

Extended Abstract

Natural Products as a Viable Alternative to Control Biodeterioration †

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Biodeterioration can be considered as one of the most powerful weapons that can destroy cultural heritage. Biodeterioration can even attack stone, leather, or other support material, producing irreversible losses. Nowadays, a great concern of the scientists is to develop new potential materials which can be used for restoration/conservation without damaging the support and possess a longer period of treatment. The study of degradation stages when dealing with chemical treatment involves transdisciplinary teams based on archeologists, historians, microbiologists, chemists, engineering, materials scientists, etc. The involvement of natural products as an alternative to classical methods requires knowledge from biotechnology or agronomy in order to obtain increased yields of active compounds with adequate purity or concentration suitable for these innovative treatments. Microorganisms present in the environment (both outside and inside) are a permanent risk factor that can damage monuments and pieces of art, but also various other materials, especially when their growth is favored by environmental conditions. The combination of moisture and nutrients favors the development of microorganisms and the deterioration of monuments over long periods of time.

Knowledge regarding natural products has been developed and nowadays, pure compounds can be used. The perspective of applying these compounds can be associated with a strong push to create, offering low-cost, environmentally responsible, sustainable solutions for controlling biodeterioration. Chemical products such as quaternary ammonium, benzalkonium chloride, and 2-octyl-2H-isothiazol-3-one were used in order to remove antimicrobial loading [1], but due to their composition based on organic carbon and nitrogen in their commercial formulations, families of biodeteriogens that were abundant in the cave (such as *Ochroconis lascauxensis* sp., *Aspergillus* sp., *Trichoderma* sp., *Cladosporium* sp., *Alternaria* sp., *Rhodotorula* sp., *Gymnascella* sp., *Ochroconis* spp., and *Herpotrichiellaceae*) had metabolized the organic additives present in the biocide and black spots appeared [2].

In this context, this review paper summarizes different aspects related to the use of natural compounds as viable recipes for controlling biodeterioration of cultural heritage. The literature review was conducted using different databases (Scopus, Web of Science, ScienceDirect, SpringerLink) using as keywords “natural products”, “biodeterioration”, “cultural heritage”, or

multiple keywords such as “natural products for cultural heritage” and “natural products for biodeterioration” within the envisaged time period (2015–2020).

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