Plastics are being glued together in the ocean

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Glue-like substances secreted by bacteria are sticking tiny particles of plastic together in the ocean to form larger masses.

As part of the NERC-funded RealRiskNano project, scientists from Heriot-Watt University used natural waters, collected from the Fore-

Shetland Channel and the Firth of Forth, to perform experiments in an attempt to understand the behaviour of nano and microplastics in the marine environment. They found that these tiny particles joined with bacteria, algae and other organic particles within minutes.

Scientists believe this could lead to larger items being mistaken for food by marine mammals. They also fear this could alter the flow of food from the surface to the seafloor, potentially leading to deep sea creatures being starved.

Team member Dr Stephen Summers said:

"This is a first step towards understanding how nanoplastics interact with natural biopolymers throughout the world's oceans. This is very important, as it is at this small scale that much of the world's biogeochemistry occurs.

"We found that the biopolymers envelope or engulf the nanoplastic particles, which caused the plastics to agglomerate into clumps. The nanoplastics, which are 100-200 times smaller than a bacterial cell, were actually incorporated into the agglomerates, which became visible to the naked eye in our lab experiments."

Dr Tony Gutierrez from Heriot-Watt University, who led the study, said:

"The agglomerates form in something similar to marine snow, the shower of organic detritus that carries carbon and nutrients from the surface to the ocean floor and feeds deep-sea ecosystems.

"It will be interesting to understand if nano- and micro-scale plastics of different densities could affect the food flux from the upper to lower reaches of the ocean.

Heavier plastics could drive marine snow to fall at a faster rate to the sea floor, while the opposite could happen with lighter forms of plastics in making it more buoyant and to fall more slowly. In that case, deep-sea ecosystems could become starved of food."

Professor Ted Henry, also from Heriot-Watt University and leader of the NERC RealRiskNano project, said:

"The discovery and characterisation of nano and microplastic agglomerates increases our understanding of how these particles behave within the environment and how they interact with marine organisms. The agglomerates are much more complex than simple pieces of plastic.

"Research like this is beginning to fill the gaps in scientists' knowledge, but we need more evidence in order to prioritise and manage plastic pollution effectively."

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