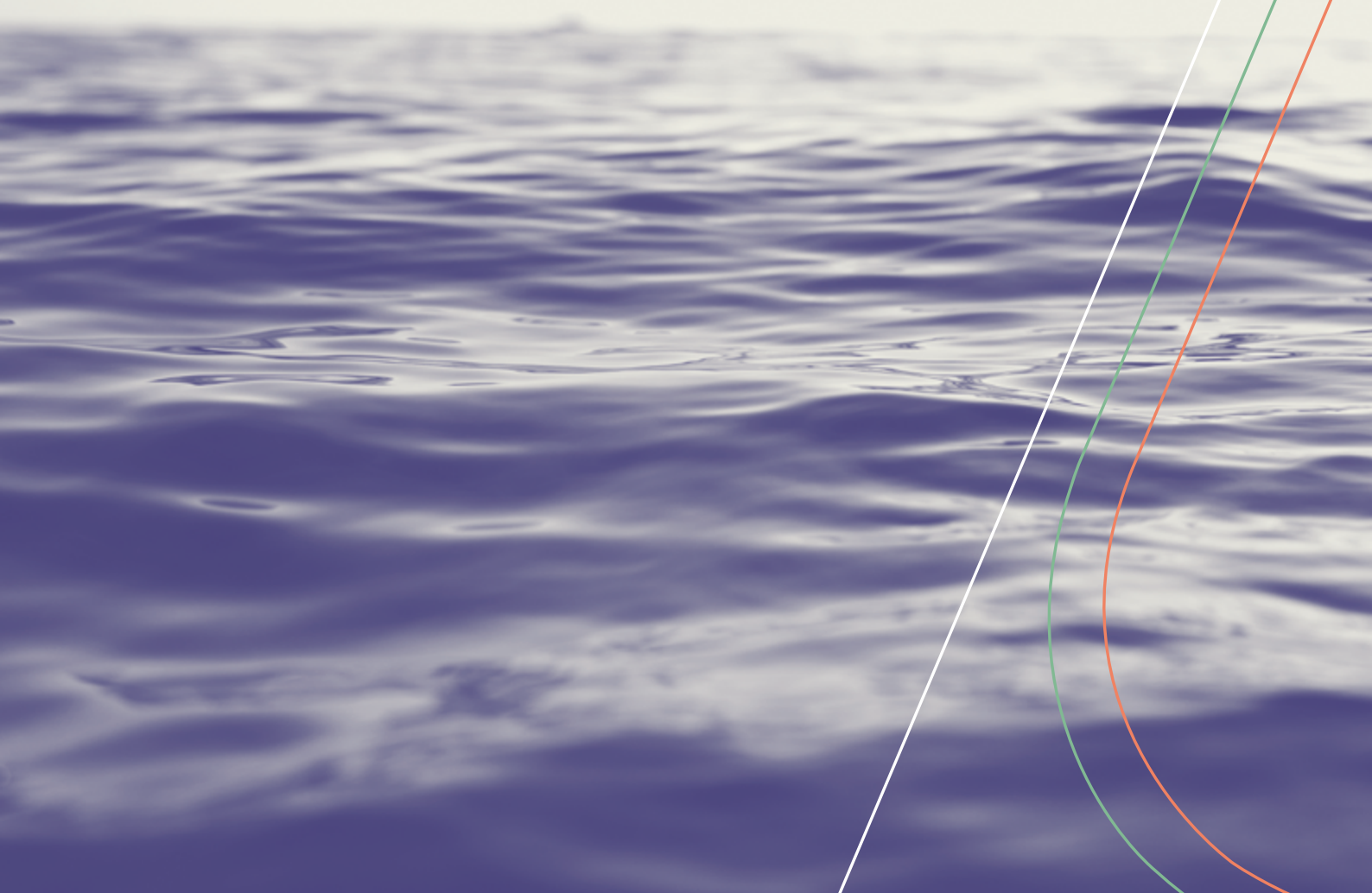




PELAGIA™

Pro-Allo

A New Fishmeal That
Boosts Growth and
Robustness



Introduction

Feed efficiency, fish health, and survival rates are major dynamics determining the operational efficiency of an aquaculture business. The quality of fishmeal can have a major influence on all of these factors. As a result, optimising the fishmeal used in feed is a strategy that can deliver substantial benefits.

For many years now, there has been little innovation in fishmeal. But that's about to change. Drawing on extensive scientific research, experts at Pelagia have collaborated with experienced scientist Anders Aksnes to develop a new fishmeal, Pro-Allo, which represents a major step forward.

