ESAI Best Poster Presentation at Environ 2025.

Exposure to bioplastic leachates impacts growth of freshwater green algae.

Megan Olley[1], Roisin Nash[1], Darragh Doyle[2], Enda Gibney[1]

[1]Marine and Freshwater Research Centre in ATU Galway, Ireland.

[2]Department of Biological and Environmental Sciences, University of Gothenburg, Sweden.

"Bioplastics" are often seen as eco-friendly alternatives to conventional plastics, but do they truly break down harmlessly in nature? In our ongoing study, we investigate how chemicals released as leachate from bio-based or biodegradable plastics, particularly polylactic acid (PLA), affect aquatic ecosystems. By simulating real-world exposure through UV light and heat, we are uncovering the complex interactions between bioplastics and aquatic life.

Over the course of the study we found that PLA leachate (10-day migration) inhibits algal growth, with lower concentrations causing more inhibition than higher ones, possibly due to degradation or transformation of inhibitory compounds. UV exposure alters PLA leachates, initially reducing algal growth before some recovery, suggesting adaptation or compound breakdown. Over the long term (1–6-month migration), the inhibitory effect peaks around five months before declining, indicating a dynamic process of compound release and transformation. Next, we will analyse the chemical composition of the leachates, assess their impact on reproduction and behaviour in other aquatic species, and expand research to other biodegradable plastics like PHB to inform future regulations, production and use.

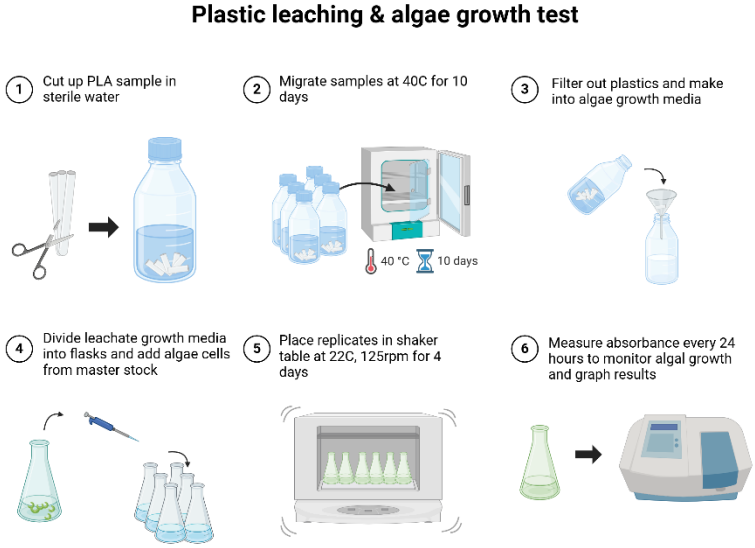

Figure 1. Leachate migration procedure and toxicity testing

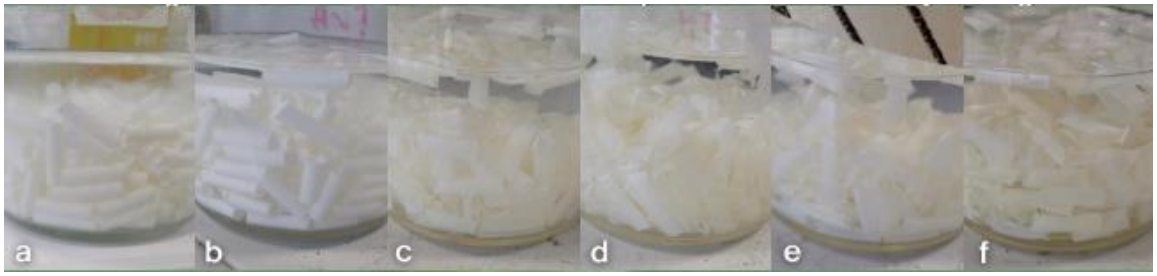

Figure 2 UV treated PLA samples (a: 1 week, b: 2 weeks, c: 3 weeks, d: 4 weeks, e: 5 weeks, f: 6 weeks)

megan.olley@research.atu.ie LinkedIn