UNIVERSITI SAINS MALAYSIA
GERAN PENYELIDIKAN UNIVERSITI PENYELIDIKAN
LAPORAN AKHIR

*H*EALTH AND SAFETY: REAL TIME DETECTION OF BUKHOLDERIA PSEUDOMALLEI AND PATHOGENIC LEPTOSPIRA SPP USING A NEW PORTABLE AMPLIFICATION DIAGNOSTICS SYSTEM

PENYELIDIK

PROFESOR MADYA DR. AZIAH BT. ISMAIL

PENYELIDIK BERSAMA

DR. FOO KENG YUEN

2017

KEMENTERIAN PENDIDIKAN MALAYSIA

FINAL REPORT
GERAN PENYELIDIKAN PENGURUSAN BENCANA BANJIR
Laporan Akhir Skim Geran Penyelidikan Pembangunan Prototaip (PRGS)
Tahun 2015

A

RESEARCH TITLE: Health and safety: Real time detection of *Bukholderia pseudomallei* and pathogenic *Leptospira* spp using a new portable amplification diagnostics system

YEAR: 2015

THEME CODE: 1.0 *(Please refer attachment)*

SUBTHEME CODE:

Please Tick (√)

PHASE:	**01: Pre-Disaster**		**02: During Disaster**		**03: Post-Disaster**	√	
AREA:	**01: Preventive**		**02: Preparedness**	√	**03: Rescue anf Recovery**		
	04:Adaptation		**05: Mitigation**				

START DATE: 01/04/2015
END DATE: 31/12/2015

PROJECT LEADER: Assoc. Prof. Dr Aziah Ismail
I/C / PASSPORT NUMBER: 691206-03-5168

PROJECT MEMBERS: 1. Dr Foo Keng Yuen
2.

PROJECT ACHIEVEMENT *(Prestasi Projek)*

B

ACHIEVEMENT PERCENTAGE			
Project progress according to milestones achieved up to this period	**0 - 50%**	**51 - 75%**	**76 - 100%**
Percentage *(please specify the percentage #%)*			√
RESEARCH OUTPUT			
Fully developed prototype *(Please specify the percentage of completion)*	Early prototype – Require more samples for testing; need to develop		
Intellectual Property *(Please specify)*	-		

Application for pre-commercialization funds *(Please specify)*	-

HUMAN CAPITAL DEVELOPMENT

Human Capital	Number	Others *(please specify)*
No. Research Officer (RO)		
Fullname: IC / Passport No.: Staff No.:		
No. Research Assistant (RA)	1	
Fullname: IC / Passport No.: Staff No.:	Farhana Muhammad Yusof 921218-03-6222 -	
Total	1	

C EXPENDITURE *(Perbelanjaan)* **as Below:** *(RM)*

Budget Approved *(Peruntukan diluluskan)* : **RM 80,000**
Amount Spent *(Jumlah Perbelanjaan)* : **RM 80,000**

Balance *(Baki)* : **RM 0.000**
Percentage of Amount Spent : 100 %
(Peratusan Belanja)

D ADDITIONAL RESEARCH ACTIVITIES THAT CONTRIBUTE TOWARDS DEVELOPING SOFT AND HARD SKILLS
(Aktiviti Penyelidikan Tambahan Sampingan yang menyumbang kepada pembangunan kemahiran insaniah)

National

Activity	Date (Month, Year)	Organizer
(e.g : Course/ Seminar/ Symposium/ Conference/ Workshop/ Site Visit) Persidangan Kajian Banjir 2016 (Poster presentation)	4-6 June 2016	Program Pengurusan Bencana Banjir, KPT

E PROBLEMS / CONSTRAINTS IF ANY *(Masalah/ Kekangan sekiranya ada)*

The duration of the project is too short.

F. RECOMMENDATION *(Cadangan Penambahbaikan)*

The suggested project duration is 18 months.

G. RESEARCH ABSTRACT – Not More Than 200 Words *(Abstrak Penyelidikan – Tidak Melebihi 200 patah perkataan)*

Burkholderia pseudomallei is the causative agent of melioidosis, an infectious disease with multifarious manifestations. The gold standard for diagnosis is the culture that requires 2-7 days to obtain a result hindering successful treatment of the patients. Leptospirosis is a widespread infection of human and animals (Rao *et al.*, 2003), and locally it assumes considerable importance as a public health and economic problem. Early detection of *Leptospira spp.* is an essential requirement in its management practice. Microscopic agglutination test (MAT) is the gold standard with high sensitivity that detects the group-specific antibodies but it is complex due to the requirement of maintaining strains or isolates for the preparation of live antigens. The microscopy method using dark field microscope is reported as easier for visualizing leptospires in blood and urine but it lacks sensitivity. As an alternative to these methods, Orf2 and lip32L genes were used to develop the DNA-based diagnostics and detect for the presence of *Burkholderia pseudomallei* and pathogenic *Leptospira* spp. Two sets of primers were designed and used to optimize the amplification of the two specific regions of the desired genes. The amplification was successfully developed with the detection limit of detection limit of the orf2 and lipL32 amplification 10 pg/µl and 26.75 pg/µl respectively. Both tests showed the amplification of the two genes are specific and could be used to further verification and evaluation of the test. The findings suggested that the verification of the specific primers for both *Burkholderia pseudomallei* and pathogenic *Leptospira spp.* was successful. A probe-based amplification system will be further optimised with the presence of heating system as a complete portable system for the preparedness of the bacterial detection during the flood situation.