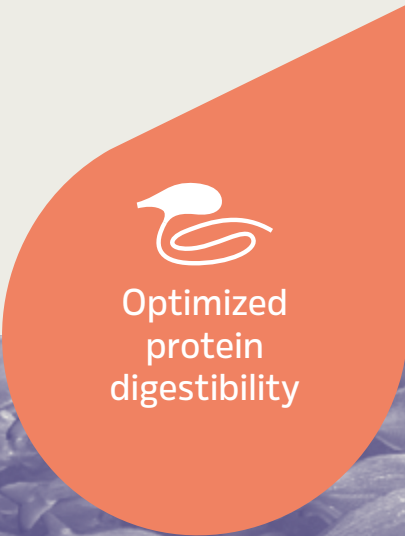
With precisely targeted nutrition, Pro-Allo creates optimal conditions in fish to support allostasis. Allostasis is the biological process of fighting stress caused by factors such as changes in the environment and handling.

Pro-Allo is produced in Norway from sustainably-sourced fish and to the same strict standards as high-quality Group 1 fishmeal. However, it is a significant upgrade on standard fishmeal. It is proven to deliver both improved feed efficiency and more robust fish by focusing on three key areas in a single solution, as follows:

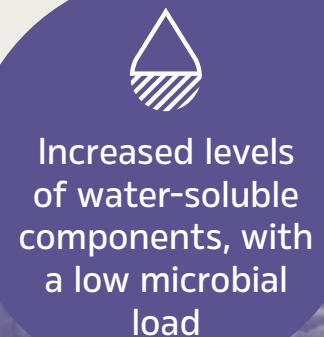
- Improved raw material freshness
- Optimized protein digestibility
- Increased levels of water-soluble components, with a low microbial load



Improved
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freshness



Optimized
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digestibility



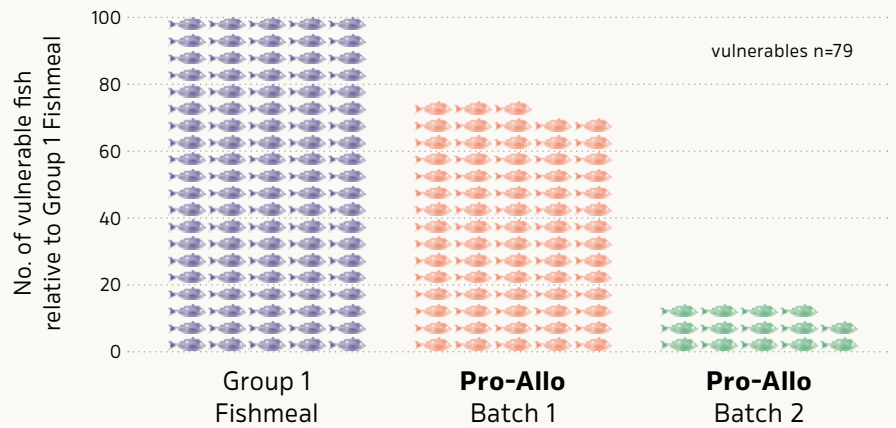
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Next page: **Proven benefits**

Proven Benefits

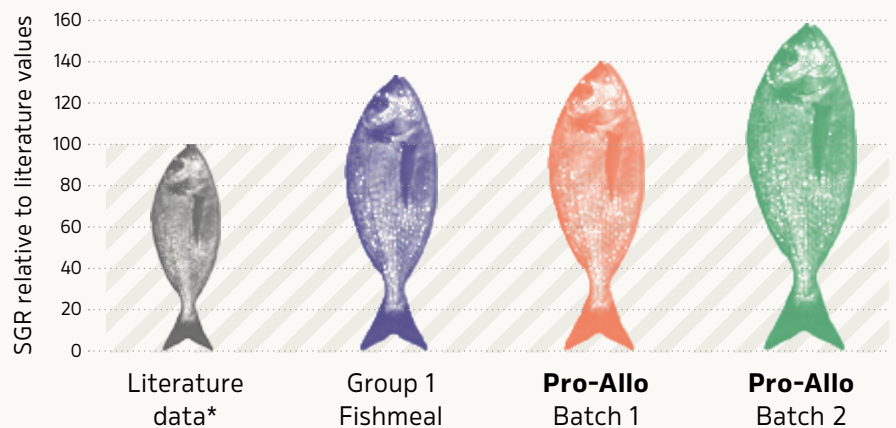
Tests conducted by Pelagia in seabass demonstrate that, depending on the levels of water-soluble protein present, Pro-Allo reduces the number of vulnerable fish by anything between 27% and 86% compared with standard Group 1 fishmeal (see Figure 1).

