

UNIVERSITI TEKNOLOGI MARA

**ANTIBACTERIAL ACTIVITY AND
TOXICITY ASSAY OF
BIOSYNTHESIZED SILVER
NANOPARTICLES BY NEEM
(*Azadirachta indica*) LEAVES
EXTRACT**

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BSc

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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

Recently, the development of nanotechnology using biological sources has attracted a great deal of attention among scientists since it is safe for human therapeutic uses as well as the environment. Therefore, this study aims to identify and characterize the presence of silver nanoparticles (AgNPs) from *Azadirachta indica* using UV-Visible spectroscopy as well as determine the antibacterial and toxicity activities of biosynthesized AgNPs. The AgNPs was biosynthesized by mixing 10 mL of *A. indica* leaves extract and 6 mL of 1 mM AgNO₃, and heated at 60°C. Then, these AgNPs were characterized by UV-Vis spectroscopy (200 – 1000 nm). For the determination of the antibacterial activity of AgNPs, the Kirby-Bauer disc diffusion technique was used against *Pseudomonas aeruginosa* and *Bacillus subtilis*. The AgNPs biosynthesized from *A. indica* leaves extract also was tested for its toxicity by using the brine shrimp (*Artemia salina* nauplii) as the test organism. Therefore, the result of this study was found that the colour changes from light yellow to dark brown indicated the formation of AgNPs after 20 minutes and the UV-Vis spectrum displayed the highest peak was in the range of 420 – 450 nm. For the antibacterial activity of AgNPs at 1000 µg/mL, the highest zone of inhibition exhibited by *P. aeruginosa* and *B. subtilis* was 12.67 mm and 12.33 mm diameter, respectively. The LC₅₀ value of brine shrimp lethality assay for AgNPs was 5223.22 µg/mL revealed that the biosynthesized AgNPs were non-toxic as the LC₅₀ was above 1000 µg/mL, based on Meyer's toxicity index. Overall, *A. indica* leaves extract can be used efficiently as an alternative for the production of potential antibacterial and non-toxicity of AgNPs.

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