

Stabilizing feed costs in aquaculture with **algae-derived omega-3**

AlgaPrime™ DHA by Corbion: a smarter way
to hedge against fish oil volatility



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Executive summary

Today, aquaculture supplies more than half of the fish consumed globally and is expected to show continued robust growth as a critical source of animal protein.

This growth increases structural dependence on omega-3 fatty acids, which are essential for fish health, performance, and product quality. The traditional source of omega-3 is fish oil and the aquaculture industry consumes approximately 65 - 70 percent of its supplies.

However, fish oil availability and pricing are increasingly volatile due to climate effects and regulatory constraints while the demand for omega-3 is also increasing in industries like petfood and human supplements. Unlike many agricultural commodities, fish oil lacks effective financial hedging mechanisms, leaving feed producers and farmers exposed to supply disruption and cost uncertainty.

Algae-derived omega-3 solutions offer a proven way at scale to complement fish oil and offer an opportunity to diversify omega-3 sourcing

strategies. Produced in controlled, closed fermentation systems and independent of wild fisheries, they enable more predictable access to key raw materials, consistent nutritional quality, and long-term supply agreements from traceable sources. These characteristics allow the aquaculture industry to hedge part of their omega-3 exposure, rather than relying solely on marine-derived fish oil.

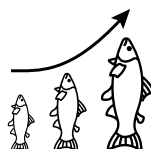
Over the recent years, demand for algae-derived omega-3s showed significant growth. Today they are used at industrial scale and incorporated into millions of tons of aquaculture feed annually. By combining fish oil with algae-based omega-3s, producers can reduce exposure to price volatility, strengthen supply resilience, and improve long-term cost predictability.

As pressure on marine resources continues to increase, diversified omega-3 sourcing is becoming not only a sustainability consideration, but a financial and operational necessity for the aquaculture industry.

Global trends drive demand for Omega-3 and seafood



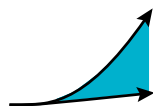
Healthy eating trends drive increasing demand for products with omega-3, often provided by seafood.



The global aquaculture market continues to grow in the coming years, requiring more feed with omega-3 ingredients.



>50% of seafood for human consumption comes from farmed fish and this share continues to grow.



The omega-3 supply gap is widening as demand continues to grow whereas supplies are limited or even stagnant.

Why omega-3 matters in human diets and aquaculture

Numerous scientific studies have demonstrated the health benefits of omega-3 polyunsaturated fatty acids. These nutrients are integral to cell membranes throughout the body and are supported by nine approved health claims of the European Food Safety Authority (EFSA), including benefits related to brain development, blood pressure, eye and heart health and inflammation regulation¹.



Omega-3s are so-called essential nutrients since the human body cannot sufficiently synthesize them and must obtain omega-3s through diet or supplementation. Traditionally, fish has been the main source of omega-3s for human consumption.

In the wild, fish accumulate these nutrients by consuming algae and plankton. These microorganisms sit at the base of the aquatic food chain and are the original producers of omega-3s. Fish, like humans, depend on omega-3s' dietary intake to support normal growth, health and physiological function.

Fish from aquaculture production is an increasingly important source of food and nutrition for human consumption. In aquaculture, fish are commonly fed fish oil or algae-based ingredients to ensure adequate omega-3 levels, supporting both fish performance and fish product nutritional quality. Aquaculture producers currently consume approximately 65-70 percent of global fish oil supply, with salmon farming alone accounts for 55 percent²³.

¹ <https://www.efsa.europa.eu/en/efsajournal/pub/2078>

² <https://thefishsite.com/articles/insights-into-omega-3s-in-aquafeeds>

³ Rabobank, 2025, Hooked on scarcity: navigating aquafeed nutrition amid looming marine ingredient solutions

Supply constraints and market dynamics

While fish oil demand has historically grown by 2-4 percent annually, global fish oil production has remained relatively stable at around one million metric tons per year. Output fluctuates due to climate phenomena such as El Niño, stagnant wild fish catches, and regulatory constraints including fishing quotas. At the same time, rising omega-3 demand in aquaculture and other industries like nutraceuticals, premium petfood and livestock increasingly exceed what marine resources can sustainably supply.

