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CAN PLASTIC CORAL HELP US SOLVE THE "MISSING" PLASTIC PROBLEM?

Marine life is at risk from microplastic pollution, but can 3D-printed corals be used to help understand the crisis?

When researchers at the University of Hull's Energy and Environment Institute were doing research into how corals trapped microplastics in the sea, they needed to find a way to create identical coral specimens for their experiment. Could the Aura Innovation Centre help them create a forest of coral?

CASE STUDY: Energy & Environment Institute

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THE CHALLENGE

All at sea

We still don't know where most of the plastic in the ocean ends up.

University of Hull researcher Freija Mendrik is working on a project to look at how coral reefs trap microplastics to try and help solve this mystery – microplastics are defined as plastics smaller than 5mm, so they're very hard to track.

Freija wanted to set up a flume (a laboratory-based artificial channel through which water runs) to mimic the environment of a coral reef to be able to study how microplastics flow through the coral. This emulates how much complex habitats, such as a coral reef, capture and trap microplastics.

It's very difficult to replicate a coral reef – they form complex structures with textured surfaces. Experiments need identical conditions to produce authentic results, and each piece of coral has to be identical so experiments can be set up in exactly the same way multiple times. Trying to grow 'real' coral reefs in an artificial environment was just never going to work, so another solution was needed.

Freija got in touch with the Aura Innovation Centre – was there anything we could do to help her experiment go ahead?

THE SOLUTION

Turning the plastic tide

Ironically, the solution to Freija's plastic pollution study problem involved... plastic!

The Aura Innovation Centre's 3D printers were used to produce 60 identical pieces of red coral. Freija is now using these as a controlled part of her experiment, with complete assurance that each piece of coral is exactly the same.

The plastic used to make the coral is created from recycled bioplastic filament, made from plant-based sources. This rPLA has premium print quality, so it won't have an affect on the experiment by rupturing or shedding, and it reduces environmental impact by being recycled from waste plastic streams.

Once the corals are in place in the flume, microplastics are introduced, and the extent to which the corals trap the particles can then be recorded.

The experiment can be replicated numerous times in this artificial flume, so that there is confidence in the accuracy of the results. Different numbers of coral can then be placed in the flume to simulate different densities of coral reef.

THE RESULT

Are corals part of the plastic pollution puzzle?

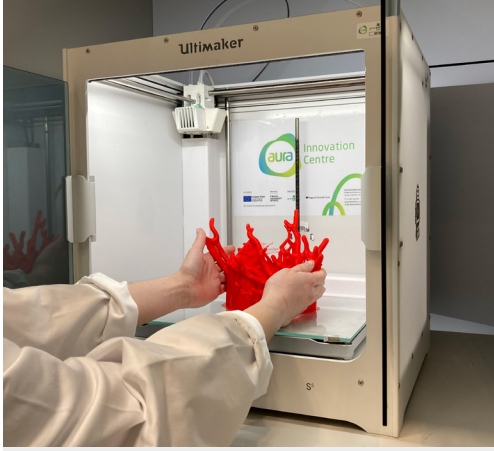
It's estimated that up to 12.7 million metric tons of plastic enter the ocean every year, so plastic pollution is a huge problem.

At the moment, there's little published research on how microplastics move around in rivers and oceans, which makes it difficult for scientists to work out how best to protect our aquatic environments.

Freija's research will mean we can better understand how coral and other aquatic structures can capture microplastics, and therefore where microplastics are ending up in the ocean. This helps us work out ways to better mitigate the problem. Plastic pollution has huge impacts on marine life, and on human health, so tackling it is a global problem, and we need a solution.

Commenting on the project, Freija said: "My research aims to provide vital information on where microplastics are ending up in aquatic environments to help solve the plastic pollution crisis. It's so important that we stop plastic pollution, as it continues to impact ecosystems worldwide.

"I couldn't have done the coral experiments to such a high level without the Aura Innovation Centre, who provided the most incredible lifelike corals to replicate a real reef. I was in awe when they arrived, as they really do look like actual corals!"



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