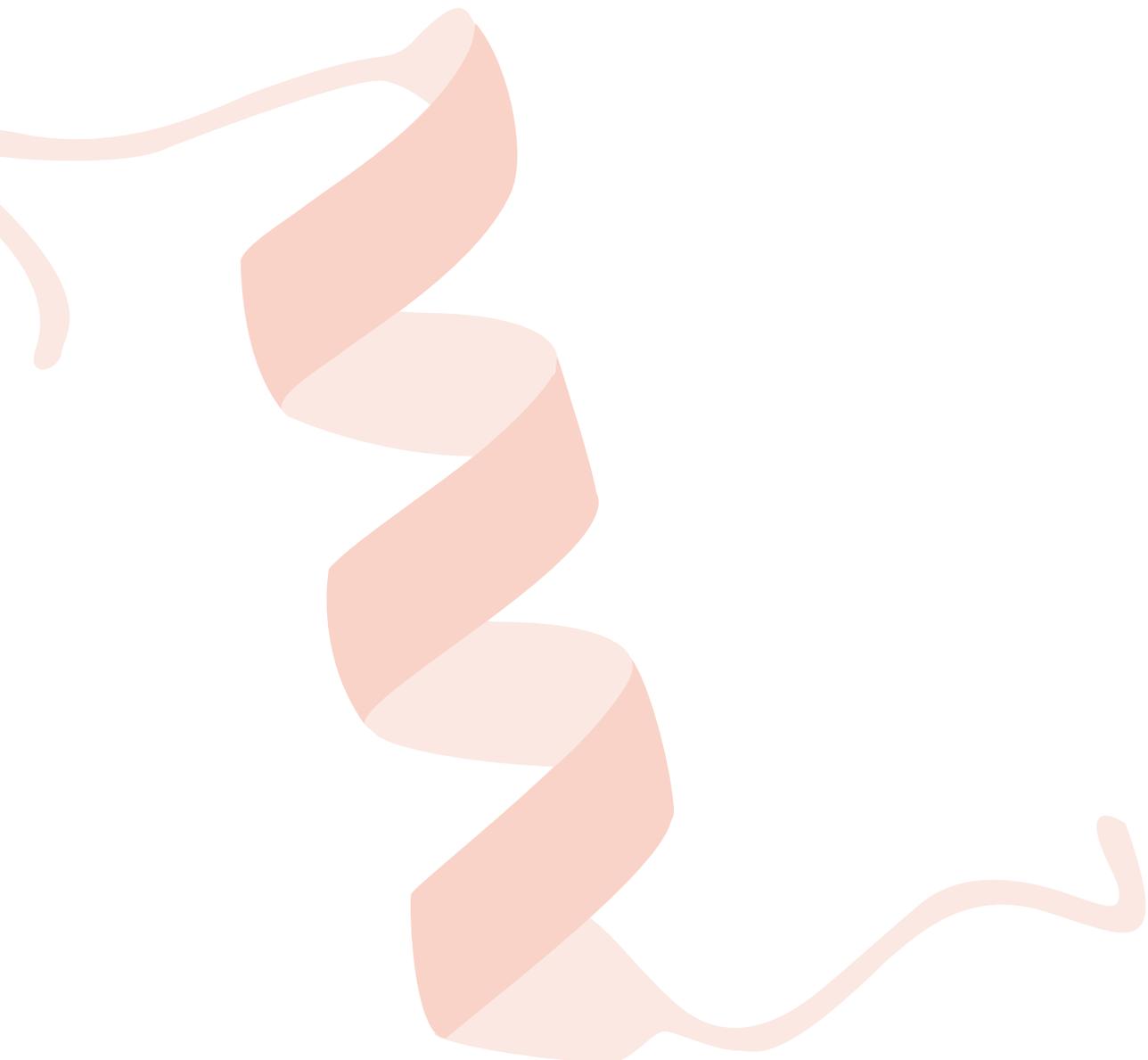
Although no official statistical information exists, it is estimated that just over 40% of global aquaculture production depends on these compound fish feeds.

