

EFFECTS OF ORAL VACCINATION OF KILLED *Pasteurella*  
*multocida* B:2 ON GUT-ASSOCIATED LYMPHOID  
TISSUE (GALT) IN WHITE RATS

CHRISTOPHER TAN MUEE HAN

FAKULTI SAINS DAN TEKNOLOGI  
UNIVERSITI MALAYSIA TERENGGANU

2006

LP 7 FST 1 2008

1100057803

Perpustakaan Sultanah Nur Zahirah (UMT)  
Universiti Malaysia Terengganu



LP 7 FST 1 2008



1100057803

Effect oral vaccination of killed Pasteurella multocida B:2 on  
gut-associated lymphoid tissue (GALT) in white rats. / Christopher  
Tan Yuet Han.

PERPUSTAKAAN SULTANAH NUR ZAHIRAH  
UNIVERSITI MALAYSIA TERENGGANU (UMT)  
21030 KUALA TERENGGANU

1100057803		

Lihat sebelah

HAK MILIK  
PERPUSTAKAAN SULTANAH NUR ZAHIRAH UMT

**EFFECTS ORAL VACCINATION OF KILLED *Pasteurella multocida* B:2  
ON GUT-ASSOCIATED LYMPHOID TISSUE (GALT)  
IN WHITE RATS**

By

Christopher Tan Yuet Han

A research report submitted in partial fulfillment of  
The requirements for the award of the degree of  
Bachelor of Sciences (Biological Sciences)

**DEPARTMENT OF BIOLOGICAL SCIENCES  
FACULTY OF SCIENCE AND TECHNOLOGY  
UNIVERSITI MALAYSIA TERENGGANU  
2008**

1100057803

This project should be cited as:

Christopher, T. Y. H. 2008. Effects oral vaccination of killed *Pasteurella multocida* B:2 on Gut -Associated Lymphoid Tissue (GALT) in white rats. Undergraduated thesis, Bachelor of Science (Biological Sciences) Faculty of Science and Technology, University Malaysia Terengganu.38p.

No part of this project report may be produced by any mechanical, photographic, or electronic process, or in the form of phonographic recording, nor may it be stored in a retrieval system, transmitted, or otherwise copied for public or private use, without written permission from the author and the supervisor of the project.



JABATAN SAINS BIOLOGI  
FAKULTI SAINS DAN TEKNOLOGI  
UNIVERSITI MALAYSIA TERENGGANU

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

Adalah ini diakui dan disahkan bahawa laporan penyelidikan bertajuk:

*Effects Oral Vaccination of Killed Pasteurella multocida B:2 on Gut -Associated Lymphoid Tissue (GALT) in White Rats* oleh Christopher Tan Yuet Han, No.Matrik UK11876 telah diperiksa dan semua pembetulan yang disarankan telah dilakukan. Laporan ini dikemukakan kepada Jabatan Sains Biologi sebagai memenuhi sebahagian daripada keperluan memperoleh **Ijazah Sarjana Muda Sains (Sains Biologi)**, Fakulti Sains dan Teknologi, Universiti Malaysia Terengganu.

Disahkan oleh:

Penyelia Utama

Nama: Prof. Madya Dr. Mohd. Effendy Bin Abdul Wahid

Cop Rasmi:

PROF. MADYA DR. MOHD. EFFENDY ABD WAHID  
Pegawai  
Institut Bioteknologi Marin  
Universiti Malaysia Terengganu  
21030 Kuala Terengganu, Terengganu.

Tarikh: 12 Mei 2008

Ketua Jabatan Sains Biologi

Nama: Prof. Madya Dr. Aziz Bin Ahmad

Cop Rasmi:

PROF. MADYA DR. AZIZ BIN AHMAD  
Ketua  
Jabatan Sains Biologi  
Fakulti Sains dan Teknologi  
Universiti Malaysia Terengganu  
21030 Kuala Terengganu

Tarikh: 13 MAY 2008

## DECLARATION

I hereby declare that this thesis entitled EFFECTS ORAL VACCINATION OF KILLED *Pasteurella multocida* B:2 ON GUT-ASSOCIATED LYMPHOID TISSUE (GALT) IN WHITE RATS is the result of my own research except as cited in the references.

Signature

:  .....

Name

: Christopher Tan Yuet Han

Matriculation Number: UK11876

Date

: 13 May 2008

## DECLARATION

I hereby declare that this thesis entitled EFFECTS ORAL VACCINATION OF KILLED *Pasteurella multocida* B:2 ON GUT-ASSOCIATED LYMPHOID TISSUE (GALT) IN WHITE RATS is the result of my own research except as cited in the references.

