

Finding an alternative to feeding fish fish

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Continuing to feed farmed fish fishmeal could cause a global fish shortage within 20 years.

Scientists at the University are developing a new plant-based product that could replace fishmeal, reducing the need for farmers to feed fish to other fish at a time when more than 90% of EU waters are at risk from overfishing.

It is estimated that in order to satisfy consumer need for [fish](#) in an expanding human population, the UK market would need to increase supplies by more than 1.9 million tonnes by 2035.

Currently farmed fish, such as [salmon](#), are fed food containing fishmeal, which means that several kilograms of [wild fish](#) are consumed to produce one kilogram of farmed fish. This has fuelled concerns that there could be a global shortage of fish in the next 20 years.

To help sustain fish stocks, the aquaculture industry is working towards replacing fishmeal with plant proteins, such as soya. The difficulty with this approach, however, is that many plants contain anti-nutrients that prevent digestive enzymes from working, resulting in poor digestion and failure to absorb important nutrients.

Scientists at the University are now leading a consortium including University of the Highlands and Islands; international feed manufacturer, Skretting; the UK's leading supplier of farmed sea bass, Anglesey Aquaculture; and University of Nottingham based company, Eminate, to resolve this issue by fermenting plant protein sources, which will use 'good bacteria' to predigest food and make nutrients more available for absorption in the gut.

Dr Iain Young, from the University's Institute of Integrative Biology, explains: "Using fishmeal means that you are feeding fish to fish. With the increasing demand for fish, in a [human population](#) that is set to reach just over nine billion in the next 20 years, this approach will continue to deplete fish stocks. Food based on soya and other beans has been tested as a possible replacement for fishmeal, but unfortunately carnivorous fish don't maintain good overall health on a diet of plant protein.

"Studies have shown that fish, such as salmon and sea bass, eat less of the plant protein product and don't grow as fast. Their flesh does not receive the necessary levels of Omega-3 fatty acids, which are a key component of human nutrition. The food also contains anti-nutrients that cause difficulties with digestion and absorption of nutrients, as well as toxins that can build up in the fish."

Solutions to this problem include preheating the plant protein to break down the toxins and anti-nutrients, but this is a costly method to sustain. Fermentation techniques, however, have proved cost-effective in agriculture and other industries and so the Liverpool team aim to exploit

this to replace up to 15% of fishmeal, representing fish sales of approximately £14 million.

Dr Young continued: “Fermentation methods could predigest the toxins and anti-nutrients in [plant protein](#) food, making it easier for the fish to absorb and maintain overall good health. It will help resolve current technical limitations of the product and address the concerns about [overfishing](#) and food shortage in the years to come.”

Provided by University of Liverpool

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