SOY-BASED INGREDIENTS IN AQUAFEED: ADOPTION AND INNOVATION LANDSCAPE

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PURPOSE OF THE STUDY

The development and use of aquafeed is a significant consideration for aquaculture producers, representing more than half the cost of their production. Feed formulations typically include a combination of protein and energy sources, notably fishmeal and oil (marine sources) as well as alternative proteins such as soybean meal (SBM). SBM has become a critical component of feed mill sustainability strategy as an affordable, environmentally responsible, nutritious alternative to finite marine sources, and several trials in recent years have shown that domestically sourced soy products support strong growth and feed conversion for multiple highly marketed seafood species. The purpose of this analysis is to help guide increased adoption of specially processed, high-quality soy ingredients for aquafeed.

OBJECTIVES

The U.S. aquafeed market was valued at $1.74 billion in 2023 and forecast to reach $2.6 billion by 2029 with the support of expanded use of plant-based ingredients — including U.S.-grown soy. This analysis:

- Examines the current state of aquafeed and the impact of soy inclusion thus far
- Explains why marine sources for aquafeed are unsustainable for the long term
- Outlines the economic and logistical advantages of increased soy inclusion for participants in the aquafeed supply chain

STUDY DESIGN

This analysis combines qualitative insights with quantitative market data to evaluate current dynamics and forecast future trends in the global aquafeed industry.

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Investigative methods used in this report include:

- Secondary research using open-source literature such as peer-reviewed academic journals, industry reports, governmental and related publications, white papers from leading feed manufacturers, and more
- Market data analysis drew on trusted sources such as Research and Markets, Statista, and the World Bank, in addition to company financials and aquaculture trade publications — focus was given to trends related to plant-based feed ingredients, notably soy
- Comparative and trend analysis across key aquaculture-producing regions and commonly farmed species
- A global scope with particular geographical focus on the United States, Norway, China, and Vietnam
- Historical data primarily from 2015-2025 and forecasts from 2023-2030

RESULTS

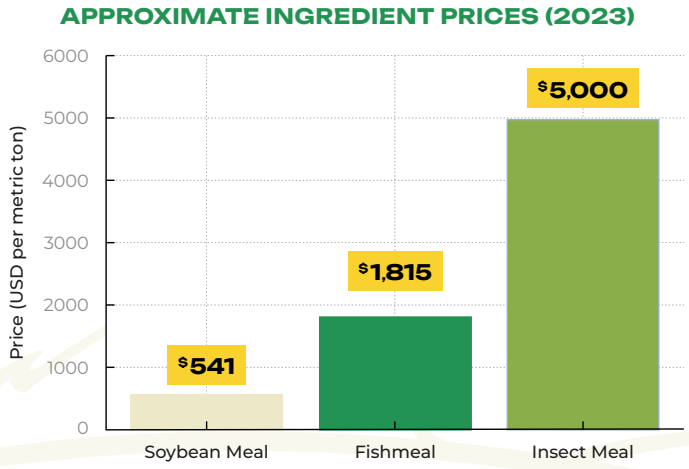
The global aquafeed market is projected to be valued at more than $69 billion by 2026, propelled by increasing seafood consumption, feed technology innovations, and transition toward more sustainable practices. The industry faces pressing challenges, particularly the inability of traditional marine-sourced ingredients to scale with projected growth. Modern salmon feed contains 25% fishmeal and oil, down from 70% four decades ago, with the remaining 75% comprised of ingredients such as soy protein concentrate (SPC) and algae oils.

Soy inclusion in aquafeed offers long-term industry scalability such as renewability, cost stability, traceability, and a lower carbon footprint. Many aquaculture species have demonstrated a tolerance for soy at 50-75% inclusion rates, with proper supplementation of glycine or taurine to offset soy's anti-nutritional factors (ANFs) that are not otherwise mitigated by processing methods (e.g., SPC, enzyme-treated SBM).

Research examples include:

- Tilapia and catfish accept high levels of SBM with no loss of growth performance
- Hybrid striped bass and trout perform well on soy-based diets when supplemented with limiting amino acids
- Atlantic salmon tolerate SPC and fermented soy when properly formulated

The following compares approximate per-ton prices of common protein sources:



OTHER SOY AQUAFEED ADVANTAGES:
High digestibility, a balanced amino acid profile, and compatibility with functional feeds.

For U.S. processors, soy is a consistent and reliable domestic protein supply that also enables them to maintain their sustainability credentials.

Challenges to soy inclusion in aquafeed include ANFs, which can interfere with digestion if not properly mitigated, public-perception association with deforestation (not tied to U.S. production), and difficulties in gaining required approvals for novel soy products and additives from regulatory agencies and certifying organizations.

STRATEGIC INSIGHTS

Adapting more soy-based ingredients into aquafeed formulations offers a critical pathway for U.S. aquaculture to meet future demands in cost, nutrition, and environmental stewardship. **Key recommendations to encourage expanded inclusion include:**

- Expanding proof-of-concept feed trials to include additional market species across diverse production systems
- Enhancing research into mitigating ANFs
- Strengthening education and outreach using case studies, data, and webinars
- Supporting precision aquaculture technologies
- Promoting market-driven soy varieties

BENEFIT FOR SOYBEAN & AQUACULTURE PRODUCERS

Expanded inclusion of U.S. soy in aquafeed would increase profitability for soybean farmers and feed processors, while also supporting sustainability certifications. It would also reduce dependence on dwindling, increasingly expensive marine source ingredients for aquaculture producers and provide a nutritious protein alternative not subject to import regulations or duties.