



UNIVERSITI PUTRA MALAYSIA

***SEROPREVALENCE OF MELIOIDOSIS AMONG SMALL
RUMINANTS IN FOSTER FARM PROGRAMME OF FACULTY OF
VETERINARY MEDICINE, UNIVERSITI PUTRA MALAYSIA***

THIVIYA BALAKRISHNAN

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UNIVERSITI PUTRA MALAYSIA

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THIVIYA BALAKRISHNAN

A project submitted to the
Faculty of Veterinary Medicine, Universiti Putra Malaysia
In partial fulfillment of the requirement for the
DEGREE OF DOCTOR OF VETERINARY MEDICINE (D.V.M)
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It is hereby certified that we have read this project paper entitled “Seroprevalence of Melioidosis Among Small Ruminants In Foster Farm Programme of Faculty of Veterinary Medicine, Universiti Putra Malaysia”, by Thiviya Balakrishnan and in our opinion it is satisfactory in terms of scope, quality, and presentation as partial fulfillment of the requirement for the course VPD 4999 – Final Year Project.

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PROF DR ABDUL RAHMAN BIN OMAR

DVM (UPM), PhD (Cornell)

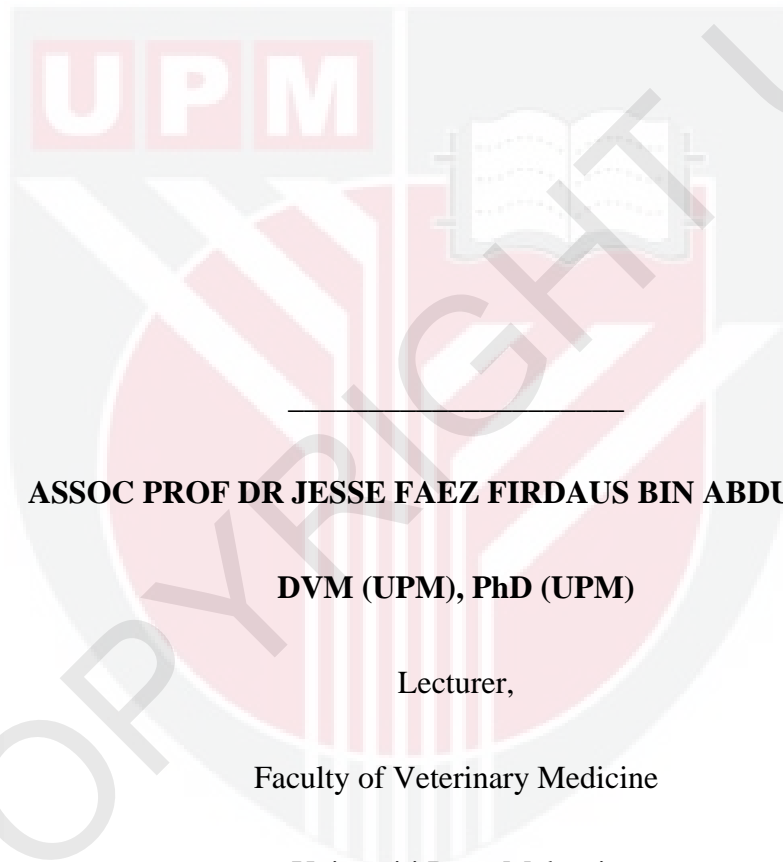
Lecturer, Faculty of Veterinary Medicine,

Director of Institute of BioScience,

Universiti Putra Malaysia

(Supervisor)

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ASSOC PROF DR JESSE FAEZ FIRDAUS BIN ABDULLAH

DVM (UPM), PhD (UPM)

