






Abstract

# Impact of Microfibers on the Marine Microalgae *Phaeodactylum tricornutum* †

Francisco Ríos , Cristina Tapia-Navarro \* , Josefa Nuñez-Olea , Juan Francisco Martínez-Gallegos   
and Mercedes Fernández-Serrano 

Department of Chemical Engineering, Faculty of Sciences, University of Granada, Avda. Fuentenueva s/n, 18071 Granada, Spain; rios@ugr.es (F.R.); jnolea@ugr.es (J.N.-O.); jfmart@ugr.es (J.F.M.-G.); mferse@ugr.es (M.F.-S.)

\* Correspondence: cristinatapia@correo.ugr.es

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## 1. Introduction

During each wash of textile materials, millions of natural and plastic microfibers (MFs) are discharged into wastewater due to the wear and friction generated on fabrics during the washing process. MFs reach wastewater treatment plants (WWTPs) or are directly released into aquatic bodies (rivers, lakes, lagoons, or oceans). Up to 20% of these MFs cannot be captured in WWTPs and are likely released directly into aquatic environments [1].

Several studies have discussed the environmental and health impacts caused by MFs, which are toxic to some aquatic organisms and persist in the environment. In this work, we study the effects of synthetic and natural MFs on the marine microalgae *Phaeodactylum tricornutum*.

## 2. Materials and Methods

In this study, we used two types of microfibers, namely MF A, composed of 100% polyester, and MF B, composed of 100% cotton. Microfibers were obtained via micro-cutting of standard fabrics supplied by the Center For Test Materials B.V (Vlaardingen, The Netherlands).

A toxicity test was carried out on the marine microalgae following the ISO 10253:2006 Guideline [2,3]. The specific growth rates and the percentages of growth inhibition were calculated at 24, 48, and 72 h.

## 3. Results

The results reveal that the specific growth rate of *Phaeodactylum tricornutum* decreased due to the presence of MFs. This effect was more pronounced in the case of natural MFs (B) when compared with a control without MFs. The percentage of growth inhibition was 12.8% for polyester MFs (A), whereas in the case of cotton MFs (B), it reached 37.1% after 72 h.

## 4. Conclusions

Microfibers, both synthetic and natural, have a negative effect on the normal growth of the marine microalgae *Phaeodactylum tricornutum*.

The negative effects of cotton MFs on microalgae are more pronounced compared with those caused by polyester MFs, probably due to the higher adsorption of nutrients onto natural MFs.



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