

Colloquium on Applied Sciences 2024

19-21 January 2024, Faculty of Applied Sciences, UiTM Shah Alam, Malaysia

Antimicrobial Efficacy of Polyherbal *Moringa oleifera* Leaf Extract (MLE) and *Ganoderma lucidum* Extract (GLE) Against Bacteria

Emilliani Pora Banye^a, Norashirene Mohamad Jamil^{ab*}

Structured Abstract

Background: Antimicrobial resistance has reached an alarming level of health concern due to the limited effectiveness of present antibiotics, poor patient compliance, uncontrolled usage of the agents, and delayed availability of novel antimicrobials. The current antibiotics are less potent to kill or inhibit the antimicrobial resistant bacteria including pathogens which cause fatal diseases. *M. oleifera* and *G. lucidum* have long been studied for its therapeutic properties and have the potential to be used as a natural alternative remedy to eradicate antibiotic resistant bacteria.

Methods: However, there is limited data regarding the antimicrobial activity of polyherbal *M. oleifera* leaf extract (MLE) and *G. lucidum* extract (GLE) prepared using the green extraction method. This study aims to determine the antimicrobial efficiency of polyherbal MLE and GLE using Kirby-Bauer disc diffusion assay and to determine the minimum inhibitory concentration (MIC) and minimum bactericidal concentration (MBC) of the extract mixture against Gram positive and negative bacteria.

Results: The result of antimicrobial assays revealed that the MIC value of bio fermented MLE and GLE was observed at 125 mg/ml against *B. subtilis* and *P. aeruginosa*. While when tested against *S. aureus* and *E. coli*, the MIC value was observed to be higher at 250 mg/ml. Meanwhile, the MIC value of ethanolic MLE and GLE is recorded at 62.5 mg/ml against *B. subtilis* and *P. aeruginosa*, and 125 mg/ml against *S. aureus* and *E. coli*. Overall, the MIC value of the ethanolic extract is lower in comparison to the bio fermented extract. Based on the MBC/MIC ratio, the ethanolic polyherbal extract was determined as bactericidal against *B. subtilis*, *E. coli*, and *P. aeruginosa*. It was also revealed that a direct cell to cell contact is required between the polyherbal extract to exert their inhibitory activity against tested bacteria.

Conclusion: Findings from this study are beneficial in providing initial data on the antimicrobial efficiency of MLE and GLE prepared using microbial fermentation with *B. subtilis*. Hence, the data from this study can be used as a future reference and to enhance our understanding and the potential application of polyherbal MLE and GLE as a natural remedy to eradicate antibiotic resistant bacteria.

Keywords: *Moringa oleifera*, *Ganoderma lucidum*, Polyherbal, Bio fermentation extraction, Antibacterial activity

*Correspondence: norashirene@uitm.edu.my

^a School of Biology, Faculty of Applied Sciences, Universiti Teknologi MARA, Shah Alam, Malaysia

^b Traditional Natural Alternative Holistic (TuAH) Industrial Research, Universiti Teknologi MARA, Shah Alam, Malaysia