Producing fish feed

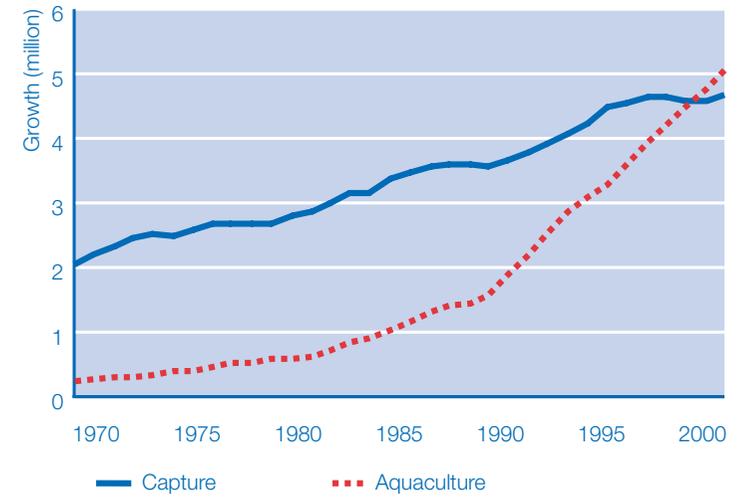
The total world production of compound fish feed is around 20 million tonnes. By comparison, the world total production of compound animal feed, for animals such as pigs and cattle, is well over 600 million tonnes. Fish feed is about three percent of that figure.

China, the largest aquaculture producer, is also the world's largest fish feed producer with close to 8 million tonnes a year. The main salmon producing countries, Norway and Chile, make about 1.5 million tonnes between them.

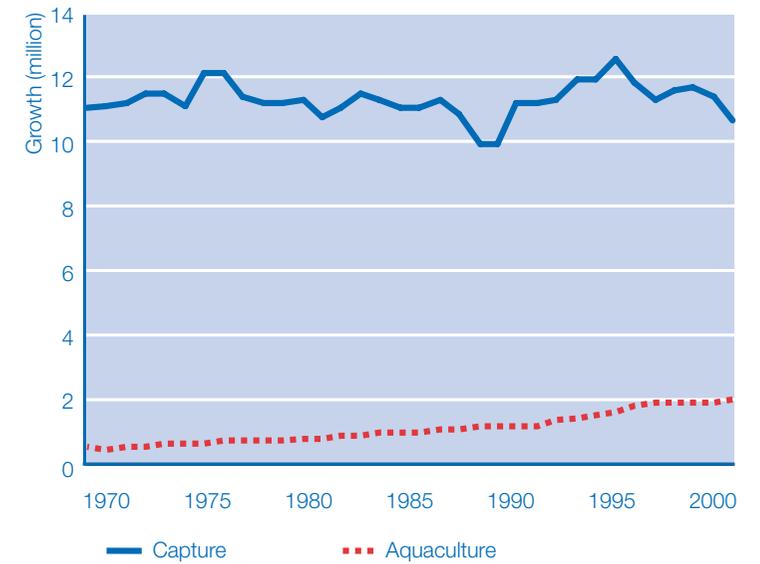
Conservative estimates for global compound fish feed production suggest total of 21 and 27.7 million tonnes by 2005 and 2010. The International Fishmeal and Fish Oil Organization (IFFO) said in 2005 that production would pass 35 million tonnes by 2012.



Growth of capture fisheries and aquaculture sector within the Asia Pacific region



Growth of capture fisheries and aquaculture sector within Western Europe



Key ingredients: fishmeal and fish oil

The makers of compound fish feed depend heavily on wild caught fish for key ingredients — fishmeal and fish oil — to provide the proteins and fats needed in the diets of farmed fish. This is especially the case with species that fit high on the aquatic food chain, including all carnivorous finfish such as salmon and omnivorous or scavenging shellfish species such as shrimps.

Fishmeal and fish oil are also commonly used as a secondary source of dietary protein and fats for many omnivorous cultured finfish species, including freshwater carps, tilapia and catfish.

We must not over fish

A proportion of the wild fish catch, about a third, is used to produce fishmeal and fish oil. Fish and animal feeds are major users of these products. Species often used for fishmeal and fish oil include jack mackerel, blue whiting, sardines and capelin. Some people are expressing concerns about the long-term sustainability and ethics of using potentially food-grade fish to produce food rather than using them directly for human consumption.

In addition there is growing awareness that we should not take too much from the wild fish stocks of our oceans and an increasing demand for assurance that fish are coming

from sustainable sources, with traceability, labelling and transparency. This links with an emerging desire to ensure our food is produced efficiently and that we do not waste resources by our farming methods.

Although the fish feed industry is highly dependent upon fishmeal and fish oil, it would be difficult to increase the supply of these ingredients without endangering the wild fish populations. The problem is that demand for fish feed is rising by some five percent a year because production from aquaculture is rising.

