

**SYNTHESIS OF ZINC OXIDE FROM OIL PALM LEAVES BY GREEN
SOL-GEL METHOD: EFFECT OF CONCENTRATION VARIATION**

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**This report is submitted in partial fulfillment of the requirements
needed
for the award of Bachelor in Engineering (Hons) Chemical and Process**

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JULY 2017

ACKNOWLEDGEMENT

In preparing this project report, I would like to thank my parents, my friends and my lecturers for their support. I was in contact with many people, researchers, academicians, and practitioners. They have contributed towards my understanding and thoughts. In particular, I wish to express my sincere appreciation to my main project supervisor, Mrs Rabiatal Adawiyah Binti Abdol Aziz for encouragement, guidance, critics and friendship. Without her continued support and interest, this research project would not have been the same as presented here.

ABSTRACT

In this study, zinc oxide (ZnO) nanoparticle has been successfully synthesized using oil palm leaves extract (OPLE) as the stabilizing agent. Oil palm leaves have been chosen because of its availability in this country as it generated as a by-product of palm oil. ZnO currently has a great potential in food industry for example zinc oxide is used as a food additive due to its antioxidant properties. However, this study is focusing more on food packaging application as it is one of food safety requirement. Thus, as the aim for this study, to characterize the OPLE should be done to study the functional group contained in the OPLE by using FTIR analysis. Green sol-gel method also has been chosen during synthesizing ZnO to study the effect of concentration variation to the physical properties of ZnO using FTIR and XRD analysis. The peak obtained from the OPLE is at 3296.12 cm^{-1} is due to stretching vibrations of O-H groups in the extract. This indicates that OPLE is suitable to be an alcohol substituent. From FTIR analysis of ZnO, it is confirmed that ZnO was present in the precipitate as the peak obtained are below 1000 cm^{-1} which is in a range between 600 cm^{-1} to 900 cm^{-1} for all variation. It is also confirmed that the concentration does effect the properties of ZnO properties as the XRD shown an increment in the size of ZnO from 17.46 nm to 22.04 nm as the concentration increases from 0.2 M to 1.0 M.

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CHAPTER 1

INTRODUCTION

1.1 Background Study

Nanoparticle research is one of the science branch that have the most studied nowadays in various fields. There are great potential applications in biomedical, optical, electronic fields, food safety and many others.

Oil Palm (*Elaeis guineensis*) is a tropical plant from West African tropical rainforest region as stated in an article from Sime Darby Plantation in their report on palm oil fact and figures. They are also stated that basically, palm oil can be found mostly at tropical countries for example Malaysia, Sweden and Brazil. An article from Green palm Sustainability page stipulated that approximately 50% of ingredients at supermarket are palm oil based including food and non food items. That was from the palm oil and palm kernel oil perspective. However, in this research, ZnO nanoparticle will be synthesis by using palm oil leaves.