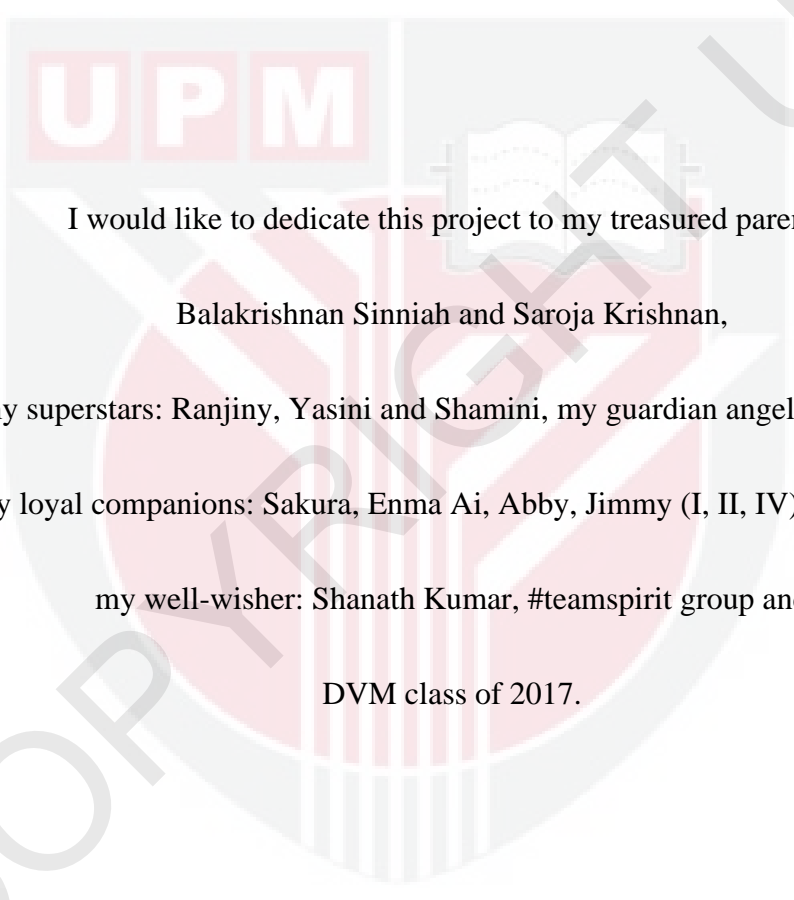
Lecturer,

Faculty of Veterinary Medicine

Universiti Putra Malaysia

(Co-Supervisor)

DEDICATION



I would like to dedicate this project to my treasured parents,
Balakrishnan Sinniah and Saroja Krishnan,
my superstars: Ranjiny, Yasini and Shamini, my guardian angel: Jayanthi,
my loyal companions: Sakura, Enma Ai, Abby, Jimmy (I, II, IV) and Billy.
my well-wisher: Shanath Kumar, #teamspirit group and
DVM class of 2017.

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ABSTRAK

Abstrak daripada kertas projek yang dikemukakan kepada Fakulti Perubatan Veterinar untuk memenuhi sebahagian daripada keperluan kursus VPD 4999 – Projek Ilmiah Tahun Akhir

KADAR JANGKITAN MELIOIDOSIS DALAM KALANGAN RUMINAN KECIL DI BAWAH PROGRAM LADANG ANGKAT, FAKULTI PERUBATAN VETERINAR,

UPM

Oleh

Thiviya Balakrishnan

2017

Penyelia: PROF DR ABDUL RAHMAN OMAR

Penyelia bersama: ASSOC PROF DR JESSE FAEZ FIRDAUS ABDULLAH

Melioidosis adalah saproozoonosis, penyakit tropika disebabkan oleh *Burkholderia pseudomallei* iaitu sejenis saprofit tanah yang sentiasa ada disekeliling, bakteria fakultatif anaerob, tiada spora, dan basilus gram negatif yang mobil dengan pewarnaan dwikutub, bakteria oksidase positif. Penyakit ini boleh ditemui dalam kalangan haiwan ternakan seperti kambing biri-biri, kambing, khinzir dan spesis kurang terjejas seperti lembu, kerbau, kuda, rusa, anjing, kucing, primat, burung,

