
GROWTH RESPONSE OF THE MARINE HETEROTROPHIC DINOFLAGELLATE, OXYRRHIS MARINA, EXPOSED TO BIODEGRADABLE PLASTIC BAG LEACHATES.

Jessy Le Du^{*†1} and Rodrigo Almeda¹

¹University of Las Palmas de Gran Canaria – Calle Juan de Quesada, 35001 Las Palmas de Gran Canaria, Las Palmas, Spain

Abstract

The toxicity of plastic alternatives to marine organisms is not well known. There is increasing evidence that leached plastic additives are the main responsible for microplastic toxicity to plankton and other studies have suggested that alternatives to plastic can not be safer. In this study, we tested the effect of leachates from a micronized biodegradable plastic bag on the growth of the marine heterotrophic dinoflagellate *Oxyrrhis marina*. Heterotrophic dinoflagellates play key roles in marine food webs as major grazers of phytoplankton and as a link for trophic upgrading of food quality. However, little is known about the impact of plastic leachates on this planktonic group. Our experimental design was constituted of closed glass bottles of 33 mL containing 500 cells mL⁻¹ with triplicate of six leachate doses from 0% to 100%. Leachate extract from 1 g of plastic bag L-1 was prepared following four steps: micronization, size fractionation, particle size characterization, lixiviation, and leachate filtration. After a period of incubation of 72 hours, cell concentration and cell size were evaluated. Our results have shown that *O. marina* was sensitive to leachates creating an increase in population growth. The leachate effect could be due to some leached compounds that improve directly the growth of *O. marina* or indirectly by allowing the growth of bacteria that can in turn serve as food for *O. marina*. In conclusion, our results demonstrate leachate solution of micronized biodegradable plastic bag particles is not toxic for the marine heterotrophic protist *O. marina* but can improve their growth. This implies that further research has to be conducted to characterize the mechanisms underlying this phenomenon and also to understand its ecological implication. In the end, these results could be used to improve ocean protection practices and regulations regarding the use of environmentally safer plastic alternatives.

Keywords: Microplastics, leachate, biodegradable plastic bag, Heterotrophic dinoflagellate, plastic alternative

^{*}Speaker

[†]Corresponding author: jessy.ledu@gmail.com