Conservation of very porous limestone tombs by biomineralisation

Summary

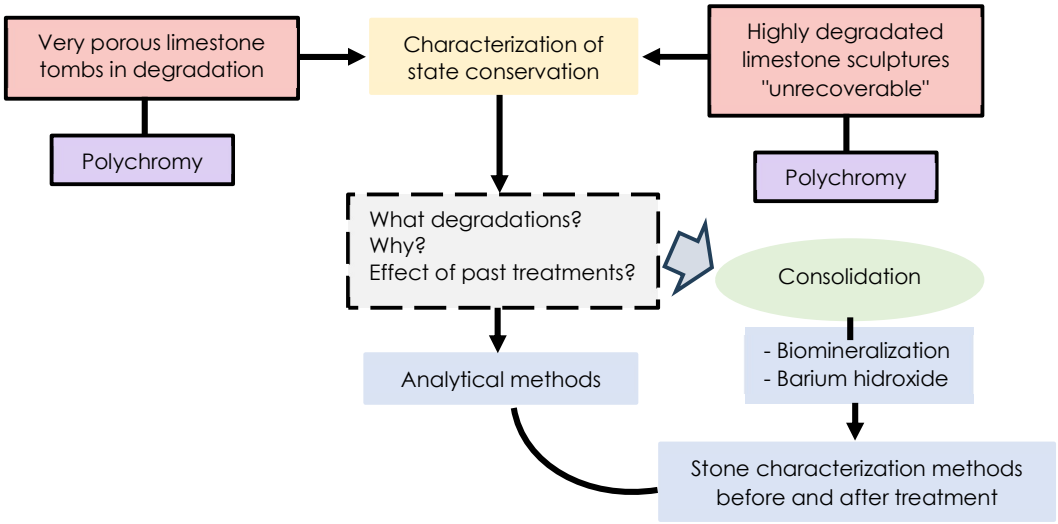
Stone tumularia is part of a rich heritage of Portuguese sculpture. Its sculptural work is of unquestionable quality, and it is associated with some of the most important monuments. A considerable number of reproductions in very porous limestones are known. This type of stone is highly susceptible to degradation phenomena that endanger its preservation. To stop or mitigate these phenomena, different consolidation treatments have been developed and applied. However, most of them do not combine the desired parameters of effectiveness and compatibility, which means that they are not always successful. The consolidation of very porous limestone reveals that there are few practical solutions for its conservation. In recent years, consolidation by biomineralisation of calcium carbonates by carbonatogenic bacteria has been proposed as an innovative method. This treatment follows a scaling up approach, where the consolidation effect is expected to induce some increase in surface resistance, but where it is crucial to keep the degree of incompatibility at a very low level. This dual combination of actions is critical for the consolidation of very porous limestones.

This study aims to analyze limestone tombs from the point of view of conservation and restoration, to characterize the problem of the alteration of very porous limestones, and to discuss the treatment methods that have been applied. Preliminary research will be carried out to select and characterize selected representative tombs and to be used as pilot experiments under real conditions. Highly deteriorated sculptures will also be studied. The focus will be on the application of biomineralisation treatment, including any necessary preliminary preparation steps, followed by the characterization of the situation after treatment and, finally, the analysis and discussion of the results. By way of comparison, the barium hydroxide consolidation method will be used. The tombs were often polychrome, although nowadays the colour is only vestigial or even non-existent. At the same time, the aim is to study the polychromy and characterize its degradation.

Keywords

Very porous limestone, compatibility, biomineralization.

Different tombs in very porous limestones.



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