

IMPACT OF MICROFIBRES ON MARINE MICROALGAE PHAEODACTYLUM TRICORNUTUM

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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. Up to **20%** of these cannot be captured in WWTP and are likely released directly into aquatic environments. [1]

Several studies have remarked the environmental and health impact caused by MFs, which are toxic for some aquatic organism and persistent in the environment.

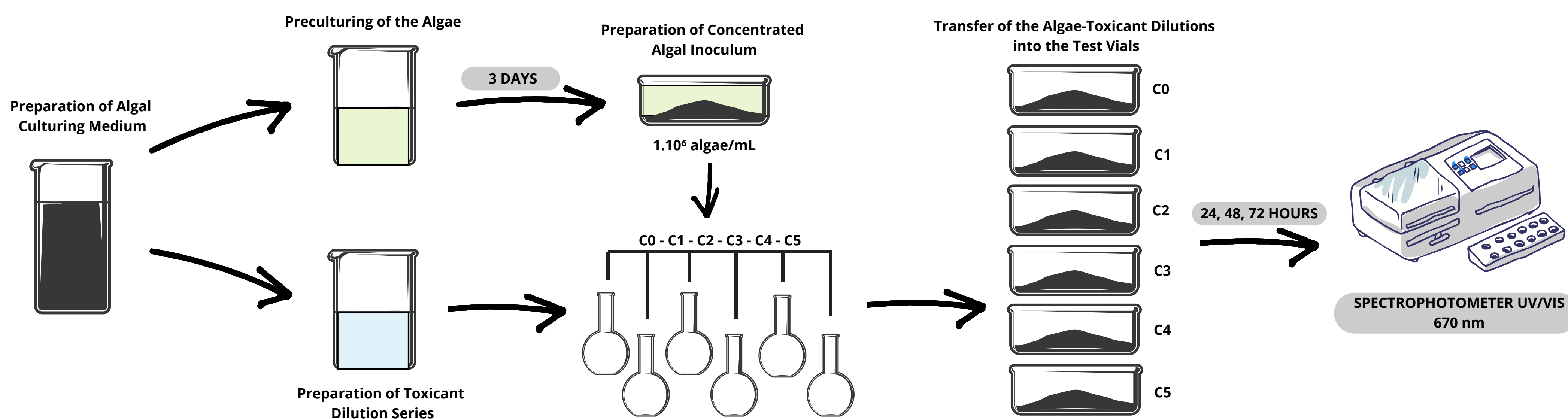
MATERIALS & METHODS

MFs A: Composed by 100% polyester.

MFs B: Composed by 100% cotton.

Microfibers were obtained by the micro-cutting of Standart fabrics supplied by Center For Test Materials B.V. In both cases, the concentration used is 100 mg/L.

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**. [2]