▼ **Figure 1.** Impact of Pelagia Pro-Allo on number of vulnerable fish (Pelagia's own trial)

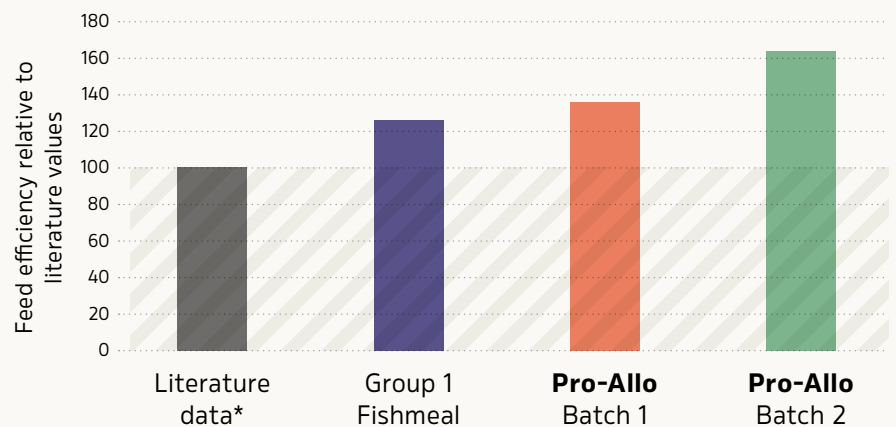


In addition, Pro-Allo has been shown to improve the specific growth rate by between 4% and 19% (see Figure 2) and feed efficiency by between 6% and 30% (see Figure 3).

▼ **Figure 2.** Impact of Pelagia Pro-Allo on specific growth rate (SGR) (Pelagia's own trial)



▼ **Figure 3.** Impact of Pelagia Pro-Allo on feed efficiency (Pelagia's own trial)



This white paper will explore in more detail how, with Pro-Allo, these improved outcomes are achieved.

*Average of the 15 most recently published data (2017-2022)

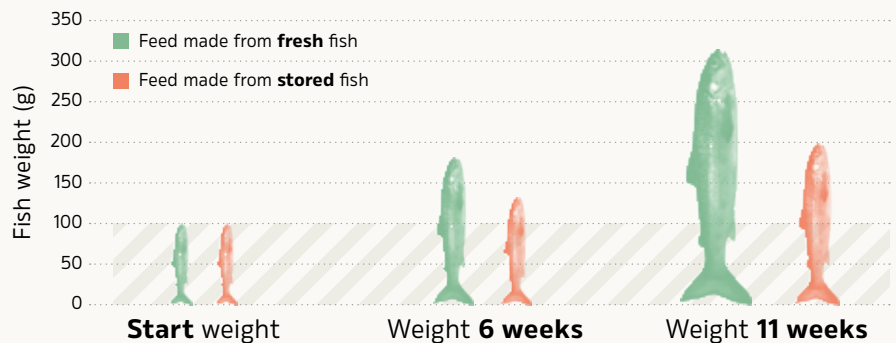


Raw Material Freshness

A substantial body of research shows that the freshness of the raw materials used in fishmeal is directly correlated to growth rates in fish.

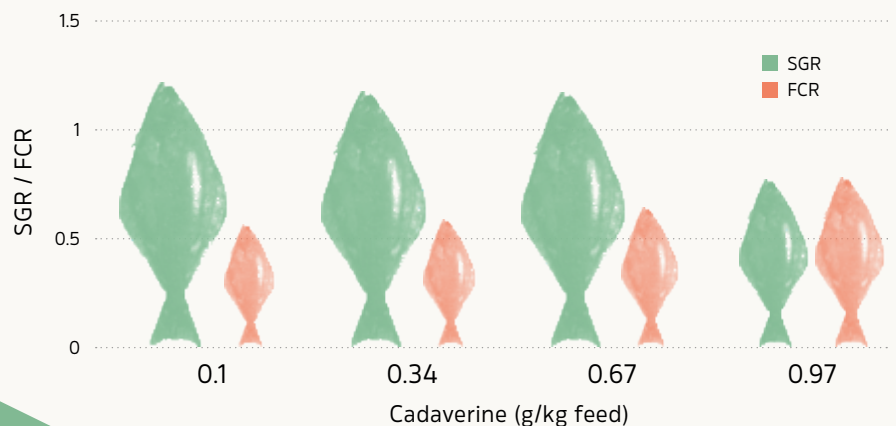
In one study (see Figure 4), scientists found that after 11 weeks, salmon given feed made from stored fish had grown at half the rate of those fed with feed made from fresh fish.¹

