

*Title:* **Microplastics determination in environmental samples using a fluorescence-based approach.**

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In the last decades, plastic environmental contamination has increased significantly. This phenomenon is especially dangerous when it comes to microplastics due to their small size range. Microplastics are defined as synthetic polymers with an upper size limit of 5 mm. This type of plastic debris produces important environmental damages, especially in the marine environment, where microplastics can be ingested by marine wildlife.

For this reason, the qualitative and quantitative determination of microplastics in environmental samples has become a critical issue. This task has become one of the most important research fields for the scientific community due to the matrices complexity, their small size and their natural degradation under environmental conditions. Therefore, there is an urgent need for the development and the implementation of an analytical methodology that allows to find the microplastics determination in a fast, easy and cost-effective way.

In 2010, A. L. Andrady proposed to perform the determination of microplastics using a fluorescence-based approach. Solvatochromic dyes such as Nile Red, allow microplastics to be grouped by polymer polarity and provides the potential to do primary polymer classification. The main problem for the routine implementation of this method is the relatively high cost of Nile Red. In this project, the development and optimization of an analytical fluorescence-based approach using Nile Red as a dye are analyzed. To test the selectivity and efficiency of this analytical approach, different polymer studies were carried out. Moreover, different low-cost fluorescent dyes like Nile Blue A, Eosin Y and Crystal Violet were also tested. The efficiency of the microplastic determination using the analytical fluorescence-based technique developed with Nile Red and the other analyzed dyes were compared.

**Keywords:** microplastics, marine environmental contamination, fluorescent-based approach, Nile Red, Nile Blue.