



Improving the Surface Consolidation of Historical Material Using Calcium-Based Consolidants

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The aim of the work is to improve an advanced consolidation system for cultural heritage materials in order to accelerate the carbonation of the consolidation process. The research represents a step towards a circular economy, as it is expected to increase the sustainability of the historical material thus consolidated and to improve the carbonation of the consolidation process, which will allow a faster restoration process and thus a reduction in restoration costs. Due to the shorter and faster curing process, it has an economic advantage over established methods. The selection of suitable materials and processes is designed to generate as little waste as possible and to have less impact on the environment than conventional processes.¹

Based on the tests conducted, we found that Consolidant Formulation Water (CFW) is the most effective and suitable consolidation agent for heritage consolidation compared to other agents (Calosil in ethanol, Calosil in isopropanol, and Nanorestore). In this study, the effects of consolidation with different consolidants are investigated: one based on calcium acetoacetate (CFW) solution and the other based on alcoholic dispersions of Ca(OH)₂ nanoparticles. Their synergistic effects on the final consolidation result are also investigated in a presented study. Monitoring of carbonation progress using FTIR spectroscopy, X-ray powder diffraction (XRD), electron scanning microscopy (FE-SEM) is presented.

Keywords: consolidation, materials, synergy effect, characterisation

Reference

1. Pondelak, A., Kramar, S., Lesar Kikelj, M., Sever Škapin, A. In-situ study of the consolidation of wall paintings using commercial and newly developed consolidants, *J. Cult. Herit.* **2017**, 28, 1-8. DOI: 10.1016/j.culher.2017.05.014