Antimicrobial activities of psychrotrophic and pyschrophillic fungi isolated from arctic soil

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ABSTRACT

Introduction: Compounds from Arctic fungi, a form of microbial natural products, have shown significant potential in pharmacotherapy applications. Prior to pure compound isolation, comprehensive screening for antimicrobial capabilities is essential to identify promising fungal strains. **Objective:** This study aims to detect and evaluate the inhibitory action of psychrotrophic and pyschrophillic fungi isolated from Arctic soil in Svalbard Island, Norway against pathogenic bacteria, including *Staphylococcus aureus, Klebsiella pneumoniae, Escherichia coli, Bacillus subtilis, Salmonella typhimurium* and *Pseudomonas aeruginosa*. **Materials and Method:** Ten pyschrophillic and nine psychrotrophic fungal strains were subjected to a liquid-liquid extraction process to obtain crude extracts. The extracts were then tested using the Kirby-Bauer disk diffusion assay, minimum inhibitory concentration (MIC), and minimum bactericidal concentration (MBC) tests. High-performance liquid chromatography (HPLC) was conducted to establish a metabolite chromatogram of the crude extracts. **Results:** Two out of nine pyschrotrophic fungi, namely isolate D3-1 showed antimicrobial activity against all tested bacteria except *P. aeruginosa*, while isolate E3-2 inhibited only *K. pneumoniae*. At a concentration of 0.05 µg/ml, both strains did not exhibit MIC and MBC values. Three out of ten psychrophilic fungal extracts (B1C1, D2CD22, and D3C1) were able to inhibit the growth of *S. typhimurium*, *E. coli, B. subtilis,* and *S. aureus*. These three extracts were then tested to determine their minimum inhibition concentration (MIC) and minimum bactericidal concentration (MBC). The MIC for B2C2 was 125 µg/ml against *S. aureus,* 250 µg/ml by D2CD22 against *B. subtilis* and *S. aureus*, and for D3C1, the MIC was 500 µg/ml against all tested strains. HPLC analysis revealed the presence of multiple peaks, representing different metabolites. **Conclusion:** This research provides insights into the antimicrobial potential of psychrotrophic and psychrophillic fungi from Arctic soil, highlighting the need for further investigation to identify and isolate specific bioactive compounds.