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the pursuit of sustainable practices aligned with the principles of the circular economy, microbial biotransformation of selenite into less harmful selenium species emerges as the most promising strategy. While actinomycetes are recognized as invaluable players in environmental biotechnology, their involvement in selenite biotransformation remains largely unexplored, primarily due to a limited understanding of oxyanion bioprocessing. In this study, *Kitasatospora purpeofusca*, a rare actinomycete isolated from agricultural soil, features a series of striking cell responses when dealing with selenite, including morphological changes, cell membrane alterations, an outburst of oxidative stress, the participation of thiol-based chemistry for selenite processing, and the generation of selenium nanomaterials consequently to selenite transformation. Moreover, findings on a laboratory-evolved strain of *Kitasatospora purpeofusca* that was repeatedly cultured in the presence of high selenite concentrations, highlight significant distinctions from its wild-type counterpart at the genome sequence level. Precisely, the genotypic variant of the *Kitasatospora* strain showcases attenuation of secondary metabolite production, placing paramount importance on selenite transformation. The attributes displayed by this *Kitasatospora* evolved strain position it as an asset in biotechnology.

B51 **Beneficial symbiosis against desertification in Southern Europe: monitoring the mycorrhizal status of key plant species of semiarid agroecosystems**

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< index

Europe is increasingly affected by soil degradation processes that can ultimately lead to desertification. Vulnerability to desertification is most serious in European southern countries where soil erosion, salinisation, loss of soil organic carbon cause declining productivity with significant social, economic, and environmental consequences.

Arbuscular mycorrhizal fungi (AMF) establish mutualistic symbiosis with more than 80% of land plant families with positive effects on plant health, resistance to abiotic stress, access to nutrients and C sequestration from the atmosphere. AMF are pivotal in the functioning of the ecosystems and they can significantly attenuate the effects of climate change. AMF spore density and root colonization are recognized as sensitive indicators of land degradation and restoration.

Within the project LIFE Desert Adapt (LIFE16CCA/IT/000011, www.desert-adapt.it/index.php/it/) we monitored, since 2018, the mycorrhizal status of twenty-one erbaceous and shrub species chosen as representative of different agro-ecosystems in nine sites of three European regions under critical desertification risk in Spain (Extremadura), Portugal (Alentejo) and Italy (Sicily). All the plants were found arbuscular mycorrhizal, including endemic species; some AM symbiosis were reported for the first time. High frequency of colonization (from 81 to 99%) was associated to variable intensity (from 29 to 72%) throughout all sites. Spore density (n. spores 100g soil d.w^{-1}) ranged from 9 to 144 with an evident decline observed in 2022 in respect to 2018. The AM data were processed to highlight correlations with soil chemical-physical parameters, soil biomass, land use and adaptation measures implemented in the sites within the LIFE Desert Adapt Project.