

Impact of microfibers on marine microalgae *Phaeodactylum tricorutum*

Francisco Ríos Ruiz^{1*}, Cristina Tapia Navarro¹, Josefa Nuñez-Olea, Juan Francisco Martínez-Gallegos¹, Mercedes Fernández-Serrano¹

¹Chemical Engineering Department, University de Granada, Faculty of Sciences, Avda. Fuente Nueva, 18071, Granada, España.

*e-mail: rios@ugr.es

1. Introduction

During each wash of textile materials, millions of natural and plastic microfibers (MFs) are discharged in the wastewater due to the wear and friction generated during the washing process on fabrics. The MFs reach the wastewater treatment plants (WWTP) or are directly released in aquatic bodies (rivers, lakes, lagoons, or oceans). Up to 20% of these cannot be captured in WWTP and are likely released directly into aquatic environments¹.

Several studies have remarked the environmental and health impact caused by MFs, which are toxics for some aquatic organisms and persistent in the environment. In this work we study the effects of on synthetic and natural MFs on marine microalgae *Phaeodactylum tricorutum*.

2. Materials and Methods

MFs A: composed by 100% polyester, and MFs B: composed by 100% cotton. Microfibers were obtained by the micro-cutting of Standard fabrics supplied by Center For Test Materials B.V.

Toxicity test to marine microalgae was carried out following the Guideline ISO 10253:2006 in which the specific growth rates and the percentage of growth inhibition were calculated at 24, 48 and 72 hours.

3. Results

Results reveals that the specific growth rate for *Phaeodactylum tricorutum* decreased due to the presence of MFs, and it is more pronounced in case of natural MFs (B) when compared with a control without MFs. In the same way, the percentage of growth inhibition was 12.8% for polyester MFs (A), whereas in case of cotton MFs (B) reached 37.1% after 72 hours.

4. Conclusions

- Microfibers, both synthetic and natural, have a negative effect on the normal growth of marine microalgae *Phaeodactylum tricorutum*.
- Negative effects of cotton MFs on are more pronounced compared with polyester MFs, probably due to the higher adsorption of nutrients onto natural MFs.