GREEN SYNTHESIS OF SILVER NANOPARTICLES USING SENDUDUK (*Melastoma malabathricum*) LEAVES EXTRACT: CHARACTERIZATION AND ANTIBACTERIAL ACTIVITY

AIMAN HAYATI BINTI ABDULLAH

BACHELOR OF SCIENCE (Hons.) BIOLOGY
FACULTY OF APPLIED SCIENCES
UNIVERSITI TEKNOLOGI MARA

JULY 2022

GREEN SYNTHESIS OF SILVER NANOPARTICLES USING SENDUDUK (*Melastoma malabathricum*) LEAVES EXTRACT: CHARACTERIZATION AND ANTIBACTERIAL ACTIVITY

AIMAN HAYATI BINTI ABDULLAH

Final Year Project Report Submitted in
Partial Fulfillment of the Requirements for the
Degree of Bachelor of Science (Hons.) Biology
in the Faculty of Applied Sciences
Universiti Teknologi MARA

JULY 2022

This Final year project report entitle **"GREEN SYNTHESIS OF SILVER NANOPARTICLES USING SENDUDUK (*Melastoma malabathricum*) LEAVES EXTRACT: CHARACTERIZATION AND ANTIBACTERIAL ACTIVITY"** was submitted by Aiman Hayati Binti Abdullah, in partial fulfillment of the requirements for the Degree of Bachelor of Sciences (Hons.) Biology, in the Faculty of Applied Science and was approved by

Dr. Nur Maisarah Binti Sarizan
Supervisor
B. Sc. (Hons.) Biology
Faculty of Applied Science
Universiti Teknologi MARA
02600 Arau
Perlis

En. Muhammad Syukri Bin Noor Azman
Project Coordinator
B.Sc. (Hons.) Biology
Faculty of Applied Sciences
Universiti Teknologi MARA
02600 Arau
Perlis

Pn. Zalina Binti Zainal Abidin
Coordinator Programme
B.Sc. (Hons.) Physics
Faculty of Applied Sciences
Universiti Teknologi MARA
02600 Arau
Perlis

Date: July 2022

ABSTRACT

GREEN SYNTHESIS OF SILVER NANOPARTICLES USING SENDUDUK (*Melastoma malabathricum*) LEAVES EXTRACT: CHARACTERIZATION AND ANTIBACTERIAL ACTIVITY

The production of nanoparticles using chemicals is extremely expensive and harmful to the environment. Thus, green synthesis of silver nanoparticles (AgNPs) is an appealing technique due to their environmentally friendly, non-toxic, and inexpensive method. In this study, green synthesis of AgNPs was attempted using senduduk (*Melastoma malabathricum*) leaves extract. Besides that, characterization of *M. malabathricum*-AgNPs was performed using UV-visible spectrophotometer (UV-Vis), Fourier-Transform Infrared spectroscopy (FTIR), Scanning Electron Microscopy (SEM) and their antibacterial activities were determined. UV–Vis absorption spectrum was observed at 421 nm and the FTIR spectra confirms the existence of various functional groups whereby the *M. malabathricum* leaves extract reacting as the reducing and stabilizing agent during the AgNPs biosynthesis process. The SEM confirmed the spherical shape of the AgNPs that are present in a nanoscale size. The antibacterial activity of the synthesized AgNPs at different concentrations (50%, 75% and 100%) showed that *M. malabathricum*-AgNPs had significant antibacterial activity at 100% concentration against *Bacillus licheniformis* (Gram positive bacteria) with inhibition zone of 12.3 ± 1.5 mm and *Escherichia coli* (Gram negative bacteria) with 15.3 ± 3.5 mm. Overall, the results suggested that *M. malabathricum*-AgNPs has successfully been synthesized and characterized, and the results from antibacterial study demonstrated a potent bactericidal impact which are well suited for medicinal usage and other biological applications in the future.

TABLE OF CONTENTS