NOVEL ANTIBACTERIAL SUBSTANCES PRODUCED BY ANTARCTIC FUNGI

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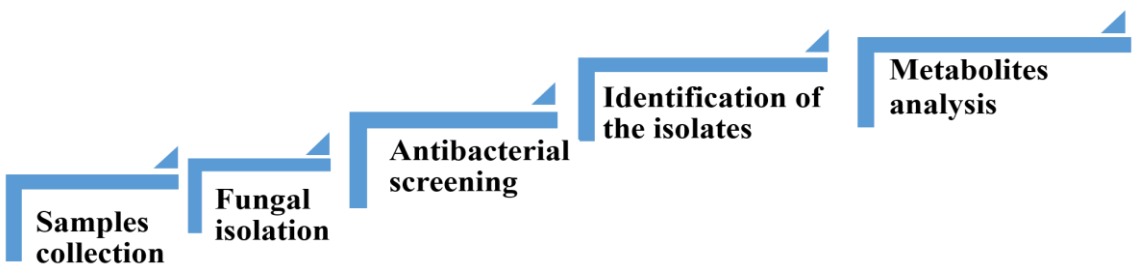
Introduction - Microbial resistance is a major challenge nowadays, increasing the need for new bioactive compounds. Extreme environments and their microorganisms are promising sources of such substances. Antarctic filamentous fungi have unique survival strategies that include producing of novel adaptive metabolites. **The aim of this study is** to investigate the potential of extremophilic filamentous fungi isolated from Antarctic soil samples collected on Livingston Island for the production of antibacterial compounds.

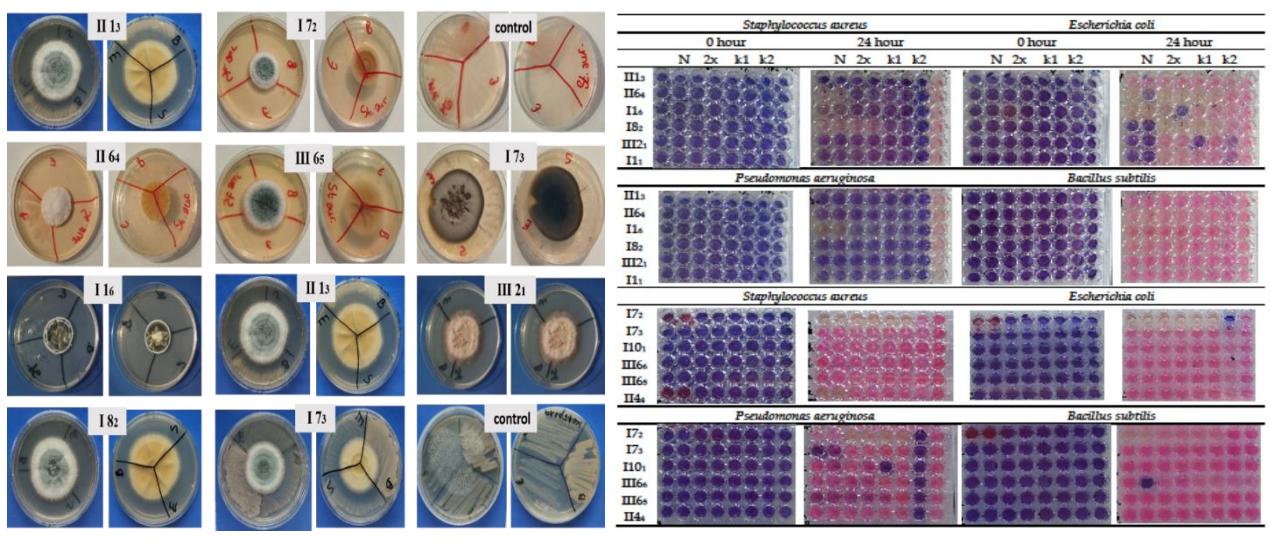
Experimental workflow



Sample collection and fungal isolation

A total of 60 fungal strains were isolated, with mesophilic strains predominating.

