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BOOK OF ABSTRACTS

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BOOK OF ABSTRACTS OF THE 8TH MEETING ON MEDICINAL BIOTECHNOLOGY

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Biotechnological Potential of Macroalgae-associated Actinomycetota

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Actinomycetota are Gram-positive bacteria widely distributed across diverse environments, from terrestrial to marine ecosystems, where they may occur as free-living organisms or in association with other organisms. This phylum is well-known for its remarkable biotechnological potential, with several members producing bioactive compounds such as antimicrobial and anticancer agents. However, macroalgae-associated Actinomycetota remain underexplored despite having a metabolic potential comparable to free-living organisms.

The main objective of this study was to explore the biosynthetic potential of 15 Actinomycetota isolates obtained from two marine macroalgae from the Portuguese coast, *Codium tomentosum* and *Chondrus crispus*, through the analysis of their genomes.

Total DNA was sequenced using Illumina technology and 17 *de novo* genomes were assembled. Phylogenomic analysis identified 5 different genera, *Actinoalloteichus*, *Cellulosimicrobium*, *Kocuria*, *Nocardia* and *Streptomyces*, with 3 putative novel species.

Genome mining, using manually curated antiSMASH data, identified 452 biosynthetic gene clusters (BGCs) across 21 metabolite classes. Among the BGCs identified are antimicrobial and anticancer compounds, siderophores and conserved metabolites. More than 60% of these BGCs have none or low similarity to previously known compounds, which can be an indicator of novelty. Compared with *Streptomyces*, one of the most studied genera, non-*Streptomyces* genera exhibited a higher novelty percentage (ca. 80%).

Additionally, BiG-SCAPE and clinker were used to visualize the data and assess the similarity between BGCs for the same compound in different strains.

Overall, these results confirm that macroalgae-associated Actinomycetota represent a valuable and underexplored source of new species and biosynthetic diversity, supporting further study of this bacterial group.

KEYWORDS: *actinomycetota, novelty; biosynthetic potential*

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