ANTARCTIC Epicoccum dendrobii EXTRACTS AS A PROMISING SOURCE OF ANTIMICROBIAL COMPOUNDS AGAINST CLINICALLY RELEVANT PATHOGENS

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Background: The global rise of microbial resistance and invasive infections has compromised the efficacy of current therapies, highlighting the urgent need for new antimicrobial agents. In this context, the Antarctic marine ecosystem represents a promising yet underexplored source of bioactive metabolites. The intense selective pressures imposed by its extreme environmental conditions may drive the biosynthesis of structurally unique and chemically diverse secondary metabolites with considerable biotechnological potential. Under laboratory conditions, this potential can be explored using the One Strain Many Compounds (OSMAC) approach, which stimulates silent biosynthetic pathways and facilitates the discovery of novel antimicrobial compounds. **Aim:** This study aimed to cultivate endophytic fungi isolated from Antarctic macroalgae, obtain their organic extracts, and evaluate their antibacterial and antifungal activities. **Methods:** Two isolates of *Epicoccum dendrobii* (LMC21028.01 and LMC21034.01) obtained from distinct Antarctic macroalgal hosts were selected for this study. Following the OSMAC strategy, both strains were cultivated in rice medium and potato dextrose broth (PDB) for 14 days, followed by extraction with ethyl acetate and concentration under reduced pressure. Antimicrobial activity was determined by broth microdilution according to CLSI protocols M38-A2 for filamentous fungi, M27-A3 for yeasts, and M100-S33 for bacteria. Antibacterial and antifungal activities were evaluated against the pathogenic microorganisms *Candida auris* CDC 811903, *Candida albicans* ATCC 64548, *Aspergillus flavus* ATCC 204304, *Fusarium keratoplasticum* ATCC 36031, *Aspergillus fumigatus* ATCC 46645, *Escherichia coli* ATCC 25922, *Staphylococcus aureus* ATCC 25923, and *Klebsiella pneumoniae* ATCC 13883. **Results and Discussion:** Extracts obtained from PDB cultures of both *E. dendrobii* isolates exhibited antibacterial activity against *S. aureus* (MIC = 125 µg/mL), whereas all derived extracts showed no activity against Gram-negative bacteria. In contrast, fungal pathogens, particularly yeasts, were more susceptible to the extracts under all cultivation conditions. Rice-derived extracts exhibited the strongest antifungal activity, notably against *C. albicans* (MIC = 7.81 and 1.95 µg/mL for LMC21028.01 and LMC21034.01, respectively) and *C. auris* (MIC = 31.25 and 7.81 µg/mL, respectively). Moreover, the rice extract of LMC21034.01 showed activity against both *A. flavus* and *A. fumigatus* (MIC = 31.25 µg/mL), indicating a broader antifungal spectrum. These findings demonstrate that cultivation conditions strongly modulate the secondary metabolism of *E. dendrobii*, resulting in distinct antimicrobial profiles among isolates under OSMAC conditions. **Conclusion:** Antarctic isolates of *Epicoccum dendrobii* represent promising sources of antimicrobial metabolites, particularly against clinically relevant fungal pathogens. These findings

underscore the value of the OSMAC approach and reinforce the importance of exploring intraspecific variability in natural product discovery.

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