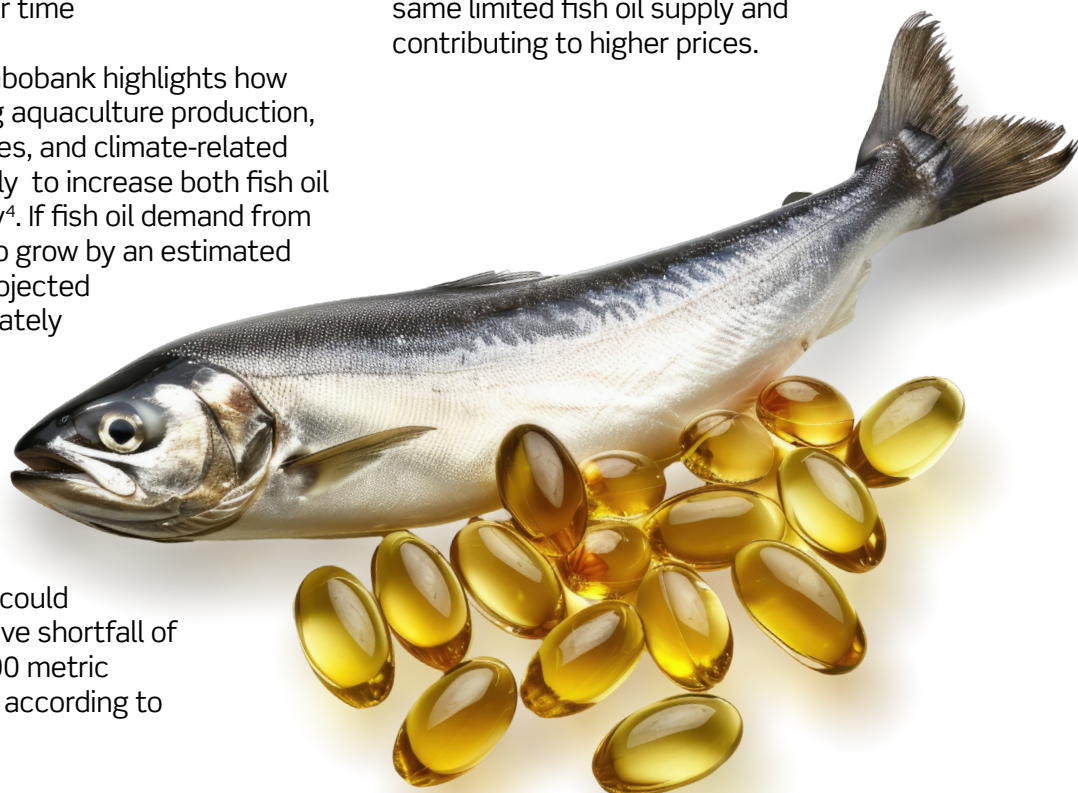
This imbalance between demand and supply has two direct consequences:

- Increasing supply insecurity and risk of shortages
- Structural price volatility, with sustained upward pressure over time

Recent research from Rabobank highlights how the combination of rising aquaculture production, stagnant wild fish catches, and climate-related supply disruptions is likely to increase both fish oil prices and price volatility⁴. If fish oil demand from aquaculture continues to grow by an estimated 2-4 percent annually, projected supply gaps of approximately 20,000-30,000 metric tons per year are expected.

Over time, and assuming current inclusion rates remain broadly unchanged, this could translate into a cumulative shortfall of around 100,000- 200,000 metric tons by the early 2030s, according to Rabobank research.

Competition from other industries further intensifies this pressure. Premium pet food and human omega-3 supplement markets are expanding rapidly, drawing on the same limited fish oil supply and contributing to higher prices.

