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Responsibility

# Cool stuff: Sea cucumbers can keep fish farms clean, research finds

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By Responsible Seafood Advocate

## University of Stirling says detritivore can flourish by feeding on organic waste

New research led by the University of Stirling's Institute of Aquaculture shows that an Asian seafood delicacy, sea cucumbers, will flourish if fed organic waste on commercial fish farms in the Mediterranean.

Adding sea cucumbers to areas near fish farms, lead researcher Karl Cutajar, Ph.D. said, can reduce the environmental impacts of marine fish farming while providing a high-value extra product for growers. Mediterranean sea cucumbers (*Holothuria poli*) can fetch between €30 per kg (US\$30) dried and €120/kg as a processed product, whereas farmed sea bream sell for around €6 per kg.

"This research shows the feeding connectivity between fish and sea cucumbers under marine commercial fish cages, which means that farming them together in an integrated multi-trophic aquaculture (IMTA) system is viable," said Cutajar. "Our results show that sea cucumbers take up fish farm waste and how this helps the sea cucumber to grow. Something that removes organic waste, which can have a negative impact on the seafloor, whilst being a valuable commercial product, without the need for feed input, is an exciting discovery that presents environmental and economic opportunities."



University of Stirling research finds sea cucumbers can flourish by feeding on organic fish farm waste and subsequently be a high-value product.

In Asia, sea cucumbers are in high demand but supply is short, leading to overfishing in some areas, the institute said. Sea cucumbers also have antibacterial and anticancer properties and are being evaluated for medicinal and pharmaceutical uses. Different varieties of sea cucumbers can grow in colder waters such as those around the UK.

A blue banner for the Responsible Seafood Conference. On the left is a silhouette of the Seattle skyline with the Space Needle. Text reads: 'FAIRMONT OLYMPIC HOTEL', 'OCTOBER 3-6', and a 'REGISTER' button with a mouse cursor. In the center is the 'goal' logo with a fish icon inside the 'o', and 'SEATTLE • 2022' below it. On the right, it says 'THE RESPONSIBLE SEAFOOD CONFERENCE' and 'CONNECT. COLLABORATE. COMMIT.'.

(<https://register.globalseafood.org>).

The research is part of the European Union's Horizon 2020-funded project Tools for Assessment and Planning of Aquaculture Sustainability (TAPAS), carried out with AquaBiotech Group and the University of Palermo. It combined two analytical techniques to prove cucumbers were successfully processing fish waste. Stable isotopes, used to assess diet, showed that the sea cucumbers were using the fish waste as their dominant food source. Fatty acid analysis in sea cucumbers grown near fish cages showed the presence of terrestrial, plant-based ingredients that could only have come from fish feed.

“As the demand for seafood grows, MFF Ltd strongly believes in the need for the development of sustainable aquaculture, possibly through IMTA systems such as this. The application of this technology across Mediterranean aquaculture now seems very possible,” said Angus Sharman, of fish farm MFF Ltd in Malta, where the research took place.



## Sea cucumber project redefining traditional farming in Madagascar

Farming sea cucumbers – known as sea slugs in China – is changing people’s lives, giving rural workers in Madagascar a potential pathway out of poverty.



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“There is increasing interest in IMTA systems in aquaculture, as there is in circular economy systems in other industries, as a way to find sustainable solutions to future challenges in seafood production,” said Prof. Trevor Telfer of the Institute of Aquaculture, who oversaw the research.

**Read the paper** (<https://www.sciencedirect.com/science/article/abs/pii/S0044848621015441?via%3Dihub>). “Culturing the sea cucumber *Holothuria poli* in open-water integrated multi-trophic aquaculture at a coastal Mediterranean fish farm.”

**Read the paper** (<https://www.sciencedirect.com/science/article/pii/S0301479722010842?via%3Dihub>). “Stable isotope and fatty acid analysis reveal the ability of sea cucumbers to use fish farm waste in integrated multi-trophic aquaculture.”

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