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**CHARACTERIZATION OF PEG-CARBON NANOTUBES FOR SLOW-RELEASE
AMOXICILLIN DELIVERY AND ANTIBACTERIAL PERFORMANCE**

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**CHARACTERIZATION OF PEG-CARBON NANOTUBES FOR SLOW-RELEASE
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NUR AMIRAH BINTI MOHD RUSLI

**Final Year Project Report Submitted in
Partial Fulfilment of the Requirements for the
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in the Faculty of Applied Sciences
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ABSTRACT

CHARACTERIZATION OF PEG-CARBON NANOTUBES FOR SLOW-RELEASE AMOXICILLIN DELIVERY AND ANTIBACTERIAL PERFORMANCE

Antibiotic resistance rises a major worldwide health issue that leads to an immediate demand for better drug delivery methods to enhances the effectiveness of existing antibiotics. Carbon nanotubes (CNTs) have garnered significant attention as nanocarriers due to their large surface area and ability to load drugs. However, because of their tendency to aggregate in aqueous solution making it limited to use in the biomedical application. To address this limitation, the CNTs were functionalized with polyethylene glycol (PEG) to improve their dispersion and suitability as a drug delivery system for amoxicillin. PEG-functionalized carbon nanotubes (PEG-CNTs) were prepared and infused with amoxicillin to create PEG-CNT-AMX nanocomposites. Fourier Transform Infrared (FTIR) spectroscopy was used to confirm the successful functionalization of CNTs with PEG and the incorporation of amoxicillin. The antibacterial activity of the PEG-CNT-AMX was evaluated against *Staphylococcus aureus* (S.aureus) and compared with free amoxicillin. The results show that PEG functionalization improved the compatibility of CNTs and enables effective amoxicillin loading. The PEG-CNT-AMX also demonstrated antibacterial properties against S.aureus, indicating its potential as a nanocarrier for antibacterial drug delivery. Although detailed drug release and quantitative antibacterial analyses were not conducted, the findings suggest that PEG-functionalized CNTs are a promising platform for future controlled antibiotic delivery applications.

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