▼ **Figure 4.** Impact of freshness in salmon feed.¹



In another study (see Figure 5), researchers concluded that spoilage of fish raw material before fishmeal production, measured by levels of biogenic amines such as cadaverine, led to reduced growth and reduced feed efficiency ratios in halibut.²

▼ **Figure 5.** Impact of freshness on specific growth rate (SGR) and feed conversion ratio (FCR) in halibut.²



The Pro-Allo Difference

For the production of Pro-Allo, Pelagia is selecting the freshest raw material by working closely with fishing fleets through a dedicated supply chain. This supply chain is centred on specific procedures from the point at which the fish are caught to the moment when they arrive at the factory to be turned into fishmeal. Pelagia is incorporating new quality parameters in relation to storage time and temperature, and handling and distribution. At every step, these carefully calibrated measures maximise levels of freshness above and beyond existing industry standards. When incorporated into fishmeal, this results in a product that exceeds the levels of freshness currently found in aquacultural feed products.



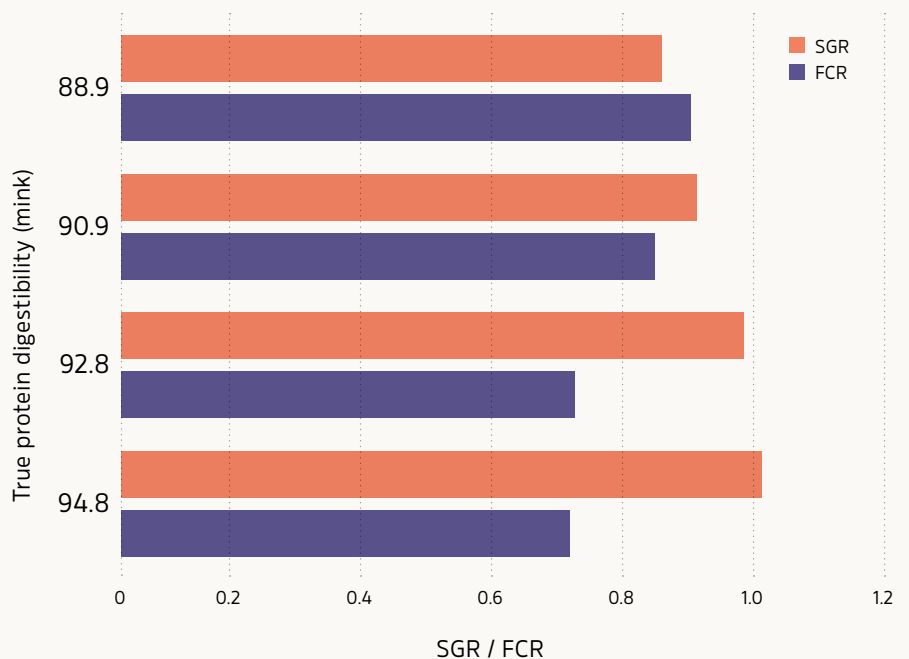
Protein Digestibility

The extent of protein digestibility in fishmeal is influenced by the method of processing. In particular, digestibility is reduced when raw materials are dried at higher temperatures. Furthermore, research indicates a link between protein digestibility in fishmeal and growth rates achieved in fish.

In one study, researchers found that processing fishmeal raw materials at 100°C resulted in a 4% reduction in protein digestibility compared with processing at 70°C.²

In the same study, it was found that this 4% reduction in protein digestibility resulted in a 7% decline in specific growth rate (see Figure 6). In addition, higher digestibility was associated with a significantly improved feed conversion ratio.

▼ **Figure 6.** The impact of true protein digestibility on specific growth rate (SGR) and feed conversion ratio (FCR) in halibut²



The Pro-Allo Difference

Pelagia is applying gentle methods to dry raw materials, which preserves a higher level of protein digestibility in Pro-Allo fishmeal. In this way, it is proven to deliver greater benefits in terms of specific growth rates, feed efficiency and feed conversion ratios. Aquaculture businesses that use feed containing Pro-Allo will see these benefits translated into bigger, healthier fish and greater operational efficiency.



Next page: **Water-soluble protein**



Water-Soluble Protein

The water-soluble fraction contains several molecules, of which the major part comprises small proteins and free amino acids that exist in isolation or in short chains – known as peptides. Amino acids are the building blocks of protein and are therefore smaller than intact proteins.

Existing aquaculture quality parameters state that Group 1 fishmeal should comprise no less than 18% and no more than 32% water-soluble protein. A water-soluble protein level higher than 32% is considered to be a quality concern, because it might indicate adverse microbial growth and, in turn, the presence of growth-retarding components.