Signature :  .....

Name : Christopher Tan Yuet Han

Matric Number : UK11876

Date : 13 May 2008

## ACKNOWLEDGEMENTS

Prior to the success of the final year project, I would like to offer my sincere thanks to my Supervisor, Assoc. Prof. Dr. Mohd. Effendy B. Abdul Wahid for his guidance throughout my project entitled “Effects Oral Vaccination Of Killed *Pasteurella multocida* B:2 On GALT In White Rats”. His support and advice has been an encouragement for me to push on in completing this project. My deep gratitude also goes to the Final Year Project Coordinator, Dr. Noraznawati Ismail for her kind support.

I would like to thank all the master students for their opinions and help throughout the progress of this project. My sincere thanks also go to all the lab assistants especially to Mr. Mohammad B. Embong (Histology Laboratory) and Mrs. Mahidawati (Microbiology Laboratory). I would like to express my thanks to Mr. Sarzuki bin Mawi and Mr. Sukri Mohd. for their help in bringing me to Hospital University Sains Malaysia (HUSM) to collect the rats for my project. I personally thank Mr. Masduki Mohd. Morni for his guidance in constructing the formation of the vaccinated pellets.

Last but not the least, I am truly thankful to my project partner, Illazuwa binti Mohd. Yusoff for her support from the beginning of the project until its completion. I would also love to extend my thanks to my parents and family members for their unending support and love in giving me the will to complete my project.

God bless and thank you all.



## ABSTRACT

*Pasteurella multocida* B:2 is a microorganism causing respiratory disease in ruminant animals mainly cattle and water buffaloes. The hemorrhagic septicemia disease causes high fatality rate towards many livestock in Asia. Oral vaccination is a way to induce mucosal immunity in the host. The Gut-associated Lymphoid Tissue (GALT) in the gastrointestinal tract plays an important role in activating and inducing immune response towards the other mucosal site through oral vaccination. Secretary IgA will be produced to prevent cellular attachment of the antigen on host cell through activation of the immune response. The effectiveness of the oral vaccination was proven having significant different of ( $p < 0.05$ ) between the control and the treatment group for the area of GALT and the number of lymphocytes using ANOVA Two-Factor with Replication. However, there was no significant different between the weeks ( $p > 0.05$ ) for both area of GALT and the number of lymphocytes due to the fact that the *Pasteurella multocida* B:2 is a microorganism which infect the lung. Migration of lymphocytes to the lung will allow the mucosal site in the lung to increase the immunity towards *Pasteurella multocida* B:2. Repeated doses of vaccine through oral administration are suggested to enable the individual obtaining sufficient immunity.

## ABSTRAK

*Pasteurella multocida* B:2 merupakan satu mikroorganisma yang menyebabkan penyakit pada sistem pernafasan dalam haiwan ternakan seperti kerbau dan haiwan tenusu. Penyakit hawar berdarah telah mengakibatkan kadar kematian yang tinggi pada haiwan ternakan di Asia. Oleh yang demikian, cara imunisasi berdasarkan oral iaitu melalui pellet yang telah diformulasikan dengan vaksin telah diwujudkan bagi mengatasi masalah ini. GALT dalam sistem penghadaman memainkan peranan penting dalam mengaktifkan imunisasi sistem mukosa lain dalam badan. Melalui pengaktifan imunisasi ini, IgA akan dihasilkan untuk menghalang pelekatan sel antigen pada sel perumah. Keberkesanan pengvaksinan melalui oral adalah nyata setelah keputusan ( $p < 0.05$ ) diperolehi apabila dibandingkan kumpulan kawalan dan kumpulan divaksin (keluasan kawasan GALT dan bilangan limfosit) menggunakan ANOVA Dua Faktor dengan Replikasi. Walau bagaimanapun, tiada kesignifikan ditunjukkan jika dibandingkan secara mingguan untuk keluasan kawasan GALT dan bilangan limfosit kerana ( $p > 0.05$ ). *Pasteurella multocida* B:2 merupakan mikroorganisma yang mengakibatkan penyakit pada sistem pernafasan. Permindahan atau migrasi limfosit ke peparu membolehkan sistem mukosa meningkatkan imunisasi untuk menentang infeksi *Pasteurella multocida* B:2. Pengambilan dos penvaksinan oral yang kerap dan teratur amat disyorkan untuk membolehkan individu mencapai imunisasi yang mencukupi menentang penyakit yang berfokuskan mukosal.