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Laboratory-Induced Endolithic Growth in Calcarenites: Biodeteriorating Potential Assessment

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Abstract

This study is aimed to assess the formation of photosynthetic biofilms on and within different natural stone materials, and to analyse their biogeophysical and biogeochemical deterioration potential. This was performed by means of artificial colonisation under laboratory conditions during 3 months. Monitoring of microbial development was performed by image analysis and biofilm biomass estimation by chlorophyll extraction technique. Microscopy investigations were carried out to study relationships between microorganisms and the mineral substrata. The model applied in this work corroborated a successful survival strategy inside endolithic microhabitat, using natural phototrophic biofilm cultivation, composed by cyanobacteria and algae, which increased intrinsic porosity by active mineral dissolution. We observed the presence of mineral-like iron derivatives (e.g. maghemite) around the cells and intracellularly and the precipitation of hausmannite, suggesting manganese transformations related to the biomineralisation.

Key-words – biodeteriorating, calcarenites, endolithic growth, biomineralisation.