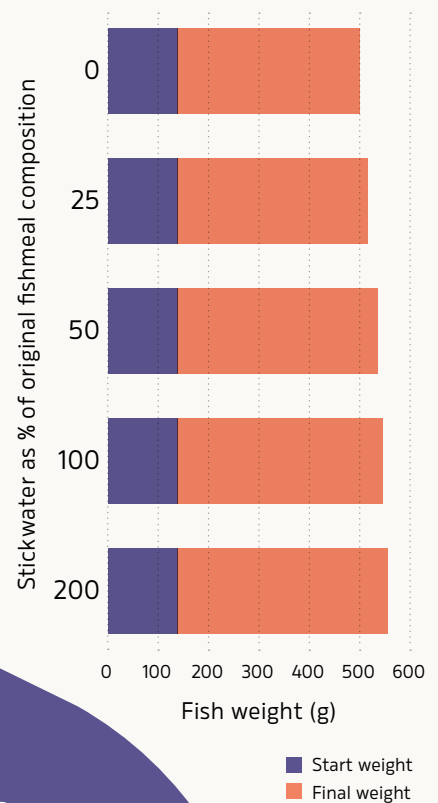
However, at the same time, research shows that water-soluble proteins are very important for fish growth and wellbeing. In one study (see Figure 7), increasing levels of stickwater (SW), a water-soluble protein solution, were added to fishmeal and fish weight was evaluated.³ It was found that there was a direct correlation between SW levels and weight, with greater quantities of SW in the fishmeal leading to bigger fish.

These findings indicate that levels of water-soluble protein higher than 32% could be desirable in fishmeal – provided that the molecules in question are beneficial in nature to fish growth and wellbeing.

In practice this suggests it would be a positive step to incorporate free amino acids and peptide fractions into fishmeal. Another study supports this⁴, with the results indicating that inclusion of the smallest molecules in SW resulted in bigger fish.

There are a number of possible reasons why water-soluble protein fractions result in bigger and more robust fish. Free amino acids have a specific smell and taste and therefore might stimulate increased feed uptake. This is especially important in fish that are struggling to achieve adequate uptake. The digestive tract contains several sensors for free amino acids and peptides, indicating that some free amino acids and peptides may have specific neurological effects that could affect fish physiology and wellbeing.

▼ **Figure 7.** The effect of water-soluble protein on fish weight³



The Pro-Allo Difference

Water soluble free amino acids and peptides are important for growth, wellbeing and survival in fish. The levels of such components in conventional fishmeal varies between 18% and 32%, in line with industry quality parameters. However, in Pro-Allo, Pelagia has taken a completely new approach. Pro-Allo contains more than 32% water-soluble protein, with a guarantee of increased levels of beneficial components and reduced levels of undesirable growth-retarding components. As a result, it delivers superior fish wellbeing, growth and robustness by promoting the allostasis phase in fish during challenging periods in their lifecycle.

Nutrient Composition of Pro-Allo

Specification	Values
Raw protein	69-72%
Lipids	11% maximum
Crude ash	18% maximum
Water	6-10%
Cadaverine	< 0.6g/kg
Histamine	< 0.2g/kg
Water soluble protein	32% of crude protein minimum

Microbials	Values
Salmonella	Negative
Enterobacteriaceae	< 10 cfu/kg

Summary

Pro-Allo is a unique, high-performance fishmeal that is based on the optimisation of three key factors:



Freshness



Protein digestibility



Beneficial water-soluble components

As demonstrated by the results of Pelagia's trials, Pro-Allo can support allostasis and provide important benefits for fish wellbeing and robustness. It delivers improved growth and higher survival rates – particularly in fish with specific vulnerabilities. Incorporating Pro-Allo in commercial feed may be especially useful when fish are facing the following challenges:



The larvae and smolt stage



Disease



Unfamiliar temperatures



Physical handling



A feed regime with high levels of plant protein

Pro-Allo is part of Pelagia's science-based innovation pipeline, which is focused on developing fishmeal solutions that deliver proven benefits to enhance fish welfare and operational efficiency.

Next page: [How to contact us](#)



PELAGIA™

For more information about Pro-Allo
and its benefits, contact Pelagia at
feed@pelagia.com

You can also visit our website:
pelagia.com

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4. Kousoulaki, et al. (2012). High growth rates in Atlantic salmon (*Salmo salar* L.) fed 7.5% fish meal in the diet. Micro-ultra- and nano-filtration of stickwater and effects of different fractions and compounds on pellet quality and fish performance. *Aquaculture* 338-341 (2012) 134-146