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ANTI-MRSA AND β-LACTAMASE INHIBITION ACTIVITIES FROM LOCAL COMPOST ACTINOMYCETES

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AUTHOR'S DECLARATION

I declare that the work in this thesis was carried out in accordance with the regulations of Universiti Teknologi MARA. It is original and is the results of my own work, unless otherwise indicated or acknowledged as referenced work. This thesis has not been submitted to any other academic institution or non-academic institution for any degree or qualification.

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ABSTRACT

Actinomycetes represents the largest group of prokaryotes and known as one of the largest phyla ubiquitous to both aquatic and terrestrial ecosystems having high G + C content. Actinomycetes reported to produce beneficial secondary metabolites such as an immunosuppressive agent, antitumor agent, vitamins, herbicides and pesticides. They are well known producers of antibiotics and more than 70% of antibiotics are obtained mainly from *Streptomyces*. Unfortunately, the efficacy of these life-saving antibiotics is significantly threatened by the spreading of drug resistance pathogens, making the treatment ineffective and can lead to death. β-lactamase inhibitors have been identified as an emerging potential in overcoming the resistance towards β-lactam antibiotics. The aims of this study are to evaluate the growth ability of actinomycetes isolates on four different types of selective media, to screen the anti-MRSA activity of actinomycetes isolates using resazurin microtiter-based assay, to determine the inhibition properties of extracts towards β–lactamase resistance mechanism and also to identify and characterize isolates with the best inhibitor properties based on 16S rRNA gene sequence. The growth study of 165 isolates demonstrated that the majority of the isolates (80%) grew on ISP 2 due to its nutrient compositions compared to ISP 3 (10.3%) and ISP 7 (9.7%). However, only 85 bioactive compounds were successfully obtained for further anti-MRA and screening for β–lactamase inhibition activity. The three highest yield of the crude obtained were 0.11%, 0.10% and 0.09%. It was found that isolate C2B6 produced the highest percentage of anti-MRSA activity (16.45%) while the highest inhibition percentage obtained was 71.02% extracted from isolate G3C38. From molecular analysis using 16S rRNA, C2B6 was mostly related to *Streptomyces cavournesis* and G3C38 was 99.36% similar to *Streptomyces griseorubens*.

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