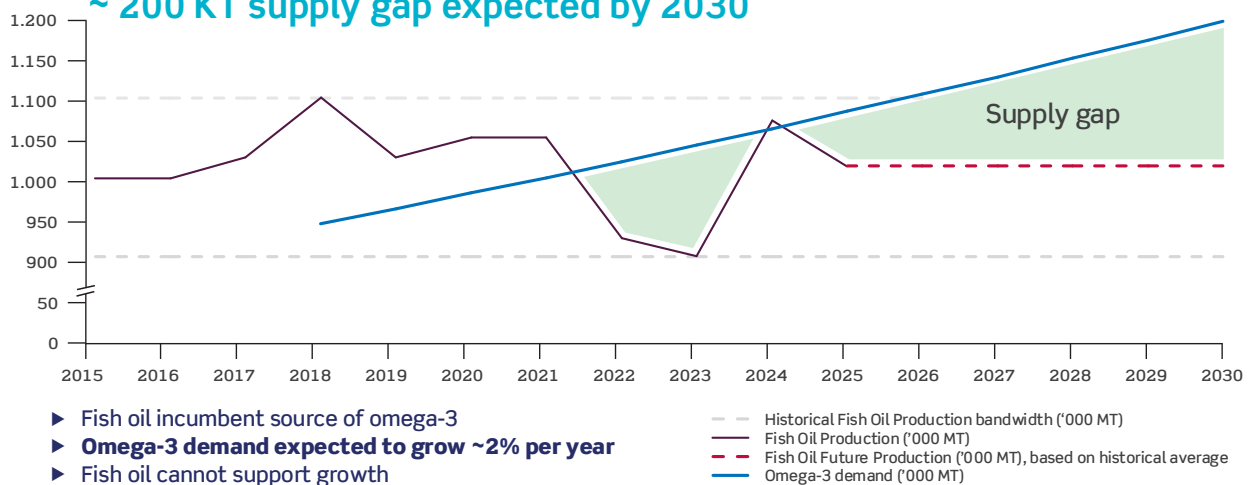


⁴ <https://www.rabobank.com/knowledge/q011497734-hooked-on-scarcity-navigating-aquafeed-nutrition-amid-looming-marine-ingredient-shortages>

A call for action for finance, supply chain and risk leaders

For finance, supply chain, and risk management professionals in animal nutrition businesses where omega-3 is a critical ingredient, active ownership of omega-3 supply risk is essential.

Omega-3 demand outpacing stagnant supply of fish oil: ~ 200 KT supply gap expected by 2030



Unlike commodities such as sugar or grains, fish oil lacks well-established futures markets or financial instruments that allow effective price hedging. Futures contracts typically enable buyers and sellers to lock in prices for future delivery, reducing exposure to volatility.

In the case of fish oil, such mechanisms are largely absent despite its sensitivity to climate effects, seasonal catch limits, regulatory changes, and risks associated with illegal, unreported, and unregulated (IUU) fishing. All these dynamics undermine future supply predictability and reputation.

As a result, securing long-term supply arrangements that include complementary, large-scale, algae-derived omega-3 capacity becomes one of the few viable strategies to diversify supply chains, stabilize input costs and mitigate supply and reputational risks.

The business impact of fish oil price volatility depends on underlying operating models and

value-in-use considerations. In general, fish oil represents a material cost driver in aquaculture feed although inclusion rates vary by species and formulation while the ability to pass higher input costs through the value chain varies across business models too. For salmon farmers that produce their own feed, predictable supplies and stable input costs for omega-3 are critical for business continuity and risk control. In this context, algae-based omega-3 solutions can support long-term supply reliability, cost predictability, and risk reduction.

Recent NOFIMA trials⁵⁶⁷ evaluating microalgae-based omega-3 sources in salmon feed have demonstrated good feed intake, effective nutrient digestion, and growth performance compared to traditional formulations based on fish oil. These findings confirm the technical viability of microalgae-based omega-3 solutions as a complementary source alongside fish oil in salmon diets.

⁵ <https://nofima.com/results/sustainable-feed-with-algae-how-nofima-works/>

⁶ <https://www.aquafeed.co.uk/nofima-tests-microalgae-based-omega-3-in-salmon-feed-with-promising-results/>

⁷ <https://weareaquaculture.com/news/feed/microalgae-to-be-a-sustainable-ingredient-in-salmon-feed>



Corbion plant in Orindiúva, Brazil.

Why Corbion is the omega-3 supply partner of choice

Corbion as a market case for algae-based omega-3 production at scale. Corbion produces omega-3 DHA using microalgae in controlled fermentation systems, avoiding reliance on wild-caught fish and marine ecosystems.

This production model reduces dependence on marine ecosystems and enables a more predictable supply of omega-3 DHA. Corbion operates a highly integrated production setup, with industrial fermentation, offering full traceability and insulation from risks associated with illegal, unreported, and unregulated (IUU) fishing and persistent marine pollutants. From a finance and risk perspective, this supports greater auditability, supply reliability, and input predictability compared to traditional sources.

Today, Corbion's algae based omega-3 solutions are incorporated into more than two million metric tons of aquaculture feed annually. This level

of adoption demonstrates that algae-derived omega-3 has moved beyond pilot use and is deployed at industrial scale, supporting long-term supply commitments.

Continued investment in production capacity by Corbion, supported by a planned expansion program, signals its long-term commitment to support algae-based omega-3 as a structural component of aquaculture feed supply.

