

Colloquium on Applied Sciences 2 2024  
8-14 July 2024, Faculty of Applied Sciences, UiTM Shah Alam, Malaysia

## **Antibacterial Activity of *Moringa oleifera* Leaf and *Ganoderma lucidum* Ethanolic Extracts Against Selected Bacteria**

Nasuha Pauzi<sup>a</sup>, Norashirene Mohamad Jamil<sup>ab</sup>

### **Structured Abstract**

**Background:** Antibiotic resistance (AR) refers to the bacteria's ability to survive and multiply despite the presence of antibiotics, diminishing their effectiveness in treating infections. This challenge highlights the need to explore plant and fungi-derived antimicrobials to reduce reliance on synthetic antibiotics and manage AR. Medicinal plants and fungi, rich in bactericidal secondary metabolites, are gaining attention as natural therapeutic agents. *Moringa oleifera* Lam and *Ganoderma lucidum* are known for their antibacterial, antioxidant, and anti-inflammatory properties. This study aims to determine the antibacterial activity of *M. oleifera* leaf and *G. lucidum* ethanolic extracts against Gram-positive and Gram-negative bacteria, which are *Escherichia coli*, *Staphylococcus aureus*, *Pseudomonas aeruginosa*, and *Bacillus subtilis*.

**Methods:** In extract preparation, the study has conducted the ethanolic extraction of *M. oleifera* leaf and *G. lucidum*. The antibacterial activity of both extracts was determined using agar-well diffusion, minimum inhibitory concentrations (MICs), and minimum bactericidal concentrations (MBCs) assays, against the Gram-positive and Gram-negative bacteria.

**Results:** In agar-well diffusion assay, *M.oleifera* leaf extract shows antibacterial activity against Gram-positive bacteria, which are *B. subtilis* and *S. aureus*, with the formation of inhibition zones observed ranging from  $\pm 10.67$  to  $\pm 12.00$  mm and  $\pm 11.00$  to  $\pm 17.67$  mm, respectively. Meanwhile, *G. lucidum* extract shows no antibacterial activity against all the tested bacteria. The MIC value of *M. oleifera* leaf extract was observed at 125 mg/mL against *B. subtilis* and 250 mg/mL against *S. aureus*, *E. coli*, and *P. aeruginosa*. Meanwhile, *G. lucidum* extract shows a higher MIC value of 250 mg/mL against *B. subtilis* and *S. aureus* and 500 mg/mL against *E. coli* and *P. aeruginosa*. Based on the MBC/MIC ratio, it shows that the *M. oleifera* leaf ethanolic extract exhibits a bactericidal effect, while, *G. lucidum* ethanolic extract exhibits a bacteriostatic effect against the tested bacteria.

**Conclusion:** The results obtained in this study is beneficial in providing data regarding the efficacy of *M. oleifera* leaf and *G. lucidum* extract to exhibit antibacterial activity against Gram-positive and Gram-negative bacteria. The findings can promote further research on *M. oleifera* leaf and *G. lucidum* extracts as synthetic antibiotic replacements.

**Keywords:** *Moringa oleifera*, *Ganoderma lucidum*, Antibiotic resistance, Antibacterial activity, Ethanolic extract

\*Correspondence: norashirene@uitm.edu.my

<sup>a</sup> School of Biology, Faculty of Applied Sciences, Universiti Teknologi MARA, Shah Alam, Malaysia