**DEVELOPING A FLOW CYTOMETRY AND CELL SORTING METHODOLOGY FOR GREEN ALGAE PHOTOBIONTS**

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Flow cytometry coupled with cell sorting (a synonym of fluorescence activated cell sorting, FACS), is a technique which allows the analysis of different morphological and physiological properties of single cells, including unicellular micro-organisms. It has been introduced as a useful tool to study microalgae, in particular *Chlorella vulgaris* due its importance in biotechnological and industrial applications. FACS is indeed an exceptional technology with a remarkably high ceiling, as it allows the detection and measurement of several compounds, parameters, and microorganisms. Since the establishment of flow cytometry, microalgae have been analysed for DNA, protein and chlorophyll content, in addition to cell size and shape. However, so far this technique has not been applied in the study of lichenised microalgae. In this work, we developed a methodology for FACS which allows us to isolate different cell populations from an axenically cultured colony of *Trebouxia* sp. TR9, a common lichen-forming algae, by sorting the cells according to their morphology and autofluorescence. Thus, we have been able to isolate thousands of cells and to observe, by laser scanning confocal microscopy, populations of young and adult vegetative cells as well as zoospores. This method has allowed us to more accurately estimate the relative abundance of cells populations during the development of a *Trebouxia* sp. TR9 colony. Furthermore, we were able to quantify the differences in cell populations abundances and autofluorescence levels in response to abiotic stress.

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