

UNIVERSITI TEKNOLOGI MARA

**OPTIMIZATION OF GREEN
SYNTHESIZED SILVER
NANOPARTICLES FROM
Ananas comosus PEEL EXTRACT
AND ITS ANTIOXIDANT
ACTIVITY**

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of the requirements for the degree of
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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

At present, biosynthesis approach by using waste materials from food is widely used as it is proven to be environmentally friendly and cost friendly to prepare metallic nanoparticles. This current study aims to synthesize, optimize as well as characterize the biosynthesized silver nanoparticles (AgNPs) and identify their antioxidant activities using the outer peel extracts of the pineapple (*Ananas comosus*), which is a food waste material. The optimization of different temperature (70°C, 80°C and 90°C) as well as different pH (pH 7, pH 8 and pH 9) was done. All the synthesized and optimized AgNPs samples were characterized by UV-Visible Spectroscopy (200 and 800 nm). The antioxidant activities of the AgNPs were identified using free radical scavenging ability on 2,2-diphenyl-2-picrylhydrazyl (DPPH) and total phenolic content (TPC). The outcome of this study showed colour changes from colourless to reddish dark brown that indicate the formation of AgNPs. Treatment at pH 9 and temperature of 90°C showed the optimum treatment as both changes colour to dark brown faster after 24 hours of incubation compared to other treatments. The results were found that at pH 9, the surface plasmon resonance peak for biosynthesized AgNPs was at 425 nm on Day 2 while other treatment took longer time to exhibit the peak. Biosynthesized AgNPs treated at temperature 90°C showed the optimum temperature when it exhibited peak at 420 nm on Day 3. The biosynthesized of AgNPs from pineapple peel extracts exhibited potential antioxidant activity in the DPPH scavenging and the TPC assay. The highest DPPH scavenging percentage is at 84.75% for AgNPs treated at pH 9 and 80.29 % for AgNPs treated at 90°C with concentration of 1000 µg/mL. Meanwhile AgNPs showed second highest phenolic content when compared to pineapple peel extracts alone which are at 338 µg GAE/g for pH 9 and 318 µg GAE/g for temperature of 90°C. Thus, the best treatment to synthesis and exhibit antioxidant potential of AgNPs from pineapple peel extract was at pH 9.

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