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RNA-FISH for investigating Cultural Heritage Microbiology- Autofluorescence of the materials and fluorophores selection

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The selection of an adequate method for investigating the microorganisms that are deteriorating a work of art is of utmost importance for selecting adequate remediation, inhibition prevention and safeguard strategies. RNA-Fluorescence In Situ Hybridization (RNA-FISH) seems to be a powerful alternative for signalizing the artwork's biodeterioration agents. The technique is based on specific and sensitive fluorescent staining of the target microorganisms. Since the materials commonly used in the production of works of art usually show autofluorescence, for improving the permorfance of the technique it is crucial to minimize/avoid this interference. Thus, investigation of materials autofluorescence and adequate fluorophores' selection is of utmost importance for unequivocal detection/identification of the microorganisms of interest. In this way, this work was focused on: i) the investigation of the autofluorescence of various materials that are found forming part of Cultural Heritage objects (parchment, paper, wood, fabric, rock, mortar and plastic among others) by epifluorescence microscopy using fluorescence filter sets targeted at commonly used fluorophores (TRITC/CY5/6-FAM); ii) the detection of RNA-FISH stained microbial cells on the selected materials or in the presence of residual particles. High orange and green fluorescence were observed for most of the materials tested. The results revealed that the use of red fluorescent dyes, in contrast to green and orange fluorophores, for staining the cells by RNA-FISH allow unequivocal detection/identification of the stained cells in the presence of most of the materials tested. It represents an important step forward in the application of RNA-FISH for detecting/identifying microorganisms causing deterioration in artworks.

Biography

Marina has completed her Master and PhD in Physical Chemistry from the University of Salamanca. She was awarded with the Prize for Excellent Doctoral Thesis. She has published more than 20 papers in peer reviewed journals. Since 2013,she is working as Post-doctoral researcher in the HERCULES laboratory at the Évora University where she is focused on the development of a rapid and accessible tool for analyzing the microorganisms involved in biodeterioration of Cultural Heritage. In 2014 awarded with a Post-doctoral Fellowship and since 2016, PI of the MICROTECH-ART project, both focused on reaching this goal and funded by FCT (Fundação para a Ciencia e a Tecnologia).

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