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Application of immobilized microalgae for removing nitrogenou
compound from mahseer rearing system / Fazilah Abd Khair.

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PERPUSTAKAAN SULTANAH NUR ZAHIRAH UMT
HAK MILIK

**APPLICATION OF IMMOBILIZED MICROALGAE FOR REMOVING
NITROGENOUS COMPOUND FROM MAHSEER REARING SYSTEM**

**By
Fazilah Binti Abd Khair**

**Research Report submitted in partial fulfillment of
the requirement for the degree of
Bachelor of Agrotechnology Science (Aquaculture)**

**Department of Fisheries
FACULTY OF AGROTECHNOLOGY AND FOOD SCIENCE
UNIVERSITI MALAYSIA TERENGGANU
2009**

This project should be cited as:

Fazilah, A.K., 2009. Application of immobilized microalgae for removing nitrogenous compound from mahseer rearing system. Undergraduate thesis, Bachelor of Agrotechnology Science (Aquaculture), Faculty of Agrotechnology and Food Science, Universiti Malaysia Terengganu. 45p.

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Borang Pengakuan dan Pengesahan Laporan Akhir Projek Ilmiah I dan II

BORANG PITA 8



**FAKULTI AGROTEKNOLOGI DAN SAINS MAKANAN
UNIVERSITI MALAYSIA TERENGGANU**

**PENGAKUAN DAN PENGESAHAN LAPORAN
PROJEK ILMIAH I DAN II**

Adalah ini diakui dan disahkan bahawa laporan ilmiah bertajuk:

Application of immobilized microalgae for removing nitrogenous compound from mahseer
rearing system

oleh..... **Fazilah Binti Abd Khair** No.Matrik **UK 13599** telah
diperiksa dan semua pembedaan yang disarankan telah dilakukan. Laporan ini dikemukakan
kepada Jabatan **Sains Perikanan dan Akuakultur** sebagai memenuhi sebahagian
daripada **keperluan memperoleh Ijazah Sarjana Muda**
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DECLARATION

I hereby declare that the work in this thesis is my own except for quotations and summaries which have been duly acknowledged

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ACKNOWLEDGEMENT

First and foremost, I would like to express my whole gratitude and recognition to my supervisor, Dr. Hii Yii Siang for being the most understanding, helpful and also for his encouragement, guidance and invaluable contribution of ideas throughout the course of this project. Truly without their encouragement and supervision, my thesis will not progress and complete as smooth as it is.

I would also like to extend my special thanks to Anatomy and Physiology laboratory technicians for their technical assistance towards accomplishing my final project.

Not forgetting my lovely family members especially my lovely father and mother for their endless love, concern and always by my side to support me during my days in university.

Last but not least, I also owes special thanks to all my friends who always been there for me and extended every possible support during this research.

ABSTRACT

The immobilized green microalgae *Nannochloropsis* sp. in sodium alginate bead was used for the removal of nitrogenous compound from mahseer rearing system. The efficiency of the treatment system was compared among immobilized microalgae, blank alginate bead and control (without alginate bead). All of the treatment system was conducted under aseptic condition. The removal rate by immobilized microalgae is 0.040 mg/L/h for total ammonia and 1.97×10^{-3} mg/L/h for nitrite. The removal rate by blank alginate bead is 0.045 mg/L/h for total ammonia and 1.95×10^{-3} mg/L/h for nitrite. The removal efficiencies of nitrogenous compound by immobilized microalgae are no significant different between the application of blank alginate bead. This is because of bacteria activities that present in water and utilize nitrogen for their metabolism. However, there is positive grow of immobilized *Nannochloropsis* sp. in alginate bead (from 28.13×10^3 cell/ml to 115.13×10^3 cell/ml). Photosynthesis of microalgae would contribute to increase dissolve oxygen in water. The application of immobilized microalgae not only to remove nitrogenous compound but also can stabilized the hydrological parameter in water. This technique is viable to control water quality in aquaculture.

ABSTRAK

Mikroalga hijau *Nannochloropsis* sp. yang dimasukkan ke dalam manik sodium alginate digunakan untuk pengambilan sebatian nitrogen dari sistem penternakan kelah. Keupayaan sistem ini dibandingkan antara mikroalga yang di masukkan ke dalam manik sodium alginate (tidak bergerak), manik sodium alginate yang kosong dan tanpa manik sodium alginate sebagai control. Semua sistem ini dilakukan dalam keadaan yang tidak steril. Kadar pengambilan ammonia dan nitrit oleh mikroalga yang dimasukkan ke dalam manik sodium alginate ialah masing-masing 0.040 mg/L/j dan 1.97×10^{-3} mg/L/j. Manakala kadar pengambilan ammonia dan nitrit oleh manik sodium alginate yang kosong adalah masing-masing 0.045 mg/L/j dan 1.95×10^{-3} mg/L/j. Kadar pengambilan sebatian nitrogen oleh mikroalga yang dimasukkan ke dalam manik sodium alginate tiada perbezaan yang ketara dengan kadar pengambilan oleh manik sodium alginate yang kosong. Ini disebabkan oleh aktiviti bacteria yang hadir di dalam air dan menggunakan nitrogen untuk metabolisme. Bagaimanapun, *Nannochloropsis* sp. yang terdapat di dalam manik sodium alginate menunjukkan pertumbuhan positif (dari 28.13×10^3 sel/ml menjadi 115.13×10^3 sel/ml). Fotosintesis yang dilakukan oleh mikroalga menyumbang kepada pertambahan oksigen terlarut di dalam air. Aplikasi dari kaedah ini bukan sahaja dapat mengambil sebatian nitrogen di dalam air, malah dapat menstabilkan ukuran hidrologi di dalam air. Teknik ini boleh digunakan untuk mengawal kualiti air di dalam akuakultur.