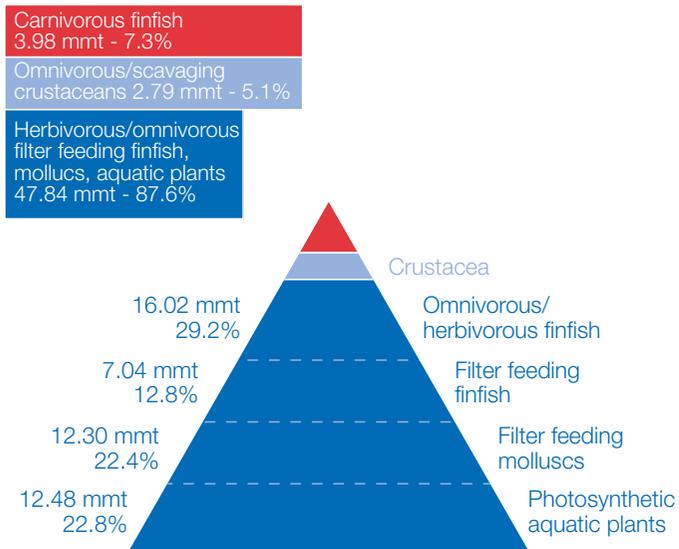
Animal protein products are important options to provide equivalent nutrition. They can and should be used in fish feed to help the aquaculture industry grow into a sustainable and ethical supplier of high quality food.

Feed and food safety; concerns are expressed

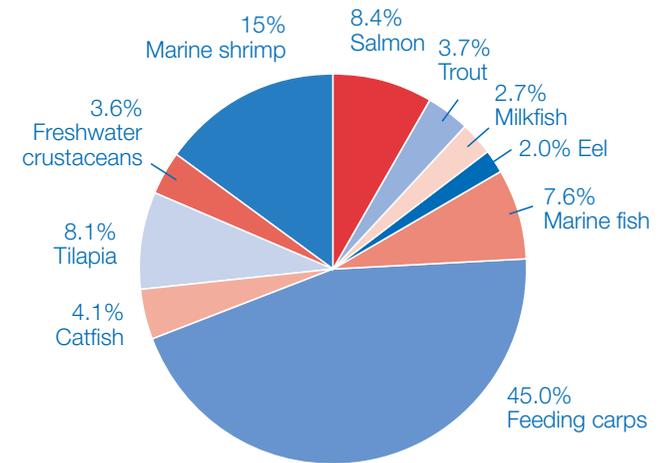
A number of consumer organizations have expressed concerns about possible contamination of fish oils and fishmeal with compounds such as dioxins and heavy metals such as mercury. The EU, for example, has set acceptable limits for contamination in fish oil, fishmeal and other feed ingredients and in the finished feeds.

Many European fishmeal and fish oil producers are developing processing techniques to reduce the presence of these environmental contaminants in their products.

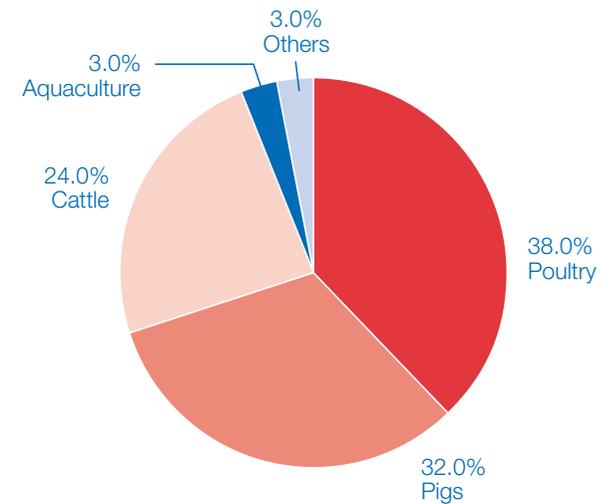
Global aquaculture production pyramid by feeding habit and nutrient supply in 2003 (million metric tonnes; calculated from FAO, 2005a)



Estimated global compound aquafeed production in 2003 for major farmed species (values expressed as % total estimated global aquafeed production of 19.5 million tonnes, dry as-fed basis)



Estimated global industrial feed production in 2004 for major farmed animal species (values expressed as % dry as-fed basis)



Excellent nutrition without contaminants

The EU food safety specialists and those in the USA have said that non-ruminant animal protein products such as haemoglobin powder and blood meal can be used in fish feed. These proteins are obtained from clean, fresh blood by one of several strictly specified techniques, for example spray drying.

