

## Beneficial or Trojan horse; Testing the combined impact of microorganism and bio-essential and toxic elements on Microplastics in marine environment

Microplastics (**MP**), are anthropogenic contribution into the sea, that will function as carriers for bio-essential and toxic metals (**Be&Te**). **MP** is also excellent surface for diverse microorganisms. **MP** can be removed by biofilms produced by microorganism (Yang Liu et al. 2021) or behave like a “Trojan horse” for carrying sorbed toxic metal into organism (Hildebrandt et al. 2021). Whether the interaction between **MP**, **Be&Te** and microorganisms are beneficial or harmful are poorly documented. The mechanisms and functions of these interactions whether they are enhancing removal of **MP**, its decomposition or pose extra risk on other organisms are not know yet.

### Aim:

To evaluate the interactions between **MP**, **Be&Te** and bacterial community and to evaluate the combined impact of these interactions on the potential of removal and degradation of **MP** or increase the harmful effects of **MP** on marine environment

### Method:

We plan a preliminary experiment to test how **MP**, **Be&Te** and bacterial will behave in both oxic and anoxic condition (see Fig.1). Initial **Be&Te** concentrations and their partition between particulate and dissolved phases will be determined before the addition of know **MPs**. Both bio essential (i.e. Fe, Mn) and toxic elements (Pb, Hg, As and others) partitions between particle and water phase will be analysed during the incubation period. Short, medium and long term (5 days, 4 weeks and 3 months) effects can be analysed. Simultaneously E-DNA (environmental DNA) analysis will be conducted to examine the bacterial community structure, and changes in **MP** content and their transformation will be analysed in both oxic and anoxic experimental conditions. Coastal seawater will be used in the experiment. Oxic and anoxic conditions will be prevailed by air and N<sub>2</sub> gas seepage by aquarium pumps if necessary. Oxic and anoxic sediment will be prepared before the experiment start. For preparation of anoxic sediment organic rich sludge can be used. Spectrometric H<sub>2</sub>S analysis will also be performed during the experiment to control anoxic condition.

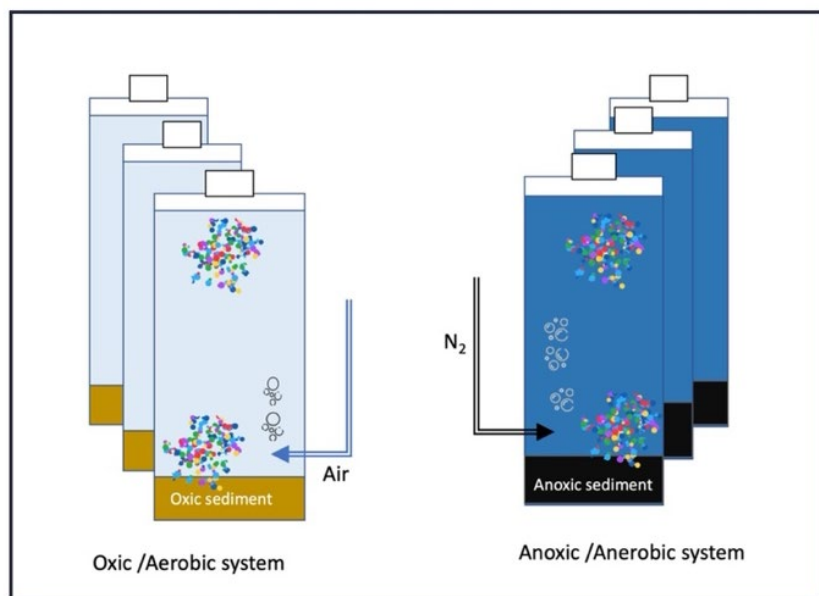


Figure 1: Schematic experimental set up; addition of know **MPs** in experimental containers. There will be three replicates for both oxic and anoxic conditions.