ikan tropika, reptilia dan manusia. Ia merupakan satu kebimbangan kesihatan awam kerana ia adalah penyakit zoonotik dan penyakit ini juga adalah satu masalah kesihatan haiwan yang boleh membawa kepada produktiviti haiwan yang kronik. Ladang-ladang yang terpilih adalah dalam kalangan Program Ladang Angkat Fakulti Perubatan Veterinar, UPM. Kajian ini dijalankan atas 100 kambing and 100 kambing biri-biri di mana sampel darah diambil dan diproses untuk ujian serologi iaitu *Complement Fixation Test (CFT)*. *Complement Fixation Test (CFT)* dipilih sebagai penentuan kualitatif immunoglobulin G, antibodi IgG terhadap *Burkholderia pseudomallei*, antigen yang digunakan dalam ujian ini disediakan oleh Unit Serologi Institut Penyelidikan Veterinar Ipoh, Perak. Satu set soal selidik telah diberikan kepada setiap pemilik ladang untuk mengenal pasti faktor-faktor risiko yang berkaitan dengan Melioidosis. Data dianalisis berdasarkan kadar kelaziman. Daripada 100 sampel kambing, 1 sampel (1%) adalah positif bagi antibodi terhadap *Burkholderia pseudomallei* manakala semua sampel lain adalah diuji negatif (0%) untuk antibodi. Sampel yang diuji positif daripada kambing itu mempunyai 0% titik akhir di mana ia mempunyai skor 4 pembentukan butang lengkap. Semua keputusan negatif menunjukkan 100% titik akhir dengan lisis penuh, oleh itu tiada pembentukan butang. Di samping itu, analisis soal selidik itu mendedahkan bahawa semua bekalan air ladang untuk haiwan ternakan mereka dirawat, tetapi berbeza dari segi sistem pengurusan; Beberapa ladang mengamalkan pertanian semi-intensif dan intensif. Kesimpulannya, kadar jangkitan Melioidosis adalah sangat rendah dalam kalangan ruminan kecil di bawah Program Ladang Angkat, Fakulti Perubatan Veterinar, UPM.

Kata kunci: *Burkholderia pseudomallei*, Melioidosis, *Complement Fixation Test (CFT)*, kadar jangkitan, kambing, biri-biri

ABSTRACT

An abstract of the project paper presented to the Faculty of Veterinary Medicine in partial fulfilment of the course VPD 4999 – Final Year Project

SEROPREVALENCE OF MELIOIDOSIS AMONG SMALL RUMINANTS IN FOSTER FARM PROGRAMME OF FACULTY OF VETERINARY MEDICINE, UPM

By

Thiviya Balakrishnan

2017

Supervisor: PROF DR ABDUL RAHMAN OMAR

Co-Supervisor: ASSOC PROF DR JESSE FAEZ FIRDAUS ABDULLAH

Melioidosis is a saprozoosis, tropical disease caused by *Burkholderia pseudomallei* which is a ubiquitous soil saprophyte, facultative anaerobic bacteria, non-spore forming, and motile Gram- negative bacillus with bipolar staining, oxidase positive bacteria. This disease can be commonly found in domesticated animals such as sheep, goats, pigs, and other affected species such as cattle, buffaloes, horses,

deer, dogs, cats, primates, birds, tropical fish, reptiles and humans. It has public health concern as it is a zoonotic disease and the disease is also a significant animal health problem leading to chronic debility that reduces the productivity of animals. The study farms were selected from the Foster Farm Programme under Faculty of Veterinary Medicine, UPM. In this study, 100 animals from each species comprises of caprine and ovine were sampled. Blood samples were taken and processed for serology test, Complement Fixation Test (CFT). Complement fixation test opted for qualitative determination of immunoglobulin G, IgG antibodies against *Burkholderia pseudomallei*, whereby the antigen used in this test is prepared by Serology Unit of Veterinary Research Institute Ipoh, Perak. A survey with a set of questionnaire was given to each farm to identify the risk factors related to melioidosis. The data was analysed based on the prevalence rate. Out of 100 goat samples, 1 sample (1%) was positive for antibodies against *Burkholderia pseudomallei* while all the sheep samples were negative (0%) for the antibody. The positive sample from the goat had 0% end point whereby it has a score of +4 of complete button formation. All the negative results shows 100% end point with full lysis, thus no button formation. In addition, analysis of the questionnaire revealed that all the farms supplies treated water to their farm animals except vary in management system; few practices semi-intensive and intensive farming. As a conclusion, the seroprevalence rate of melioidosis is very low among small ruminants under the Foster Farm Programme of Faculty of Veterinary Medicine, UPM.

