

Search of natural alternatives for the development of solid and semi-solid cosmetic formulations

Beatrice De Santes^{1,2}, Francesca Spena^{1,2}, Chiara Maria Giustra¹, Federico Cerri², Marco Giustra¹, Lucia Salvioni¹, Miriam Colombo¹, Davide Prosperi¹, Paolo Galli^{2,3}

E-mail: b.desantes@campus.unimib.it

¹ Department of Biotechnology and Biosciences, University of Milano-Bicocca, Milan, Italy

² Department of Earth and Environmental Science (DISAT), University of Milano-Bicocca, Milan, Italy

³ MaRHE Center (Marine Research and High Education Centre), Magoodhoo Island, Faafu Atoll, Republic of Maldives

Keywords: Sustainability, *Avicennia marina*, *Prosopis cineraria*, Cosmetics, Anti-age, Bioactive molecules

Abstract:

Nowadays, the sustainability topic is gaining increasing interest for several reasons. Above all, the climate emergency that our planet is facing and that brings disastrous consequences, including soil depletion and desertification, deforestation and the decline of available water resources. Clearly, in this scenario an ecological transition involving many sectors is badly needed. Among these, the cosmetics industry requires a long-term vision of sustainability management both for the centrality of “body care” that has received a boost with the advent of the pandemic, and as it consumes many natural resources.

For these reasons, in this work we look for natural alternatives to synthetic molecules for the development of solid and semi-solid cosmetic formulations. *Avicennia marina* is the most dominant mangrove species along the coasts of the Arabian Gulf. This region is characterized by extreme environmental conditions such as high temperatures, salinity and turbidity of the water. These environmental factors affect the production of specific secondary metabolites that the plant needs to cope with the stressful situation. For this reason, *Avicennia marina* could be a good candidate for the search of bioactive molecules with possible applications in the cosmetic field (i.e., antioxidant, anti-wrinkle and photoprotective activity).

To date, specific portions of this plant have been collected and chemically extracted. Preliminary tests have been conducted to screen the potential effects on cell viability and possible antioxidant activity. The next steps will be to investigate the metabolic pathways in which these molecules are involved and the morpho-structural study of the compounds to develop solid and semi-solid formulations as final goal of the project.

In conclusion, *Avicennia marina* represents a novel opportunity for the development of innovative eco-friendly cosmetic products. This sustainable mindset concerns not only the raw materials choice but also the methods used for their realizations. For this purpose, this kind of research, closely linked to green chemistry and to rational use of resources, is needed more than ever at this point of history.