Antibacterial activity

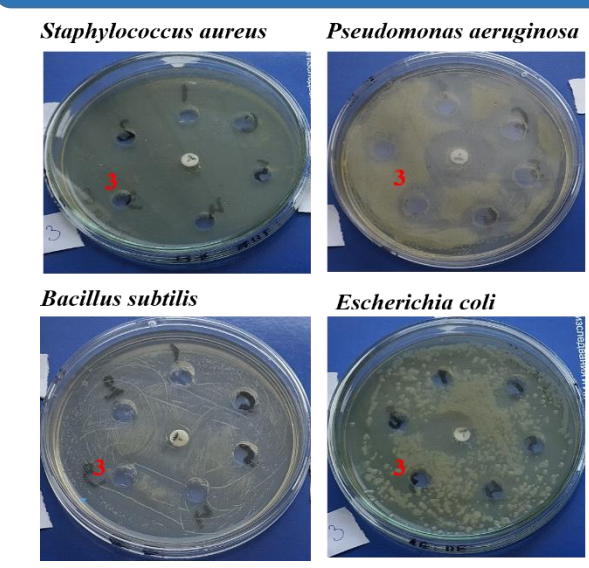


A B

Fig . 1. Antibacterial activity of the selected active strains against E – *E.coli*, B- *B.subtilis*, S – *S. aureus*. **A)** Initial screening **B**) Rezazurin test

75% of the studied strains of Antarctic filamentous fungi produce substances with antimicrobial activity

Metabolite analysis



Fractions
1st 0 – 10 kDa
2nd 10 – 50 kDa
3rd 50 – 100 kDa
4th ≥100 kDa
5th – sediment

Fig.2. Fractional antibacterial activity culture fluid from ***Talaromyces pinophilu***

Antibiotic detection

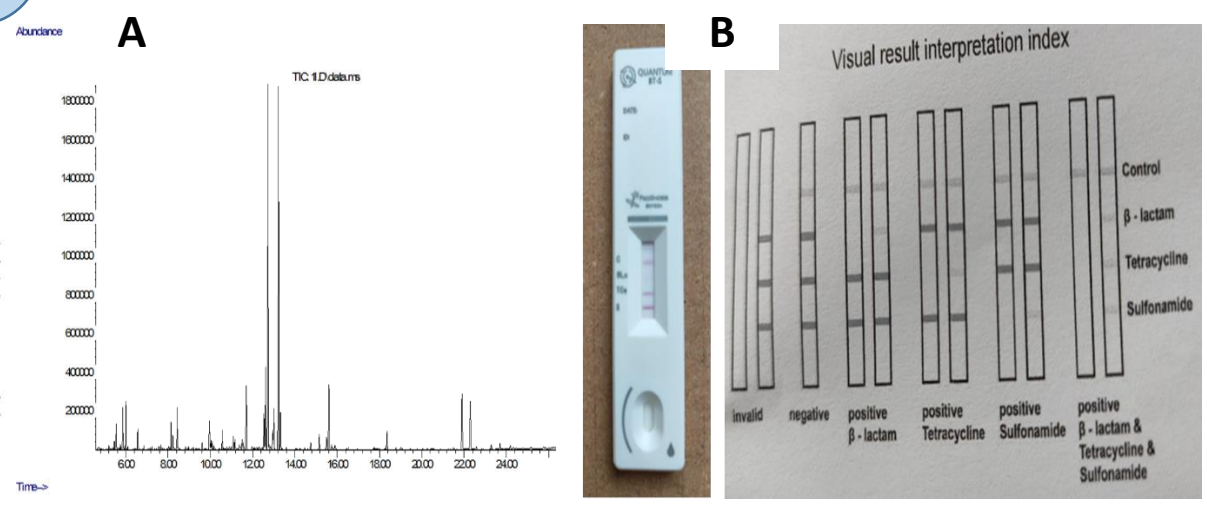


Fig. 3. A - Chromatogram of fraction 1
B - Quantum BT-S quick test

Indicated presence of β-lactam antibiotic

Conclusions

- ***Talaromyces pinophilus* II13** was the most active strain, producing **β-lactam antibiotics** and other antimicrobial compounds.
- **Extremophilic fungi** represent a promising but underexplored resource for discovering new agents to combat antimicrobial resistance.

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