CROSS PROTECTION OF CELLS PRIMED WITH
FORMALIN-KILLED *Pasteurella multocida* B2 AGAINST
LIVE *Mannheimia haemolytica* A2 INFECTION

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2007

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CROSS PROTECTION OF GOATS PRIMED WITH FORMALIN-KILLED *Pasteurella multocida* B2 AGAINST LIVE *Mannheimia haemolytica* A2 INFECTION

By
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Adalah ini diakui dan disahkan bahawa laporan penyelidikan bertajuk: **CROSS PROTECTION OF GOATS PRIMED WITH FORMALIN-KILLED *Pasteurella multocida* B2 AGAINST LIVE *Mannheimia haemolytica* A2 INFECTION** oleh **HAFIZAH BT ABDUL LATIB**, no. matrik: **UK 10541** telah diperiksa dan semua pembetulan yang disarankan telah dilakukan. Laporan ini dikemukakan kepada Jabatan Sains Biologi sebagai memenuhi sebahagian daripada keperluan memperolehi Ijazah **SARJANA MUDA SAINS (SAINS BIOLOGI),** Fakulti Sains dan Teknologi,Universiti Malaysia Terengganu.

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LIST OF ABBREVIATIONS

cfu	Colony forming unit
CMI	Cell-mediated immunity
CPS	Capsule polysaccharide
ECM	Extracellular matrix
H_2O_2	Hydrogen peroxide
HCl	Hydrochloric acid
HS	Haemorrhagic septicaemia
IVET	In vivo expression technology
Lkt	Leukotoxin
LPS	Lipopolysaccharide
M. haemolytica	*Mannheimia haemolytica*
OMP	Outer membrane protein
P. multocida	*Pasteurella multocida*
STM	Signature-tagged mutagenesis

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ABSTRACT

Pasteurella multocida B2 and *Mannheimia haemolytica* A2 are among the bacteria that caused haemorrhagic septicaemia in cattle and buffaloes worldwide. A study was conducted from 24th September until 5th November 2006 to determine the cross protection ability of formalin-killed *Pasteurella multocida* B2 inoculated goats against live *Mannheimia haemolytica* A2 infection. This study will give better understanding in developing homologous and heterologous protection against the bacteria. Nine clinically healthy goats aged between seven to nine months were divided equally into three groups. Group 1 and 2 were exposed to formalin-killed *P. multocida* B2 at the bacterial load of 10^8 colony forming unit (cfu)/mL, twice intranasally with two weeks interval. Two weeks after the second exposure, Group 1 were challenged with *M. haemolytica* A2 while group 2 with *P. multocida* B2. Group 3 was remained as the control unexposed group. One goat in Group 2 died on day 3 post-exposure while the remaining survived. On seventh week, all of the goats were slaughtered. Mild gross lesions were observed on the vital organs of goats in Group 1 and 2 upon post mortem. Samples for microbiology and histology were taken from lung, liver and kidney. *P. multocida* B2 was successfully re-isolated from the vital organs of goat in Group 2. Generally, histology study showed that all of the goats except the control have lymphocyte infiltration and fibrinous material in their lungs but managed to survive. It can be concluded that the cross protection level of *P. multocida* B2 is low and further studies should be conducted.

ABSTRAK

KETAHANAN SILANG TERHADAP *Pasteurella multocida* B2 YANG TELAH DIBUNUH DENGAN FORMALIN TERHADAP KAMBING YANG DIJANGKITI DENGAN *Mannheimia haemolytica* A2

Pasteurella multocida B2 dan *Mannheimia haemolytica* A2 adalah antara bakteria yang telah mengakibatkan kematian banyak lembu dan kerbau di seluruh dunia. Satu kajian telah diadakan dari 24hb September sehingga 5hb November 2006 untuk menentukan kebolehan *Pasteurella multocida* B2 yang telah dibunuh dengan formalin untuk melindungi kambing dari jangkitan *Mannheimia haemolytica* A2. Kajian ini akan memberikan lebih pemahaman tentang perlindungan homologus dan heterologus bakteria-bakteria terbabit. Sembilan ekor kambing yang sihat, berumur antara tujuh hingga sembilan bulan telah dipilih dan dibahagi secara rambang kepada tiga kumpulan. Kumpulan 1 dan 2 telah didedahkan dengan *P. multocida* B2 yang telah dibunuh dengan formalin, sebanyak dua kali, dengan selang masa dua minggu bagi setiap pendedahan. Dua minggu selepas pendedahan itu, Kumpulan 1 dijangkitit dengan *M. haemolytica* A2 manakala Kumpulan 2 dijangkiti dengan *P. multocida* B2. Kumpulan 3 sebagai kawalan tidak didedahkan dengan mana-mana bakteria tadi. Seekor kambing dari Kumpulan 2 mati tiga hari selepas dijangkiti manakala yang lain dapat mengatasi jangkitan tersebut. Pada minggu ke-tujuh,semua kambing disembelih dan kerosakan tisu yang sederhana dapat diperhatikan dari organ-organ penting dari kambing di Kumpulan 1 dan 2. Sampel untuk kajian histologi dan mikrobiologi telah diambil dari organ peparu, hati dan buah pinggang. *P. multocida* B2 telah berjaya diasingkan dari organ-organ penting seekor kambing di Kumpulan 2. Secara keseluruhannya, kajian histologi menunjukkan bahawa kesemua kambing kecuali dari kumpulan kawalan mengalami infilterasi limfosit dan kehadiran material berfibrin di beberapa kawasan pada peparu tetapi ianya tidak kritikal dan ini adalah antara faktor kejayaan kumpulan ini untuk hidup. Dapat disimpulkaan di sini bahawa ketahanan silang *P. multocida* B2 terhadap jangkitan *M. haemolytica* A2 adalah rendah dan kajian yang lebih mendalam harus dilakukan pada masa akan datang.