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Could 'seawool' – a textile made from mussel waste – be part of the future of sustainable design?

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By Responsible Seafood Advocate

Seastex upcycles mussel waste into 'seawool' – a recyclable, biodegradable textile offering a green alternative to synthetics

Scottish startup Seastex is transforming mussel farming waste into "seawool," a biodegradable, recyclable textile made from mussel byssus – the tough, thread-like fibers mussels use to cling to rocks and ropes. The innovation could offer a potential sustainable alternative to synthetic materials in construction and design.

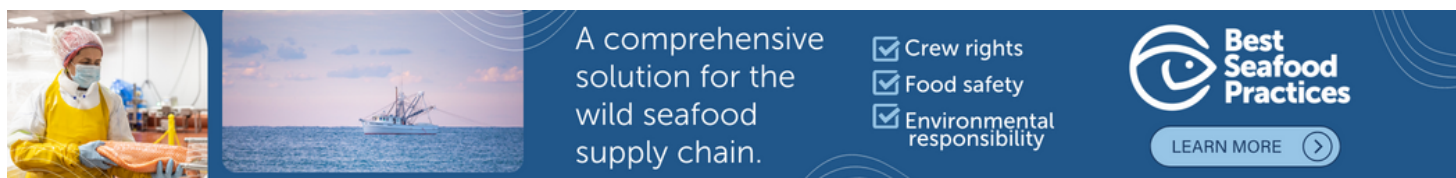

"The idea for Seastex came to me after watching a documentary on mussel farming, where I noticed de-byssing machines cutting off the beards during the cleaning process before the mussels were bagged and sent to stores," said Sander Nevejans, CEO and founder. "Until that point, byssus has never been used as a textile material. However, a similar material, ancient Sea Silk – made from the byssus of the noble pen shell, a type of clam – was once woven into garments for nobility and religious leaders around the Mediterranean over 2,000 years ago."



Scottish startup Seastex is transforming mussel farming waste into “seawool,” a biodegradable, recyclable textile made from mussel byssus. Photo courtesy of Seastex.


After cleaning, the mussel beards are dried and transformed into what Seastex calls “seawool”— a chemical-free, recyclable material that’s lightweight and naturally fire retardant. The company’s first product, an acoustic panel for soundproofing in construction, debuted at the London Design Fair in 2023.

“The plan is to significantly expand the range of applications for our seawool over the next decade, but at the moment, we are particularly interested in acoustic applications for building,” said Nevejans. “Using a bio-based material could help to transform the carbon footprint of insulation compared to the likes of glass wool, rock wool and petroleum-based products, which can also be tricky to work with. Once an interior needs refurbishment, our products can be easily renewed and the material recycled, as no synthetic glues or bonding agents are used in seawool – it can be reused time and time again.”

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Seastex plans to grow from a two-person team to 40 over the next five years from its new base in East Glasgow. Partnering with Scottish cooperatives, it's securing around three tons of mussel byssus each week to fuel production. A prototype line is already in place, and with support from the Industrial Biotechnology Innovation Centre (IBiolC), the company aims to scale up fully by 2026.

"As the Sea Silk industry overseas has all but disappeared – due to overfishing, the decline of seagrass beds and a bacterial outbreak causing a mass die-off of the now endangered noble pen shell," said Nevejans. "The ambition is to collaborate with shellfish producers to reimagine this material for the 21st century, reviving and preserving a part of this ancient craft. Moving to Glasgow is a critical step in our growth plan and brings us closer to the essential supply chain that can ensure access to even more mussel beards to turn into new products."

A record-breaking 10,000 tons of mussels were produced in Scotland in 2023, with estimates suggesting up to a third would have been discarded as waste, often ending up in landfill. Waste products typically include mussels deemed unsuitable for sale due to shape and size, cracked shells, contamination by wastewater, algae, sediment and the inedible byssus threads.

"Increased development and adoption of bio-based materials will be a key part of Scotland and the UK achieving net zero, and Seastex is a great example of a startup making significant progress in that area," said Dr. Liz Fletcher, director of business engagement at IBiolC. "The feedstock used by the business is typically considered waste, but for the construction and textiles sector it could be incredibly valuable for its green credentials. We look forward to supporting Seastex to scale up and see the material used in even more settings."

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