

**ELUCIDATION OF CARBON DIOXIDE
CONTENT GENERATED VIA
BIODEGRADATION OF BIOPLASTIC
DERIVED FROM LOCAL BANANA PEEL**

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This Final Year Project Report entitled “**Elucidation of Carbon Dioxide Content Generated Via Biodegradation of Bioplastic Derived from Local Banana Peel**” was submitted by Nur Hanim Aqilla binti Suhaimi 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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TABLE OF CONTENTS

ACKNOWLEDGEMENTS	iv
TABLE OF CONTENTS	v
ABSTRACT	viii
ABSTRAK	ix
LIST OF TABLES	x
LIST OF FIGURES	xi
LIST OF SYMBOLS	xii
LIST OF ABBREVIATIONS	xiii
CHAPTER 1: INTRODUCTION	1
1.1 Background	1
1.2 Problem Statement	3
1.3 Objectives	4
1.4 Significance of Study	5
CHAPTER 2: LITERATURE REVIEW	6
2.1 Overview of Fruit Waste	6
2.1.1 Banana Peel	8
2.1.2 Different Stages of Ripening	10
2.2 Biodegradability Study	12
2.2.1 Role of Microorganism in Biodegradation	14
2.3 Plasticizer	15
2.3.1 Glycerol	18
2.3.2 Sorbitol	20
2.4 Biodegradation of Banana Peel Film	22

ABSTRACT

ELUCIDATION OF CARBON DIOXIDE CONTENT GENERATED VIA BIODEGRADATION OF BIOPLASTIC DERIVED FROM BANANA PEEL

In recent years, there has been a lot of research towards sustainable substitutes for traditional petroleum-based plastics due to the worldwide environmental crisis and the growing problem of plastic waste. Bioplastics have become a possible alternative to lessen the negative environmental effects of conventional plastics. Thus, conventional plastics are primarily linked to pollution and ecological deterioration throughout their lifecycle, which has exacerbated environmental problems. This research responds to the necessity to look into sustainable alternatives. Achieving sustainable development objectives can be done by effectively utilising banana peel wastes from different stages of ripening to lessen carbon footprints and greenhouse gas emissions. Physicochemical characterization of banana peel includes sensory evaluation, ATR-FTIR analysis, water solubility, soil burial test and aerobic biodegradation measurement. It was found that ripe bioplastic has a sweet scent due to 90% of the total amount of esters present in the film. The texture of each film can have a different impact on the water solubility. Thus, ATR-FTIR was performed to test whether functional groups like C-O stretching and C-H stretching are present in the films at the certain band. It was observed that only minimally existent unripe and overripe peaks are at wavenumber 2250-2100 cm^{-1} . A few parameters including soil moisture, pH, and temperature were thoroughly assessed as part of a biodegradability study of the bioplastic generated. This research shows bioplastic from all stages of ripening degrade more quickly in wet soil and at high temperatures. When bioplastics are buried in soil, it is broken down by microorganisms, which produce gases, biomass, and water. Aerobic biodegradation measurement was conducted by titrating KOH and HCl with the presence of phenolphthalein for five consecutive weeks to determine the amount of released CO_2 . In conclusion, bioplastics made from unripe, ripe and overripe banana peels have a lot of potential to replace conventional plastics. It is because these bioplastics exhibit a high rate of degradation in soil burial tests over a variety of factors, such as pH, temperature, and moisture content.