

4N 5191

1100054342

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Universiti Malaysia Terengganu



LP 14 FMSM 2 2007



1100054342
Fecal coliform and e.coli contamination in cultured oyster,
(Crassostrea iredalei), water and sediment of Setiu Lagoon,
Terengganu / Kuik Soon Ngee.

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**FECAL COLIFORM AND *E.coli* CONTAMINATION IN CULTURED
OYSTER, (*Crassostrea iredalei*), WATER AND SEDIMENT OF SETIU
LAGOON, TERENGGANU.**

By

KUIK SOON NGEE

**Research report submitted in partial fulfillment of
The requirements for the degree of
Bachelor of Science (Marine Science)**

Department of Marine Sciences

Faculty of Maritime Studies and Marine Science

UNIVERSITY MALAYSIA TERENGGANU

2007

1100054342

This project report should be cited as:

Kuik, S. N. 2007. Fecal Coliform and *E.coli* Contamination in Cultured Oysters (*Crassostrea iredalei*), Water and Sediment of Setiu Lagoon, Terengganu. Undergraduate thesis, Bachelor of Science (Marine Science), Faculty of Maritime Studies and Marine Science, University Malaysia Terengganu, Terengganu.

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FAKULTI PENGAJIAN MARITIM DAN SAINS MARIN
UNIVERSITI MALAYSIA TERENGGANU**

**PENGAKUAN DAN PENGESAHAN LAPORAN
PROJEK PENYELIDIKAN I DAN II
*RESEARCH REPORT VERIFICATION***

Adalah ini diakui dan disahkan bahawa laporan penyelidikan bertajuk:

**Fecal Coliform and *E.coli* Contamination in Cultured Oysters (*crassostrea iredalei*),
Water and Sediment of Setiu Lagoon, Terengganu** oleh **Kuik Soon Ngee**, No. Matrik
UK10965 telah diperiksa dan semua pembedaan yang disarankan telah dilakukan. Laporan
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Tarikh: 6/5/07

Acknowledgements

Firstly and foremost, I would like to take this opportunity to thank my supervisor, Professor Dr. Law Ah Theem. His guidance and advice are essential in helping me to complete my thesis successfully. Without his encouragement and supervision, my thesis will not complete as smooth as it is. I gain a lot of experience from him. I also would like to convey my sincere gratitude to Dr. Antonina Abudullah for her unlimited guidance.

Next, I would like to thank my seniors, Mr. Yong Jaw Chuen and Mr. Chuah Lai Fatt and other seniors who help me in management of my project. Their advices and experiences are invaluable in the progress of my work.

I am also thankful to all my friends for their helps and support especially Lih Yan, Sin Chieh, Boon Sim, Ee Ling, Khai Shen, Swee Yin and Julius. For lacking of this, may be I cannot finish this project work successfully especially during lab analysis. My appreciation also goes to my housemate Siau Wei, Pee Wee, Hui Peng and Shek Hong for their all sorts of help during my thesis writing.

I would also like to express my appreciation to all laboratory assistants in KUSTEM, especially to for their helpful and technical assistance during my research.

Finally, this thesis is dedicated to my dearest family, for their supports and helps from all these years. Thank you.

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List of Symbols

APHA	-	American Public Health Association
Apr	-	April
Aug	-	August
ASEAN	-	Association of South East Asia Nations
°C	-	degree centigrade
CSSP	-	Canadian Shellfish Sanitation Program
Dec	-	December
DO	-	dissolve oxygen
DOE	-	Department of Environment
DSP	-	diarrheic shellfish poison
<i>E. coli</i>	-	<i>Escherichia coli</i>
EU	-	European Union
FAD	-	Food and Drug Administration
FC	-	fecal coliform
FDA	-	Food and Drug Administration
g	-	gram
GAD	-	glutamic acid decarboxylase
INWQS	-	Interim National Water Quality Standards
kg	-	kilogram
M	-	molarity
Mg	-	miligram

mL	-	mililitre
mm	-	milimetre
MF	-	Membrane Filter
MPN	-	most probable number
MTF	-	Multiple-tube Fermentation Technique
NaCl	-	sodium chloride
NaOH	-	sodium hydroxide
Nov	-	November
NSSP	-	National Shellfish Sanitation Program
Oct	-	October
pH	-	potential of hydrogen
ppt	-	parts per thousand
PSP	-	Paralytic shellfish poison
Sept	-	September
TC	-	total coliform
USEPA	-	United States Environmental Protection Agency
WHO	-	World Health Organisation

