

**ANTIBACTERIAL ACTIVITY OF TERRESTRIAL SNAIL  
MUCUS (*Achatina fulica*) MEDIATED GREEN  
SYNTHESIS OF SILVER NANOPARTICLES**

**FATIN NUR FATEHA BINTI S ABDUL JALIL**

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

**JULY 202**

This Final Year Project Report entitled “**Antibacterial Activity of Terrestrial Snail Mucus (*Achatina Fulica*) Mediated Green Synthesis of Silver Nanoparticles**” was submitted by Fatin Nur Fateha Binti S Abdul Jalil in partial fulfilment of the requirement for the Degree of Bachelor of Science (Hons.) Biology, in the Faculty of Applied Sciences and was approved by

---

Dr. Nur Maisarah Sarizan  
Supervisor  
Faculty of Applied Sciences  
Universiti Teknologi MARA  
02600 Arau, Perlis

---

Muhammad Syukri Noor Azman  
Project Coordinator  
Faculty of Applied Sciences  
Universiti Teknologi MARA  
02600 Arau, Perlis

---

Pn. Zalina Zainal Abidin  
Head Centre of Programme  
Faculty of Applied Sciences  
Universiti Teknologi MARA  
02600 Arau, Perlis

Date:           JULY 2022

## ABSTRACT

### ANTIBACTERIAL ACTIVITY OF TERRESTRIAL SNAIL MUCUS (*Achatina fulica*) MEDIATED GREEN SYNTHESIS OF SILVER NANOPARTICLES

The growth and bacterial resistance necessitate the development of new anti-infective agents, with silver nanoparticles (AgNPs) exhibiting particularly intriguing features. AgNPs exert antibacterial activity via a variety of molecular pathways. This study carried out antibacterial activity of a recently described type of AgNPs using *A. fulica* snail mucus (SM) where their protein determined. Characterization of AgNPs-SM was done by UV-Visible spectrophotometer (UV-Vis), Fourier-Transform Infrared spectroscopy (FTIR) analysis and Scanning Electron Microscopy (SEM). Their visible colour changes determined along with UV-Vis absorption spectrum plasmon peak at 404.9 nm showed the formation of AgNPs. The FTIR spectra was observed the variation of functional groups existing and the SEM confirmed the AgNPs physical shape in nanoscale size. Antibacterial activities mediated AgNPs was conducted by disc diffusion method with different concentrations. The outcome from the study showed that AgNPs-SM had significant antibacterial activity against *Bacillus licheniformis* (Gram-positive bacteria) and *Escherichia coli* (Gram-negative bacteria).

## TABLE OF CONTENTS

	<b>Page</b>
<b>ABSTRACT</b>	ii
<b>ACKNOWLEDGEMENTS</b>	iv
<b>TABLE OF CONTENTS</b>	v
<b>LIST OF TABLES</b>	vii
<b>LIST OF FIGURES</b>	viii
<b>LIST OF ABBREVIATIONS</b>	ix
<b>CHAPTER 1 INTRODUCTION</b>	
1.1 Background of study	1
1.2 Problem statement	3
1.3 Significance of study	4
1.4 Objectives of study	6
<b>CHAPTER 2 LITERATURE REVIEW</b>	
2.1 Introduction to Mollusca	7
2.1.1 Gastropods	8
2.2 Terrestrial snails	10
2.2.1 <i>Achatina fulica</i>	13
2.3 Snail's mucus	14
2.3.1 Chemical properties of snail's mucus	16
2.3.2 Snail's mucus applications	16
2.4 Silver nanoparticles (AgNPs)	20
2.4.1 Synthesis of AgNPs	21
2.4.2 AgNPs applications	23
<b>CHAPTER 3 METHODOLOGY</b>	
3.1 Experimental design	25
3.2 Sample collection	26
3.3 Protein concentration determination	27
3.4 Green synthesis of silver nanoparticles	28
3.5 Characterization of synthesized silver nanoparticles	29
3.5.1 UV-visible spectroscopy	29
3.5.2 Scanning electron microscopy (SEM)	30
3.5.3 Fourier Transform Infrared (FTIR) spectroscopy	31
3.6 Antibacterial assay	32
3.6.1 Nutrient agar and nutrient broth preparation	32
3.6.2 Inoculum preparation	33
3.6.3 Disk diffusion test	33
3.7 Statistical analysis	34

<b>CHAPTER 4 RESULTS AND DISCUSSION</b>	
4.1 Protein concentration determination of <i>A. fulica</i> mucus	35
4.2 Green synthesis of AgNPs	36
4.3 UV-Visible spectroscopy analysis of snail mucus-AgNPs	37
4.4 Scanning electron microscopy (SEM) analysis of snail mucus-AgNPs	38
4.5 Fourier Transform Infrared (FT-IR) spectroscopy analysis of snail mucus-AgNPs	39
4.6 Antibacterial activity of snail mucus-AgNPs	40
<b>CHAPTER 5 CONCLUSION AND RECOMMENDATIONS</b>	43
<b>CITED REFERENCES</b>	45
<b>APPENDICES</b>	47
<b>CURRICULUM VITAE</b>	53
<b>FYP GANTT-CHART</b>	55