

Antimicrobial Activity of Selected Plant Extracts Against *Pseudomonas aeruginosa* Isolates

Norlisa Syadina Shaiful Azam, Umi Marshida Abd Hamid*

Structured Abstract

Background: The increasing concern over antibiotic resistance, particularly in *Pseudomonas aeruginosa*, has driven the search for alternative therapeutic options derived from natural products. Plant-based compounds are promising due to their bioactive properties and lower risk of resistance development. In this study, *Morus nigra* and *Etlingera elatior* were selected for their traditional medicinal use and potential antibacterial and antibiofilm activities against *P. aeruginosa* strains.

Methods: Plant extracts were obtained via methanolic maceration. The disc diffusion method was used to measure the inhibition zones, while MIC was determined using broth microdilution in serial concentrations (20–160 mg/mL). Biofilm inhibition was evaluated using the crystal violet assay. All tests were performed on clinical isolates of *P. aeruginosa*, including susceptible, ATCC, and MDR strains. Imipenem and gentamicin was used as the positive control.

Results: *M. nigra* showed moderate antibacterial activity across all strains, with clearer zones of inhibition at lower concentrations, likely due to better diffusion through agar. MIC results confirmed *M. nigra*'s stronger antibacterial potential compared to *E. elatior*, which showed little to no activity. The antibiofilm assay further supported this, where *M. nigra* significantly inhibited biofilm formation, especially at lower concentrations (20–40 mg/mL). In contrast, *E. elatior* demonstrated minimal antibiofilm effect and in some cases promoted biofilm proliferation. Both extracts were less effective than the antibiotic control.

Conclusion: The findings suggest that *M. nigra* has potential as a natural antimicrobial and antibiofilm agent against *P. aeruginosa*, although its effects are still inferior to standard antibiotics. On the other hand, *E. elatior* showed limited efficacy, highlighting the need for further investigation and optimization.

Keywords: *Morus nigra*, *Etlingera elatior*, *Pseudomonas aeruginosa*, Antibacterial, Antibiofilm

*Correspondence: marshida@uitm.edu.my

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