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P-105 - FLOW CYTOMETRY FOR THE ASSESSMENT OF MICROBIOLOGICAL CONTAMINATION OF OUTDOOR SCULPTURES

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Background

Urban outdoor public sculptures are some of the most vulnerable cultural objects due to their constant exposure to pollution and changing atmospheric conditions. The physicochemical changes undergone by these cultural objects over time and the variety of microorganisms growing on their surfaces make conservation treatments difficult and lead to the loss of the object's value [1, 2]. An assessment of the microbial contamination and biodeterioration status of outdoor sculptures must firstly be done in order to devise innovative solutions.

Method

In this work, we used flow cytometry as a quick and effective method to determine the total number of microorganisms present in samples collected from a granite sculpture from *Museu Internacional de Escultura Contemporânea de Santo Tirso* (MIEC), in Santo Tirso, Portugal. The samples were collected from five different sites of the sculpture using a swab as a non-invasive method, and suspended in peptone water with 1% Tween 80. A protocol adapted from [3] was chosen to eliminate debris and prepare the samples for analysis in a flow cytometer (BD Biosciences, USA). The samples were analyzed without adding any probes to determine the presence of autofluorescent microorganisms. Cell viability was also determined after addition of thiazole orange (TO) and propidium iodide (PI) (BD™ Cell Viability Kit, BD Biosciences, USA).

Results & Conclusions

Flow cytometry is an efficient technique for the determination of the presence of microorganisms on the surface of outdoor granite sculptures. Autofluorescence was detected when the samples were analyzed without the addition of probes, which could indicate the presence of microalgae and other autofluorescent microorganisms. Cell viability was determined after addition of TO and PI, which demonstrated that the percentage of live cells corresponded to a range of 3% to 37%, depending where the samples were collected from the sculpture. In conclusion, flow cytometry could be used in the future for a rapid quantification of the microorganisms present in stone sculptures and their cell viability, for application in studies concerning microbial contamination and biodegradation in Cultural Heritage.

References & Acknowledgments

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