

Anti Staphylococcus aureus and Methicillin Resistant Staphylococcus aureus Action of Thermophilic Fungi Acrophialophora levis IBSD19 and Determination of Its Mode of Action Using Electron Microscopy

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Abstract : Staphylococcus aureus and Methicillin-resistant Staphylococcus aureus (MRSA) remains one of the major causes of healthcare-associated and community-onset infections worldwide. Hence the search for non-toxic natural compounds having antibacterial activity has intensified for future drug development. The exploration of less studied niches of Earth can highly increase the possibility to discover novel bioactive compounds. Therefore, in this study, the cultivable fraction of fungi from the sediments of natural hot springs has been studied to mine potential fungal candidates with antibacterial activity against the human pathogen Staphylococcus aureus and Methicillin-resistant Staphylococcus aureus. We isolated diverse strains of thermophilic fungi from a collection of samples from sediment. Following a standard method, we isolated a promising thermophilic fungus strain IBSD19, identified as Acrophialophora levis, possessing the potential to produce an anti-Staphylococcus aureus agent. The growth conditions were optimized and scaled to fermentation, and its produced extract was subjected to chemical extraction. The ethyl acetate fraction was found to display significant activity against Staphylococcus aureus and MRSA with a minimum inhibitory concentration (MIC) of 0.5 mg/ml and 4 mg/ml, respectively. The cell membrane integrity assay and SEM suggested that the fungal metabolites cause bacteria clustering and further lysis of the cell.

Keywords : antibacterial activity, antioxidant, fungi, Staphylococcus aureus, MRSA, thermophiles

Conference Title : ICBBBN 2021 : International Conference on Blue Biotechnology, Biodiversity and Natural Products

Conference Location : Amsterdam, Netherlands

Conference Dates : May 13-14, 2021