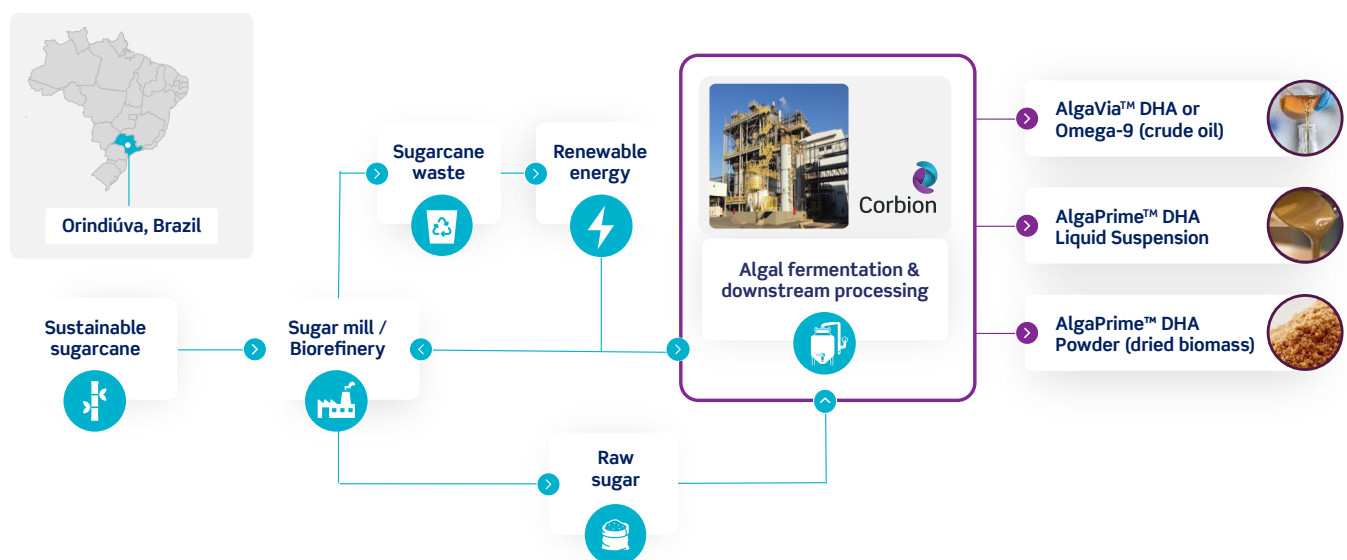
Such investments support continuity of supply and reinforces the role Corbion is committed to take in supporting risk mitigation for the aquaculture industry leading to price stability.

Long-term supply agreements incorporating algae-based omega-3 are already in place across parts of the aquaculture industry. These agreements include pricing structures designed to reduce exposure to fish oil volatility, such as fixed price elements or defined pricing bandwidths. In practice, this allows producers to hedge part of their omega-3 exposure while maintaining competitiveness relative to fish oil markets.

Beyond supply security and pricing stability, algae-based omega-3 solutions can also reduce product-level carbon intensity. ISO-compliant Life Cycle Assessments show that fermentation-based algae omega-3 has a lower carbon footprint than fish oil⁸. While aquaculture is currently

outside formal carbon pricing schemes, lower embedded emissions already support ESG reporting and may become financially relevant as sustainability requirements evolve. In such scenario, early carbon pricing adopters that secured long term supply of algae-based omega-3 create a competitive advantage.

Regulatory frameworks are also evolving. In its “Study to support a Sustainable EU Algae Industry”, the European Commission⁹ outlined potential future measures to accelerate non-fish-derived omega-3 uptake, including indicative inclusion targets of 25% and incentives to reduce dependence on forage fish. While these proposals are not binding, they signal the direction of travel toward more diversified omega-3 sourcing.



About the authors

Author Maurizio Carrus is Finance Leader at Corbion and member of the leadership team that transformed the Algae Ingredients business into a profitable segment. He previously served as Chief Internal Audit and Risk Management and as Finance Business Partner to the Chief Operations Officer. Earlier in his career, he worked for Ernst & Young across multiple countries and is a Dutch Registered Accountant.

Co-author Lucas Jan Wiarda currently acts as Strategic Marketing Director at Corbion. Previously he worked for various companies including DSM and performed leadership roles in marketing, business, finance and risk management.

⁸ <https://www.sciencedirect.com/science/article/pii/S2211926421003131>

⁹ https://cinea.ec.europa.eu/publications/digital-publications/study-support-eu-sustainable-algae-industry_en



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