



ALLIANCE™

[.https://www.globalseafood.org](https://www.globalseafood.org)

Aquafeeds

# A singular focus: Making single-cell proteins a fixture on the aquaculture feed ingredient menu

12 May 2025

By Bonnie Waycott

## Animal nutrition expert Louise Buttle at dsm-firmenich discusses the promise of single-cell proteins for aquaculture feeds

As the aquaculture industry searches for more sustainable raw material alternatives, attention is turning to a promising source: microbes.

Leading the charge is Swiss-Dutch company **dsm-firmenich** (<https://www.dsm-firmenich.com/en/home.html>), which is developing single-cell proteins (SCPs) – scalable, protein-rich microbial biomass in the form of yeast, bacteria or fungi – as an alternative to conventional feed ingredients.

Aquaculture's progress on sustainability relies on many areas, including diversifying the types of ingredients used in feed formulations. Companies are working to unlock alternative feed sources that have solid sustainability credentials and are rich in nutrition, helping to expand aquaculture's raw material basket while mitigating environmental impact.



Fish nutrition expert Louise Buttle of dsm-firmenich talks about the potential of adding nutrition-packed single-cell proteins to aquafeeds. Adobe stock image.

“The strategy behind our work is to deliver a sustainable source of protein for aquaculture,” Dr. Louise Buttle, global key account manager at dsm-firmenich, told the *Advocate*. “Some years ago, we set up a multi-disciplinary strategic project called Lighthouse Aquafeed to demonstrate the feasibility of using our expertise in fermentation technology to deliver a strong nutritional, functional and health performance of fish by feeding them SCPs with high protein levels. This project was about focusing on the protein gap, the role of aquaculture in filling this gap and the question of what we were going to feed aquaculture. Today, we are working further on the development of single-cell proteins to feed the sector.”

A comprehensive solution for the wild seafood supply chain.

- ✓ Crew rights
- ✓ Food safety
- ✓ Environmental responsibility

**Best Seafood Practices**

LEARN MORE >

(<https://bspcertification.org/>).

SCPs are produced using fermentation technology, whereby naturally occurring microorganisms convert different feedstock molecules into proteins. This can be achieved by combining biotechnology with new bioscience to train and evolve microorganisms to become super protein producers in order to maximize the nutritional value.

To date, researchers at dsm-firmenich's pilot facility in Germany have produced several metric tons of "smart protein" containing approximately 70 percent protein. With high productivity and an appropriate amino acid profile for carnivorous species, SCPs are a rich source of protein equivalent to good quality fishmeal and soy protein concentrate, said Buttle. SCPs can also be grown anywhere geographically, without the need to rely on certain weather conditions or fishing seasons. Using fermentation vessels, they can also be scaled without land use and have the potential to reduce the carbon footprint of feed and food systems.

"All these factors offer assurance around biodiversity impacts," said Buttle. "Meanwhile, after initial life-cycle assessment with a lens to the future production strategy, we've found that we can reduce the carbon footprint down to near zero, but this is reliant on using certain types of feedstock and renewable energy."

Trials on rainbow trout (*Oncorhynchus mykiss*) by dsm-firmenich in France have also generated positive results. Over 12 weeks, the fish were given feed containing different amounts of SCPs from zero to 20 percent (SCPs replaced a combination of fishmeal and soy protein concentrate when working with an inclusion of 20 percent). Data from the trial indicated that the inclusion of SCPs in feed maintained good fish performance measured by final body weight across all treatment groups.

The demand from aquaculture for sustainable, protein-rich raw materials is clearly present, but for the sector to adopt SCPs, it's important to be pragmatic about the challenges, including overcoming barriers in the investment phase, said Buttle. This includes initial high production costs, appreciating that advanced fermentation technology requires substantial infrastructure investment, and achieving economies of scale to make SCPs cost-competitive with conventional proteins. Going forward, protein alternatives like SCPs are also likely to complement rather than rival each other.

"Nutritionally, they could probably replace fishmeal, but that's not where we're going," said Buttle. "Our focus is to complement and expand the raw material basket, giving aquaculture an extra option at scale and at an affordable price. We've proven time and again that we can feed fish with SCPs but the volume, scale and affordability haven't been delivered. Looking ahead, it's not so much the nutritional properties of SCPs that we need to focus on, but rather success at scale."

With aquaculture a key sector to help close the protein gap and feed the global population, the need for a steady supply of nutrient-rich, protein raw materials for feeds are a crucial driver for the future. Buttle says that long-term partnerships are needed to scale up SCPs, and such partnerships along the value chain, both upstream and downstream, will determine the extent to which SCPs can be successfully integrated into feed and be produced commercially.

"Aquaculture has made it clear that it needs protein-rich raw materials, feed companies have invested a lot in screening those materials, and we have now reached a point where some insect feed companies are getting to commercial scale, but market conditions could be better," she said. "To really have an impact, however, you have to reach the commercial scale so that's what we need to focus on when it comes to SCPs, and whether there's a role there for governments to step into, or other initiatives and financial mechanisms that could support, such as industry players that may be willing to invest in large-scale testing or production. It will be interesting to see what happens in the next few years."



Louise Buttle addresses attendees of the North Atlantic Seafood Forum in Bergen, Norway, in March 2025. Photo by Bonnie Waycott.

## Author



**BONNIE WAYCOTT**

Correspondent Bonnie Waycott became interested in marine life after learning to snorkel on the Sea of Japan coast near her mother's hometown. She specializes in aquaculture and fisheries with a particular focus on Japan, and has a keen interest in Tohoku's aquaculture recovery following the 2011 Great East Japan Earthquake and Tsunami.

Copyright © 2025 Global Seafood Alliance

All rights reserved.