RESULTS

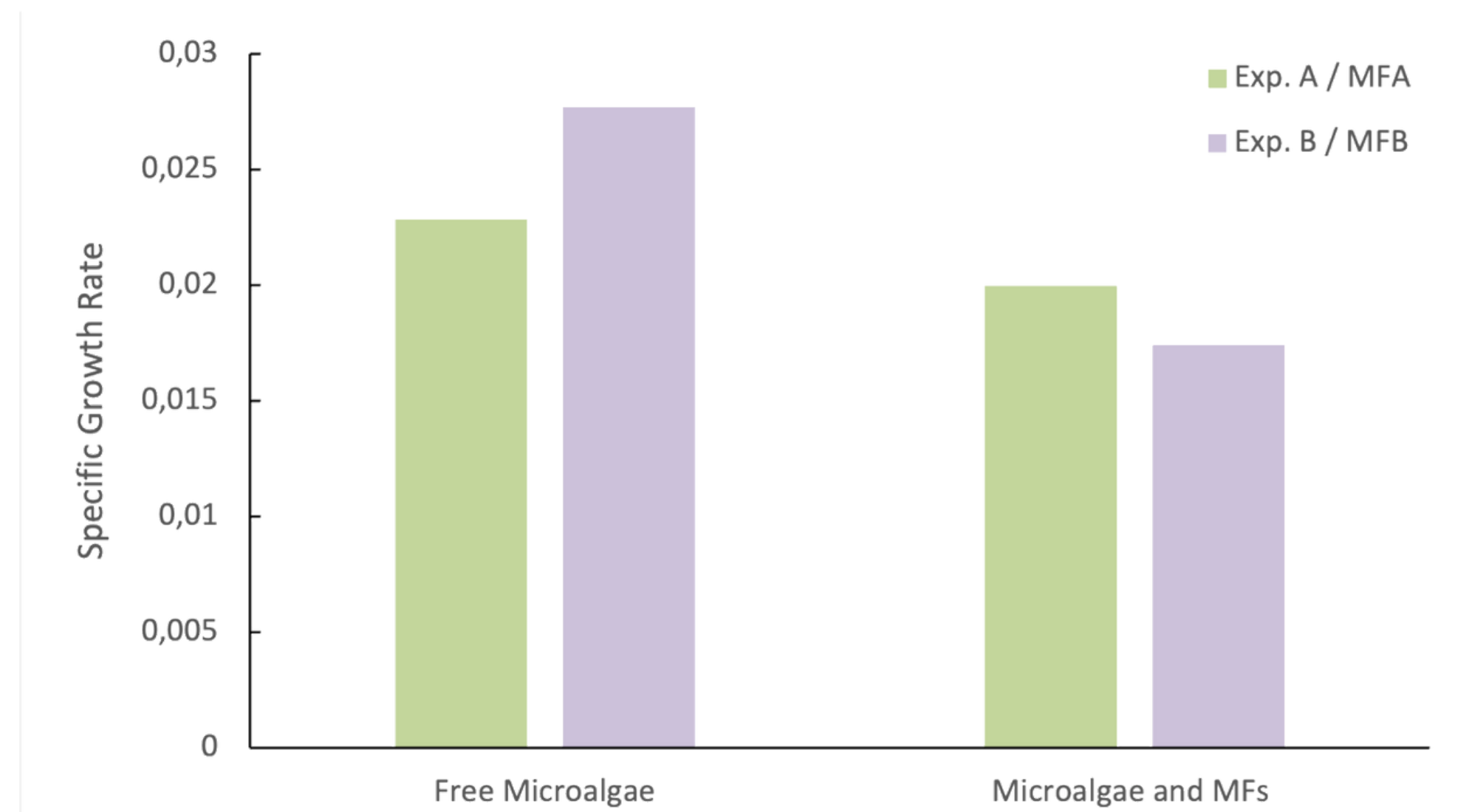


Figure 1. Specific Growth Rate comparative chart between Free Microalgae and Microalgae in contact with MFs.

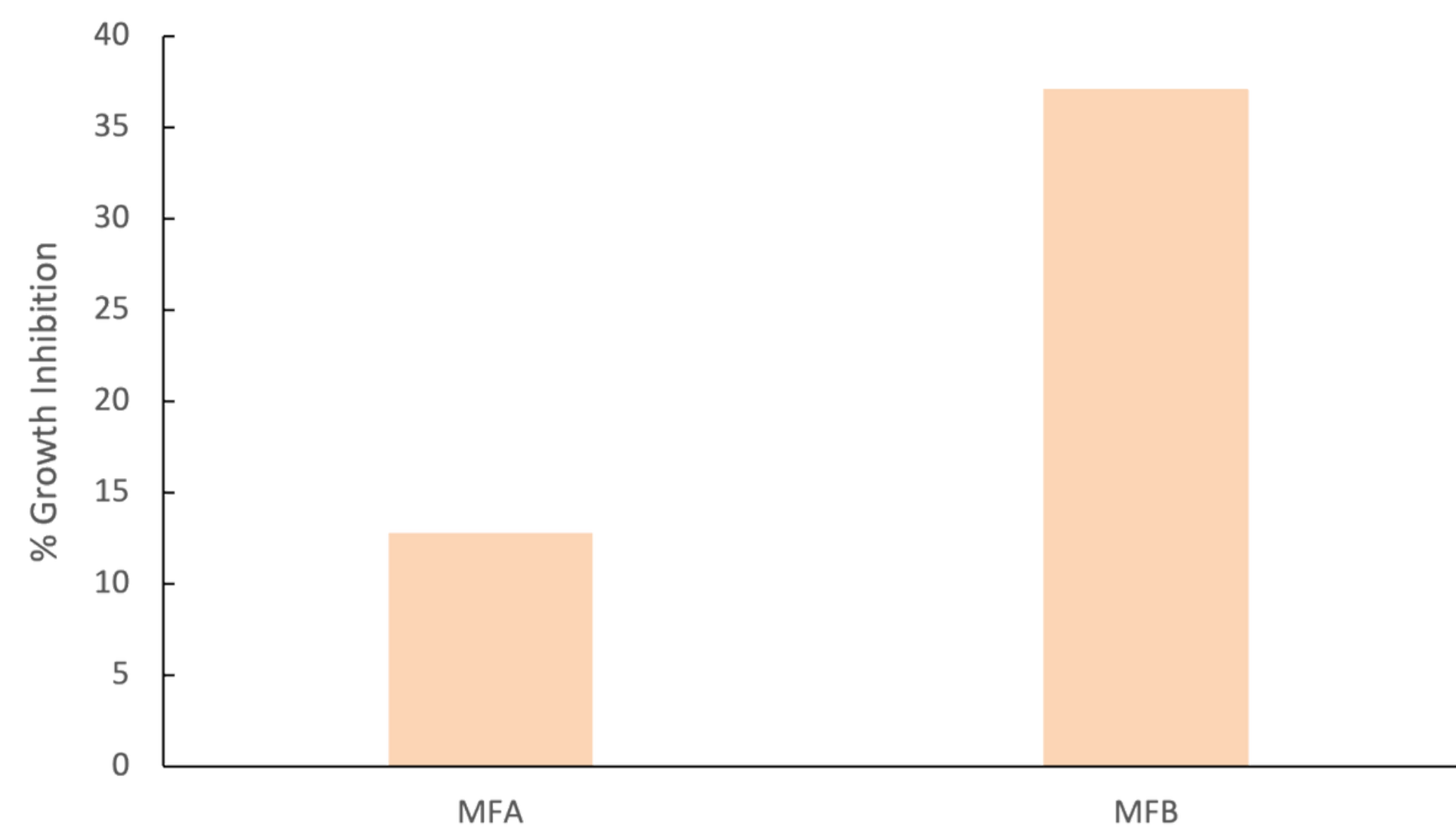


Figure 2. Percentage Growth Inhibition chart of MFA and MFB.

Results reveals that the specific growth rate for *Phaeodactylum tricornutum* 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, after 72 hours, **12,8% for polyester MFs (A) and 37,1% for cotton MFs (B)**.

CONCLUSIONS

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

Negative effects of cotton MFs on are more pronounced compared with polyester MFs, probably due to the higher adsorption of nutrients onto natural MFs.

REFERENCES

- [1] Dos Santos, N.D.O., Busquets, R., Campos, L.C. Insights into the removal of microplastics and microfibres by Advanced Oxidation Processes. (2023) Science of the Total Environment, 861,160665
- [2] ISO 10253:2006; Water Quality. Marine Algal Growth Inhibition Test with *Skeletonema Costatum* and *Phaeodactylum Tricornutum*. International Organization for Standardization: Geneva, Switzerland, 2006.