Keywords: *Burkholderia pseudomallei*, Melioidosis, Complement Fixation Test (CFT), seroprevalence, goat, sheep



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1.0 INTRODUCTION

Melioidosis is a saproozoonosis, tropical disease caused by *Burkholderia pseudomallei* which is a ubiquitous soil saprophyte, facultative anaerobic bacteria, non-spore forming, and motile gram negative bacillus with bipolar staining, oxidase positive bacteria which readily grows on routine culture media under aerobic condition (*Allen, 2005*). However, *B. pseudomallei* can multiply in the presence of nitrate or arginine under anaerobic condition (*Yabuuchi et al., 1992*) and survives in absence of nutrients in distilled water for several years (*Wuthiekanun et al., 1995*).

This disease can be commonly found in domesticated animals such as sheep, goats, pigs, and other affected species such as cattle, buffaloes, horses, deer, dogs, cats, primates, birds, tropical fish, reptiles and humans. It has public health concern as it is a zoonotic disease and the disease is also a significant animal health problem leading to chronic debility that reduce the productivity in animals and loss of valuable animal protein due to condemnation of carcasses at the abattoir (*Ketterer et al., 1986; Choy et al., 2000*).

The bacterium can be transmitted via percutaneous inoculation, open wound, ingestion or inhalation of pathogen from the contaminated environment (e.g., contaminated soil and surface water). Trans-placental infection has been reported in goats that results in abortion. Laboratory acquired infection and iatrogenic infection via contaminated antiseptics, injections, or other hospital or surgical equipment has been reported (*Merck Veterinary Manual, 10th Edition*).

Incubation period of melioidosis may vary, however, asymptomatic with presence of abscess may occur in goats, sheep and pigs. *B. pseudomallei* infection results

insuppurative or caseous lesions in lymph nodes or other organs. There are ranges of clinical signs including fever, anorexia and lymphadenopathy. In sheep and goats, lung abscesses and pneumonia are commonly found (Srikawkheaw, 2007).

The gold standard method for melioidosis diagnosis is isolation and identification of the organism from lesions and discharges which may take 4 to 7 days for identification. The samples collected from animals for isolation are blood, nasal swab, wound exudates, pus or tissues. The organism is readily cultured on routine diagnostic media and a selective media. For immunological method, the most common approach is antibody detection as it is simple and requires minimal laboratory equipment. Effective serologic screening tests include complement fixation test (CFT) and indirect hemagglutination (IHA), Enzyme Link Immuno Serological Assay (ELISA) and immunofluorescence antibody test (IFA) (Sirisinha, 2000). Serology has always been used for detection *B. pseudomallei* of anti-*Burkholderia* antibodies in horses, goats and dairy cattle in veterinary diagnosis (Thomas et al., 1988).

In Malaysia, the disease was first reported in 1913 (Stanton, 1932) which continuously reported among animals and humans since then (Strauss et al., 1969; Puthucheary et al., 1992; Vadivelu et al., 1995; Norazah et al., 1996; How et al., 2005; Azizi et al., 2005; Puthucheary, 2009; Deris et al., 2010). The seroprevalence data on melioidosis in Malaysia in 2009/2010 was reported highest among sheep in Pahang while goat recorded highest in Selangor (Naama, 2011). There is no any screening up to date have been recorded on melioidosis status in small ruminant farms of Foster Farm Programme FPV, UPM. Therefore, this project was designed

to obtain the current status of seroprevalence of melioidosis and the risk factor and its association towards the seroprevalence of melioidosis among small ruminant farms in Foster Farm Programme of FPV, UPM.



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