

## Do microplastics enhance marine trace gas production?



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### Scientific Background

Marine plastic pollution is found throughout the world's oceans and there is great concern about the impact on the marine environment. The potential for microplastics (< 5mm) to cause harm to marine organisms and influence broader-scale biogeochemical processes is not well established. Recent research suggests that marine plastics aid the production of trace gases such as dimethyl sulfide (DMS), increasing their palatability to marine organisms that use chemical cues to locate their prey, e.g. seabirds and fish. This project will significantly increase our understanding of how microplastics affect not only the functioning of marine microbiota but also the formation of climatically-active trace gases, which influence the formation of atmospheric particles and the atmosphere's ability to self-cleanse.

### Research Methodology and Training

In this novel, innovative and exciting project the student will examine the role of plastics on the production of trace gases by marine phytoplankton and bacteria. Gases, including DMS, halocarbons, and volatile organic compounds, will be considered, all of which play important roles in atmospheric chemistry and climate after their release from seawater and transformation in the atmosphere.

The research will primarily be laboratory-based at Plymouth Marine Laboratory, providing access to new chemistry and ultraclean-microplastic facilities, and focusing on single, model phytoplankton and bacteria species, to establish the role of plastics in the formation of trace gases. PML's state-of-the-art Single Cell Genomics facility will be used to screen for diagnostic markers for trace gas biosynthesis genes.

### Key research questions include:

- Does the presence of plastic in the marine environment influence trace gas production?
- Is plastic-associated trace gas production a result of physiological mechanisms associated with microbial biofilm formation?
- What are the implications for marine trace gas production and ultimately, global climate and atmospheric chemistry?

### Person Specification

We seek a student with qualifications in marine or environmental sciences, analytical or general chemistry. Applicants with a numerical/chemistry degree may be eligible for additional 3-6 month stipend for advanced training in marine sciences. The ideal candidate will have an aptitude and enthusiasm for hands-on practical work, problem solving and working with analytical instrumentation.



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