



**UNIVERSITY RESEARCH GRANT
FINAL REPORT**
**Geran Penyelidikan Universiti
Laporan Akhir**

A. PARTICULARS OF RESEARCH / MAKLUMAT PENYELIDIKAN:

- (i) **Title of Research:**
Tajuk Penyelidikan:
STUDIES ON ANTIDIABETIC AND ANTIOXIDANT EFFECTS OF LOCAL TUALANG HONEY IN STREPTOZOTOCIN-INDUCED DIABETIC RATS
- (ii) **Account Number:**
Nombor Akaun: 1001/PPSP/81202020

B. PERSONAL PARTICULARS OF RESEARCHER / MAKLUMAT PENYELIDIK:

- (i) **Name of Research Leader:**
Nama Ketua Penyelidik:
Dr Mohd Suhaimi Ab Wahab
- Name of Co-Researcher**
Nama Penyelidik Bersama:
- PM Siti Amrah Sulaiman ✓
 - PM K. N. S. Sirajudeen ✓
 - Dr Md. Salzihan Md. Salleh ✓
 - PM Sunil Gurtu ✓

- (ii) **School/Institute/Centre/Unit :**
Pusat Pengajian /Institut/Pusat/Unit :
PUSAT PENGAJIAN SAINS PERUBATAN

C. Research Platform (Please tick (I) the appropriate box):
Pelantar Penyelidikan (Sila tanda (I) kotak berkenaan):

- A. Life Sciences**
Sains Hayat
- B. Fundamental**
Fundamental
- C. Engineering & Technology**
Kejuruteraan & Teknologi
- D. Social Transformation**
Transformasi Sosial
- E. Information & Communications Technology (ICT)**
Teknologi Maklumat & Komunikasi
- F. Clinical Sciences**
Sains Klinikal
- G. Biomedical & Health Sciences**
Bioperubatan Sains Kesihatan



F. SUMMARY OF RESEARCH FINDINGS

Ringkasan dapatan Projek Penyelidikan

This study shows that tualang honey does not produce antioxidant effect in non-diabetic rats, neither does it increase or decrease blood glucose in normal/healthy rats.

Our results also show that tualang honey, in a dose dependent response, ameliorates oxidative stress in kidney of diabetic rats and also has hypoglycemic effect.

Tualang honey produces weight gain more than glibenclamide and/or metformin in experimental diabetes.

Tualang honey, glibenclamide and metformin do not produce any significant effect on food consumption in streptozotocin-induced diabetic rats.

Tualang honey reduces serum glucose to the level which is very similar and comparable to that of glibenclamide or metformin in diabetic rats.

Tualang honey decreases fructosamine whereas glibenclamide or metformin alone did not. Therefore, the results of fructosamine suggest that tualang honey produces better glycemetic control than glibenclamide or metformin in streptozotocin-induced diabetic rats.

However, glibenclamide or metformin combined with tualang honey produces much lower glucose concentrations and fructosamine levels.

Besides, glibenclamide or metformin combined with tualang honey reduces the elevated levels of creatinine, bilirubin, triglycerides and VLDL cholesterol.

So far, this study has been able to show that glibenclamide or metformin combined with tualang honey results in improved glycemetic control, and provides other additional antidiabetic benefits, not achieved with either glibenclamide or metformin alone.

Although glibenclamide and metformin exhibit some antioxidant properties, tualang honey shows much better antioxidant effect than glibenclamide and/or metformin in both pancreas and kidney.

Tualang honey in combination with metformin and/or glibenclamide augments NOT only the antioxidant effects BUT ALSO the hypoglycemic effects of metformin or glibenclamide.

This study has demonstrated and showed that tualang honey exhibits antioxidant effect in both pancreas and kidney. Unlike tualang honey, glibenclamide and/or metformin ameliorate(s) oxidative stress, to a certain extent, in kidney only but not in pancreas.

This study also suggests that the hypoglycemic effect of tualang honey might be linked to the protection of pancreas against oxidative stress and damage as well as increased insulin secretion.

Comparison of the antioxidant and hypoglycemic effects of tualang honey in non-diabetic and diabetic rats suggests that tualang honey offers therapeutic benefits only in a diseased state such as diabetes and/or hypertension which are characterized by oxidative stress.

Our results also show that tualang honey ameliorates oxidative stress in kidney and reduces elevated blood pressure in diabetic spontaneously hypertensive rats.

Similar effects were also observed following long-term administration of tualang honey to non-diabetic spontaneously hypertensive rats.

In kidney of non-diabetic spontaneously hypertensive rats, the results of the effects of tualang honey on mRNA expressions of the antioxidant enzymes and Nrf2 suggest that the antioxidant effect of tualang honey is mediated predominantly through translational and/or post-translational mechanism(s).

H.

a) Results/Benefits of this research

Hasil Penyelidikan

No. Bil:	Category/Number: Kategori/ Bilangan:	Promised	Achieved
1.	Research Publications (Specify target journals) <i>Penerbitan Penyelidikan (Nyatakan sasaran jurnal)</i>	4	8
2.	Human Capital Development		
	a. Ph. D Students	0	1
	b. Masters Students	1	0
	c. Undergraduates (Final Year Project)	0	0
	d. Research Officers	0	0
	e. Research Assisstants	0	0
	f. Other: Please specify	0	0
3.	Patents <i>Paten</i>		
4.	Specific / Potential Applications <i>Spesifik/Potensi aplikasin</i>		YES. BASED ON THE EXPERIMENTAL RESULTS, THERE IS A HIGH POSSIBILTY FOR A CLINICAL TRIAL
5.	Networking & Linkages <i>Jaringan & Jalinan</i>		
6.	Possible External Research Grants to be Acquired <i>Jangkaan Geran Penyelidikan Luar Diperoleh</i>		YES

- Kindly provide copies/evidence for Category 1 to 6.

b) Equipment used for this research.

Peralatan yang telah digunakan dalam penyelidikan ini.

Items Perkara	Approved Equipment	Approved Requested Equipment	Location
Specialized Equipment Peralatan khusus	Glucometer	Glucometer	Animal house
Facility Kemudahan			
Infrastructure Infrastruktur			

- Please attach appendix if necessary.