

BioSurfactants from underexplored sources and potential For heavy metal bioremediation (SOFIA)

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Abstract

Biosurfactants (BSs) are natural molecules of increasing interest in different fields (i.e. medical, pharmaceutical, environmental) because they are renewable, *environmentally friendly* with many valuable properties. The research project will focus on the discovery of new biosurfactants from marine bacteria and microalgae, by exploiting the strain collections already available at SZN (Messina and Napoli). Importantly, this BS research will focus on the detection of novel sources for the isolation of new producers, to favor the discovery of new molecular structures. To date, the investigated sources of biosurfactant producers are mainly represented by contaminated river water and sediments. Marine environments offer a multitude of underexplored sources for bioprospecting, as it is widely recognized as a hotspot of biodiversity, which will correspond to an interesting chemodiversity. So, the SOFIA project will explore heavy metal (HM) tolerant bacteria and microalgae and enhance their ability as biosurfactant producers. A screening process on heavy metal tolerant bacteria and microalgae will detect the most promising producers, which will be furtherly taxonomically characterized. The production conditions will be optimized to achieve a final step in a bioreactor to obtain the best cost/yield ratio. The chemical structure and properties of the crude extract will be evaluated. Regarding blue bioprospecting, a biotechnological evaluation on BSs will be carried out, to identify innovative HM bio-removal strategies.

The **intellectual merit** of the proposed activity lies in the aim of bridging some existing gaps in biosurfactant research, and in the expected strong contribution to the development of technologies for bioremediation strategies in marine environment, by coupling biological and chemical expertise.

The expected results will have a **broader impact** in the context of green technologies and blue economy, moving steps towards the potential valorization of new compounds and/or methods for a sustainable commercialization and the patent development. Moreover, the potential outcomes and products could be applied in different research field, as for example for the recovery of environment polluted by contaminants different from heavy metals.