UNIVERSITI TEKNOLOGI MARA

COMPARATIVE STUDY ON USING
\textit{CERBERA ODOLLAM} OIL AND PALM OIL
FOR MICROBIAL LIPASE PRODUCTION

MOHD ZULHILMI BIN WAN SALLEH

Thesis submitted in fulfillment
of the requirements for the degree of
\textit{Master of Science}

Faculty of Chemical Engineering

March 2013
| Perpustakaan Tun Abdul Razak  
UITM Shah Alam |
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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 result of my own work, unless otherwise indicated or acknowledged as referenced work. This thesis has not been submitted to any academic institute or non-academic institution for any other degree or qualification.

I, hereby, acknowledge that I have been supplied with the Academic Rules and Regulations for Post Graduate, Universiti Teknologi MARA, regulating the conduct of my study and research.

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ABSTRACT

Research on useful application of Cerbera odorollam in Malaysia is relatively few despite its abundance mainly due to its toxicity. In order to utilize this plenty natural resource, the Cerbera odorollam oil was extracted from the fruit's seed. The yield from the extracted oil achieved was at 53% (w/w) oil. On the other hand, bacteria known as Pseudomonas aeruginosa ATCC 27853 was able to grow in the agar medium containing Cerbera odorollam as base media. This finding led to the use of this microbe to enhance lipase production by Cerbera odorollam oil as a carbon source in the fermentation media. Similar fermentation using palm oil was carried out as comparison. There has been found that 3% (v/v) of oil produced maximum activity for media of Cerbera odorollam oil compared to 5% (v/v) optimum of palm oil with activity 199 mU/mL and 189 mU/mL respectively. Lipase production secreted high activity when initial pH 7 was applied and the maximum activity achieved was 199 mU/mL and 134 mU/mL for Cerbera odorollam media and palm oil media respectively after incubation of 72 hour. The temperature of 37°C was found as the optimum condition with activity 200 mU/mL and 146 mU/mL for Cerbera odorollam oil media and palm oil media respectively. Other study showed that lipase activity from both produced media was found to be stimulated by the addition of ion Ca²⁺, Cu²⁺, Li⁺, and Mn²⁺ only stimulated palm oil produced media. The optimum conditions by response surface methodology revealed that the maximum activity for Cerbera odorollam oil production media is 219 mU/mL for optimum condition at 44°C, 3.4% (v/v) of Cerbera odorollam oil and at 55 hour. Furthermore, the maximum of lipase activity of 210.76 mU/mL has been produced by Palm oil production media at optimum condition of 46.3°C, with concentration 6.3%(v/v) of palm oil and at 48.6 hour.
ACKNOWLEDGEMENTS

First and foremost I would like to take this opportunity to thank to Allah for give me blessing and strength to endure all the challenge that I need to go through to complete my research. I also would like to acknowledge and recognize several people who had help and influence me to finish this project. Most grateful to my former supervisor Assoc. Prof. Dr. Murthy V.P.S Veluri and my main supervisor Dr. Tan Huey Ling for your generous and continuous support, encouragements and numerous discussions given to me while doing this research project until the completion of my thesis. Special thanks to my co supervisor Dr Jagannathan Krishnan with your valuable ideas, suggestions and advice for my project. Not forget to Madam Miradatul Najwa bt. Mohd Rodhi for your idea for this project.

Likewise, I am grateful to the Dean of the Faculty of Chemical Engineering Prof. Dr. Sharifah Aishah Syed Abd.Kadir and the Head of Postgraduate Studies, Dr. Kamariah Noor Ismail and Dr Junaidah for your continuous support and moral to me to finish this project. I would like to extend my gratitude to all faculty members including technicians and administrative staff for your cooperation when dealing with you. Thank you to Ministry of Science, Technology and Innovation (MOSTI) for the E-Science grant and also awarding me with PGD scholarship for my Master's study. Many thanks to all my postgraduate members, Kak Su, Sufian, Zaki, Afiq, Shanor, Izan and Fathi for your patience while taught with the lab skill, help me with apparatus and most important is moral and support from you.

Finally, I express my infinite love towards my parents Hj Wan Salleh bin Ismail and Hjh Saodah binti Abdullah, and my sister Kak, K.Chaq, K.cik, Ateh, Alang and Adik and not forget to my beloved nephew, Baihaqi. I feel very privileged and fortunate to have them.