

**BIOSYNTHESIZED SILVER NANOPARTICLES (AgNPs)  
FROM AGRO WASTE *MANGIFERA INDICA* (MANGO) PEEL  
AQUEOUS EXTRACT REINFORCED INTO POTATO PEEL-  
STARCH BASED BIOFILM IN GREEN ACTIVE PACKAGING.**

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This Final Year Project Report entitled “ **Biosynthesized Silver Nanoparticles (AgNPs) From Agro Waste *Mangifera Indica* (Mango) Peel Aqueous Extract Reinforced into Potato Peel-Starch Based Biofilm in Green Active Packaging** ” was submitted by Dhanisya Arisya Binti Norrazlan in partial fulfilment of the requirements for the Degree of Bachelor of Science (Hons.) Applied Chemistry, in the Faculty of Applied Sciences, and was approved by

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## ABSTRACT

### **BIOSYNTHESIZED SILVER NANOPARTICLES (AgNPs) FROM AGRO WASTE *MANGIFERA INDICA* (MANGO) PEEL AQUEOUS EXTRACT REINFORCED INTO POTATO PEEL-STARCH BASED BIOFILM IN GREEN ACTIVE PACKAGING.**

The growing demand for environmentally friendly food packaging materials emphasises the need for alternate techniques of producing silver nanoparticles (AgNPs) that do not rely on harmful chemicals. This research investigates the green synthesis of AgNPs utilising *Mangifera Indica* (mango) peel aqueous extract as a natural reducing agent, as well as their incorporation into Potato peel-starch based biofilms formed from potato peels for food packaging purposes. The goals of the study were to characterize the biosynthesised AgNPs using UV-Vis Spectroscopy, FTIR, and SEM, and to assess their antibacterial activity and also sensory evaluation of the fruit. The biosynthesized AgNPs exhibited a surface plasmon resonance peak at 427.4 nm, which FTIR results confirmed the presence of reducing agents in the mango peel extract. Furthermore, SEM exhibited spherical AgNPs with little aggregation. Antimicrobial testing revealed notable inhibition zones against *Escherichia coli* (18 mm) and *Staphylococcus aureus* (16 mm). The biofilm's moisture barrier qualities were enhanced when 1% AgNPs were added, which resulted in a 43% decrease in the Water Vapour Transmission Rate (WVTR). Based on sensory examination, the AgNPs/Potato peel-starch based biofilm preserved the fruit's texture and freshness without changing its flavour or odour. To sum up, this study shows that AgNPs from mango peels may be successfully added to starch-based biofilms, offering an environmentally friendly active food packaging approach that improves food safety and shelf life.

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