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Prospecting antimicrobial molecules from marine bacteria of Northeastern Brazil

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The search for new molecules to combat multidrug-resistant bacteria of the ESKAPE group is a global priority, as highlighted by the WHO. Natural products, especially those produced by *Streptomyces* species, remain among the most promising sources of new antibiotics. The Brazilian marine environment offers a unique opportunity to accelerate the discovery of innovative antimicrobial agents. In this study, we explored acetate extracts from *Streptomyces* strains (BRA 679, BRA 732, and BRA 720) from the MICROMARIN database, aiming to advance dereplication studies and to understand possible antimicrobial mechanisms of action against *Pseudomonas aeruginosa*, a pathogen with high resistance and biofilm-forming capacity. For this purpose, extracts at a concentration of 10 mg/mL were tested for biofilm formation and biofilm dispersion, as referenced by Monroe et al., 2014. For pyocyanin quantification, the method described by Saha et al., 2023 was applied. The results obtained from these three approaches demonstrated the promising potential of the evaluated extracts, providing a comprehensive view of their effects on bacterial viability as well as on factors related to virulence and infection persistence. The extracts showing the best results (BRA 679 and BRA 732) were further analyzed by MALDI-TOF, where a laser irradiates the sample, causing ionization, and the m/z is calculated from the time of flight. In this analysis, HCCA and DHB matrices were used, forming positive ions $[M+H]^+$, which allowed the identification of biomolecules. For strain BRA 679 (HCCA), characteristic peaks of seco-surugamide B (m/z 974.66) and fungicin C (m/z 711.15) were detected, while for strain BRA 732 (HCCA), surugamide A (m/z 911.62) and O-benzyl-surugamide F (m/z 1247.76) were observed. These compounds have been previously reported in the literature for their antimicrobial, cytotoxic, and antifungal activities. In addition, characteristic peaks of cyclic peptides were observed in both strains, a class well known for their high antimicrobial activity due to diverse mechanisms of action. These findings highlight the potential of this material as a promising source of antimicrobial molecules for addressing infections caused by multidrug-resistant strains.
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