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Exploring the Antimicrobial Potential of Endophytic Fungi from Sweet Flag (*Acorus calamus*): A Promising Source of Novel Therapeutics

Fungal endophytes derived from medicinal plants are valuable sources for the identification of natural products and bioactive compounds with potential uses in the fields of industry, medicine, agriculture, and related sectors. In this study, endophytic fungi were isolated from the medicinal plant *Acorus calamus*. The rhizome of this plant yielded 5 different distinct endophytic fungal isolates. Ethyl acetate crude extracts of the fungal isolates were tested for their antimicrobial activity and MIC against the test pathogenic bacteria *Escherichia coli*, *Staphylococcus aureus*, *Pseudomonas aeruginosa* and *Bacillus subtilis* using disc diffusion assays and microdilution method respectively. Two fungal isolates (ACR-12 and ACR-15) out of the 5 fungal isolates tested showed potential antimicrobial activity against the test pathogenic bacteria. The zone of inhibition of the antibacterial activity test ranged from 2mm to 7mm for ACR-12 and 3 mm to 5 mm for ACR-15. The MIC value of ACR-12 was found to be 3.125 mg/mL and 1.5625 mg/mL against test pathogen *P. aeruginosa* and other test pathogens respectively. The MIC value of ACR-15 against all the test pathogens was found to be 2.125 mg/mL. Additional tests, such as MTT assays to determine potential cytotoxicity and 18s rRNA gene sequencing to identify the isolates, will be performed. Further isolation and identification of these secondary metabolites by using GC-MS will be undertaken in order to identify the particular compound demonstrating antibacterial action. This initiative could result in the identification of novel medicinal molecules.

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