According to the American Feed Industry Association (AFIA) these animal protein products contain essential amino acids, vitamins and minerals. They provide a good source of the essential amino acids histidine (almost twice that found in other dietary protein sources), leucine, and lysine. They also are rich dietary sources of iron.

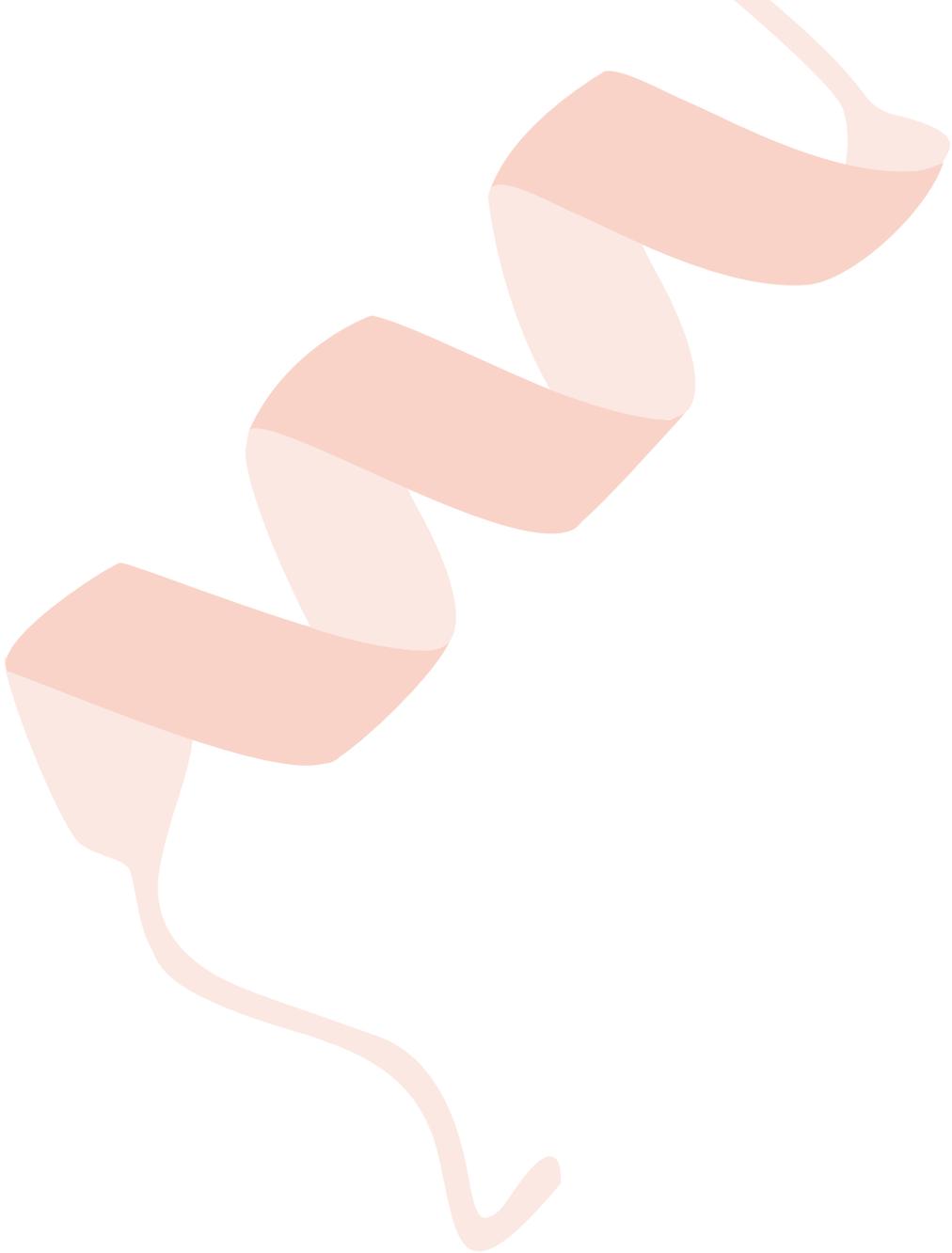
Animal protein products can easily be combined with other feed ingredients with complementary amino acid profiles, including plant proteins such as soya.