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ABSTRACT

This study is aimed to evaluate the level of fecal contamination that caused by sewage pollution in Setiu lagoon, Terengganu and also to determine whether the cultured oysters in the lagoon are safe for human consumption. Three sampling trips were conducted on 13th September 2006, 12th October 2006 and 14th December 2006. Fourteen sampling stations were established in the lagoon. Total coliform, fecal coliform, *Escherichia coli* (*E. coli*) counts in water, sediment and cultured oysters (*Crassostrea iredalei*) were estimated by using Multiple Test Tube Fermentation of Standard Method. GAD test was carried out to determine the presence of *E. coli* in the samples. The mean of total coliform, fecal coliform and *E. coli* in waters of Setiu lagoon were 652.88 MPN.100 mL⁻¹, 219.46 MPN.100 mL⁻¹ and 22.07 MPN.100 mL⁻¹ respectively. The mean of total coliform, fecal coliform and *E. coli* in the sediments of Setiu lagoon were 37.83 MPN.g⁻¹, 20.49 MPN.g⁻¹ and 4.03 MPN.g⁻¹ respectively. The mean of total coliform, fecal coliform and *E. coli* counts in cultured oysters were 176.93 MPN.g⁻¹, 245.52 MPN.g⁻¹ and 1.72 MPN.g⁻¹ respectively. The presence of total coliform, fecal coliform and *E. coli* in the waters and sediment of Setiu lagoon indicates that the lagoon has been contaminated by domestic sewage effluent. This study shows that, the level of fecal coliform is over the safety level for aquaculture but the *E. coli* in Setiu lagoon are still within the safety level for human consumption. Even then a proper measurement should be taken to maintain a healthy environment quality for future use.

ABSTRAK

Kajian ini bertujuan untuk menentukan tahap pencemaran najis akibat pembuangan bahan kumbahan ke dalam lagun Setiu dan juga menentukan sama ada tiram yang dikultur di lagun itu selamat untuk dimakan. Kerja persampelan dilakukan sebanyak tiga kali iaitu, pada 13th September 2006, 12th Oktober 2006 and 14th Disember 2006. Empat belas stesen persampelan dipilih di sekeliling lagun Setiu. "Multiple Test Tube Fermentation of Standard Method" digunakan untuk menentukan bilangan coliform, fecal coliform dan *E. coli* di dalam air, sedimen, dan tiram yang dikultur (*Crassostrea iredalei*) di lagun Setiu. Ujian GAD telah digunakan untuk mengesan kehadiran *E. coli* di dalam sample. Nilai purata untuk bilangan coliform, fecal coliform dan *E. coli* dalam air masing-masing ialah 652.88 MPN.100 mL⁻¹, 219.46 MPN.100 mL⁻¹ and 22.07 MPN.100 mL⁻¹. Nilai purata untuk bilangan coliform, fecal coliform dan *E. coli* dalam sedimen masing-masing ialah 37.83 MPN.g⁻¹, 20.49 MPN.g⁻¹ and 4.03 MPN.g⁻¹ manakala bagi tiram yang dikultur di Setiu pula masing-masing 176.93 MPN.g⁻¹, 245.52 MPN.g⁻¹ and 1.72 MPN.g⁻¹. Kehadiran total coliform, fecal coliform dan *E. coli* di dalam air dan sedimen menunjukkan bahawa lagun Setiu telah dicemari oleh bahan kumbahan. Kajian ini menunjukkan tahap fecal coliform di dalam lagun Setiu melebihi tahap keselamatan untuk aktiviti-aktiviti akuakultur tetapi tahap *E.coli* masih dalam tahap keselamatan untuk dimakan. Walaubagaimanapun langkah-langkah yang sewajarnya perlu diambil untuk mewujudkan persekitaran lagun dengan kualiti yang bersih bagi penggunaan masa depan.