

Is using insect meal for aquaculture good for the planet?

The salmon-farming industry's ambition to increase production capacity is doomed to failure, as current salmon feeding methods are incompatible with the planetary limits they face.

At present, fishmeal, made from small wild-caught fish such as anchovies (also known as "forage fish"), contributes to the destruction of marine ecosystems. With 92% of fish caught at their maximum biologically sustainable limits or overfished¹, the salmon farming industry's desire to continue producing salmon intensively has led it to experiment with other types of feed. First of all, the industry vegetalized salmon feed, using soy-based vegetable meal in particular. While this has enabled to reduce the intake of ingredients of marine origin, it has also contributed to the transfer of impacts from marine ecosystems to terrestrial ecosystems, via deforestation of the Amazon rainforest

The other option being considered is the use of insect meal, presented by the industry as a more sustainable option. But what is the reality?

To answer this question, we collaborated with [the Observatoire national de l'élevage d'insectes](#) (ONEI), an organization that disseminates scientific knowledge on the challenges and prospects of this sector.

What is the impact of insect meal?

Scientific studies on the use of insect meal [are limited](#) and often conducted on a small scale. Available life-cycle analyses, essential for assessing environmental impact, [vary considerably](#) in their methodologies and come from countries with different contexts, such as Thailand. As a result, the long-term impact of this industry remains [uncertain](#).

A systematic review from 2022, the most comprehensive to date ([Quang Tran et al. 2022](#)), indicates that, with the exception of reduced pressure on forage fish, **insect meal has higher environmental impacts than fish meal**. Insects have a "huge impact" on climate, energy consumption and water use. These effects are mainly due to the production of insect feed and the maintenance of the infrastructure required to rear these animals, often maintained at temperatures of 30°C for optimal growth.

In addition, insect meal is a major contributor to water acidification and eutrophication, due to nutrient pollution. The only potential benefits are reduced pressure on forage fish (compared with fishmeal) and reduced land use (compared with soybean meal).

¹ FAO, The State of World Fisheries and Aquaculture 2022.

Using waste to feed insects?

One of the arguments often put forward by the industry is its ability to recycle waste. In practice, however, the sector's major companies mainly use [agricultural by-products](#) to feed their insects, often [cereal-based](#). The use of waste is limited by logistical, regulatory, sanitary and economic [constraints](#). The industry therefore prefers safe feeds, available in large quantities, similar to those already used in conventional breeding - and which insects could compete with.

Can insects be used to reduce overfishing of forage fish?

At present, insect meal is unlikely to reduce overfishing as long as its price remains [higher](#) than that of conventional ingredients ([€3,500 to €5,000](#) per tonne versus €1,600 for fish meal). Despite technological advances, companies are struggling to develop insect farming on an industrial scale while reducing costs. Ynsect, one of the sector's leaders, [laid off](#) 20% of its staff in 2023 due to the difficulty of being profitable in the animal feed market. Providing products with stable nutritional content is also a challenge. A recent study estimates that **insects will account for only a small share of the animal feed market in the years to come** ([Leipertz et al. 2024](#)).

Uncertain impact on local biodiversity

Researchers have expressed [concern](#) about the impact on biodiversity if farmed insects [accidentally escape](#) into the wild, especially if they are genetically modified or selected. These insects could compete with local species or cause genetic "pollution". Cases have [already been reported](#) of black soldier flies escaping from breeding farms, reproducing with local populations. These environmental concerns are one of the reasons that led the Global Animal Partnership to [exclude insect-based feeds](#) from its animal welfare standards for Atlantic salmon.

Conclusion

Thus, **current research does not allow us to conclude that insect meal is a sustainable alternative to fish meal - on the contrary, its impacts, though different, are in some respects more deleterious on the environment.** A 2022 report concludes that there appears to be no major environmental benefit in preferring insect meal to fish meal ([Bryan Garnier, Faes, 2022](#)).

Sources for the above statements can be found in the following scientific papers, currently available in prepublication, of which a ONEI co-founder is lead author. They cover various themes: [the sector's environmental performance](#), [economic competitiveness](#), [barriers to waste use](#) and [consumer acceptability](#).

To find out more about ONEI and its activities, visit <https://onei-insectes.org>.