Compared with most marine feed ingredient sources, animal protein products contain low levels of environmental contaminants such as dioxins or heavy metals.

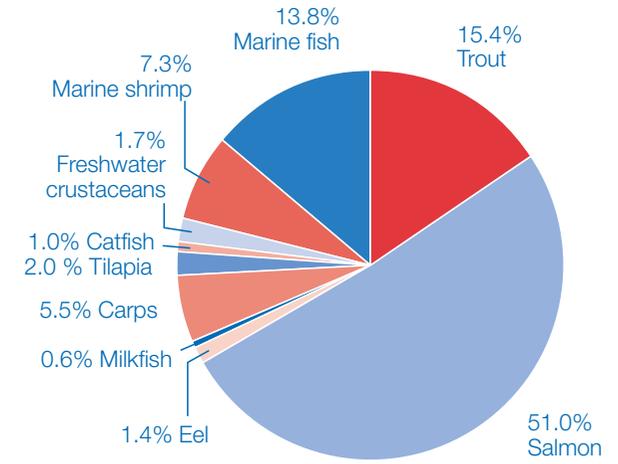
Widely used in fish feeds

Feed manufacturers in countries from Australia, North and South America and Asia are using animal protein products in their fish feeds. They consider them to be cost-effective and sustainable sources of highly digestible animal protein for farmed fish and shrimp and as a valuable and responsible dietary fishmeal replacement.

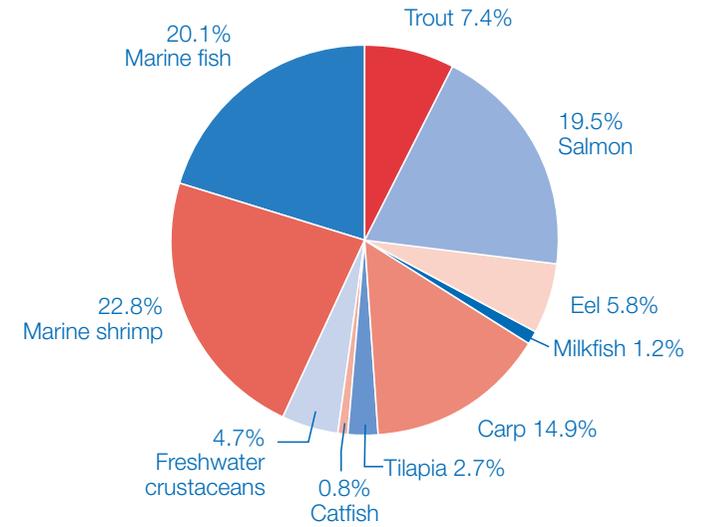
The United States, the largest producer of animal protein and related by-products, has been successfully using haemoglobin powder and blood meal in salmon feed for over 25 years with no reported problems in fish or human health.



Estimated global use of fishmeal within compound aquafeed in 2003 by major species (% total fishmeal used within aquafeed, dry as-fed basis)



Estimated global use of fish oil within compound aquafeed in 2003 by major cultivated species (% total fishmeal used within aquafeed)



Permitted in Europe

Non-ruminant haemoglobin and blood meal have been permitted in fish feeds produced in the EU since 2003. Currently European feed manufacturers do not use these products even though they accept they are a cost-effective, safe and highly digestible protein source for farmed fish and shrimps.

This is because of restrictions imposed by leading European retailers. They are prohibiting the use of land animal proteins in feeds given to fish that are to be sold in their supermarkets. A similar situation exists for salmon or shrimp feeds produced outside the EU if the intended market is within the European community.

The ban by these retailers is without any scientific foundation and works against the development of more environmentally responsible and ecologically sustainable aquaculture by inhibiting the reduction of its dependence on precious and finite marine protein resources.

Time for retailers to rethink

Global aquaculture currently depends on the use of marine fishery resources as feed inputs in the form of fishmeal and fish oil. There is an urgent need to reduce this dependency by finding other sustainable resources where production can keep pace with the growth of aquaculture.

For the sustainable development of the aquaculture sector, which is providing consumers with excellent, healthy nutrition, representatives of leading EU retailers engaged in seafood sales and corresponding international farmer associations must reconsider their unfounded opinion.

For further information on the benefits of natural animal proteins in fish feed please contact EAPA. EAPA represents all European producers, specialized in the production and supply of high quality natural animal proteins.

EAPA

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