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## Investigation of the Potential of *Opuntia Ficus-Indica* as a Possible New Cleaning and Preservation Agent for Archaeological Cultural Heritage Due to its Anti-Biofilm Effect on Microbiological Corrosion Before and After Microbiological Corrosion Occurrence

C.OZDEMIR<sup>1</sup>, M. BRAILO<sup>2</sup>, M. KOTLAR<sup>4</sup>, and L. SCRANO<sup>3</sup>, L.EMANUELE<sup>4</sup>

- 1 Department of Science, Basilicata University, Italy [cagdaz.ozdemir@unibas.it](mailto:cagdaz.ozdemir@unibas.it)
- 2 Department of Aquaculture, University of Dubrovnik, Croatia [marina.brailo@unidu.hr](mailto:marina.brailo@unidu.hr)
- 3 Department of European and Mediterranean Cultures, Basilicata University, Italy, [laura.scrano@unibas.it](mailto:laura.scrano@unibas.it)
- 4 Department of Art and Restoration, University of Dubrovnik, Croatia, [lemanuel@unidu.hr](mailto:lemanuel@unidu.hr)

**Introduction:** Recently, mechanical and chemical methods are frequently used in the biorestitution and regeneration of metallic archaeological cultural heritage subjected to microbiological corrosion. It is aimed to use plant extracts as *Opuntia Ficus-Indica L.* as a more environmental method for cleaning microbiological corrosion, preventing its recurrence and especially to protect health, of cultural heritage.

**Method:** The anti-biofilm effect of *Opuntia Ficus-Indica L.* on copper, brass and bronze metals against *Pseudomonas Aeruginosa* bacteria was analyzed by colony staining and colony counting method in microscope observation. Positive control: Bacteria, Negative control: Bact.+Antibiotic, Test: Cactus extr.+Bact.

**Results:** *Opuntia Ficus-Indica L.* has shown strong anti-biofilm property. When placed on the metal surface at the same time with the bacteria, it kills the bacteria at the antibiotic level and no biofilm layer is formed. At the end of 72 hours, extract killed 80% of the bacteria in the biofilm layer proving that it is a potential tool for the protection of cultural heritage. The extract did not leave any traces of deforming effect on the surface of the metal materials after 24 hours of incubation.

**Conclusions:** The high potential of *Opuntia Ficus-Indica L.* shows that biorestitution agent and a different natural way of safely passing cultural heritage to future generations. The unique value of extract and our results is that they do not harm nature, the economy, the and most importantly, cultural heritage.

**Keywords:** Antibiofilm, Biorestitution, *Opuntia Ficus-Indica L.* extract, Cultural heritage, Copper materials.

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