

Analysis of Antibacterial Activity of Methanol Extract from *Morus Nigra* Leaves Against *Bacillus Cereus* (Attc 11778), *Klebsiella Pneumoniae* (Attc 10031) and *Staphylococcus Aureus* (Attc 25923)

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Structured Abstract

Background: Antimicrobial resistance (AMR) is a significant global health threat due to the increasing of ineffectiveness of antibiotic against resistant pathogens. *Bacillus cereus* and *Klebsiella pneumoniae* are the bacteria known to develop resistance against commonly used antibiotics such as penicillin and carbapenem. Thereby, natural remedies *Morus nigra* (black mulberry) leaves may seems to have potential benefits due to traditionally used for their medicinal properties and most studies have been reported that it can exhibit antibacterial activity due to the presence of flavonoids, phenolic acids, and anthocyanins. This study aims to evaluate the antibacterial potential of methanol extract form *Morus nigra* leaves against *Bacillus cereus*, *Klebsiella. pneumoniae*, and *Staphylococcus aureus*.

Methods: A total of 200 g of *M. nigra* leaves were extracted using 70% methanol through maceration. The extract obtained from the preparation process was tested for antibacterial activity using concentrations ranging from 3.125 mg/mL to 200 mg/mL by conducting disk diffusion (Kirby-Bauer) method, minimum inhibitory concentration (MIC) test, and minimum bactericidal concentration (MBC). The bacteria tested were *B. cereus*, *K. pneumoniae*, and *S. aureus* which serves as a control bacterium. Gentamicin, and ciprofloxacin were used as standard antibiotics for positive control, and 10% DMSO was used as negative control.

Results: This study showed that across all concentrations tested (3.125 – 200 mg/mL), the methanol extract of *M. nigra* leaves did not exhibit significant antibacterial activity against the tested bacteria. No inhibition zones were observed in the disk diffusion assay. The MIC and MBC values cannot be determined as there was no effect upon the tested bacteria, meaning the tested bacteria are resistant to methanol extract of *M. nigra* leaves. Positive controls showed expected results, confirming the validity of the methods.

Conclusion: In conclusion, the findings of this study indicated that methanol extract of *M. nigra* leaves possess lacks effective antibacterial activity against *B. cereus*, *K. pneumoniae*, and *S. aureus* up to 200 mg/mL. Nevertheless, further research on this topic is strongly recommended to prove and validate these findings, particularly by exploring different extraction solvents, conducting phytochemical analysis, and optimizing extraction parameters.

Keywords: Antimicrobial resistance (AMR), *Morus nigra*, *Bacillus cereus*, *Klebsiella pneumoniae*, *Staphylococcus aureus*.

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