

**UNIVERSITI SAINS MALAYSIA
GERAN PENYELIDIKAN UNIVERSITI
PENYELIDIKAN
LAPORAN AKHIR**

**EFFECT OF SAGO STARCH PASTE INGESTION DURING
STEADY-STATE CYCLING ON SUBSEQUENT TIME-REAL
PERFORMANCE**

PENYELIDIK

DR. CHEN CHEE KEONG

PENYELIDIK BERSAMA

PROF. MADYA ASOK KUMAR GHOSH

2012

1. Nama Ketua Penyelidik: DR. CHEN CHEE KEONG

Profesor Madya/
Assoc. Prof.

Dr./
Dr.

Encik/Puan/Cik
Mr/Mrs/Ms

2. Pusat Tanggungjawab (PTJ): UNIT SAINS SUKAN, PPSP
School/Department

3. Nama Penyelidik Bersama: PROF. MADYA ASOK KUMAR GHOSH
Name of Co-Researcher

4. Tajuk Projek:
Title of Project

Effect of Sago Starch Paste Ingestion during Steady-State Cycling on Subsequent
Time Trial Performance

5. Ringkasan Penilaian/Summary of Assessment:

	Tidak Mencukupi Inadequate		Boleh Diterima Acceptable	Sangat Baik Very Good	
	1	2		3	4
i) Pencapaian objektif projek: Achievement of project objectives	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
ii) Kualiti output: Quality of outputs	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
iii) Kualiti impak: Quality of impacts	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
iv) Pemindahan teknologi/potensi pengkomersialan: Technology transfer/commercialization potential	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
v) Kualiti dan usahasama : Quality and intensity of collaboration	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
vi) Penilaian kepentingan secara keseluruhan: Overall assessment of benefits	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

6. Abstrak Penyelidikan

(Perlu disediakan di antara 100 - 200 perkataan di dalam Bahasa Malaysia dan juga Bahasa Inggeris. Abstrak ini akan dimuatkan dalam Laporan Tahunan Bahagian Penyelidikan & Inovasi sebagai satu cara untuk menyampaikan dapatan projek tuan/puan kepada pihak Universiti & masyarakat luar).

Abstract of Research

(An abstract of between 100 and 200 words must be prepared in Bahasa Malaysia and in English).

This abstract will be included in the Annual Report of the Research and Innovation Section at a later date as a means of presenting the project findings of the researcher/s to the University and the community at large)

Please refer to Appendix A

7. Sila sediakan laporan teknikal lengkap yang menerangkan keseluruhan projek ini.

[Sila gunakan kertas berasingan]

Applicant are required to prepare a Comprehensive Technical Report explaining the project.

(This report must be appended separately)

Please refer to Appendix B

Senaraikan kata kunci yang mencerminkan penyelidikan anda:

List the key words that reflect your research:

Bahasa Malaysia

Bahasa Inggeris

Kanji sago

Sago starch

Persekitaran panas

Hot environment

Prestasi Ujian Masa

Time trial performance

8. Output dan Faedah Projek

Output and Benefits of Project

(a) * Penerbitan Jurnal

Publication of Journals

(Sila nyatakan jenis, tajuk, pengarang/editor, tahun terbitan dan di mana telah diterbit/diserahkan)

(State type, title, author/editor, publication year and where it has been published/submitted)

- (b) **Faedah-faedah lain seperti perkembangan produk, pengkomersialan produk/pendaftaran paten atau impak kepada dasar dan masyarakat.**
State other benefits such as product development, product commercialisation/patent registration or impact on source and society.

NIL

* Sila berikan salinan/Kindly provide copies

- (c) **Latihan Sumber Manusia**
Training in Human Resources

- i) Pelajar Sarjana: **Hishamuddin bin Ahmad (Calon PhD)**
Graduates Students
(Perincikan nama, ijazah dan status)
(Provide names, degrees and status)

Did not graduate because thesis write-up not completed and candidature period had expired.
According to his supervisors (Prof Rabindarjeet Singh and Assoc. Prof Asok Kumar Ghosh),
this candidate has not submitted his chapter on "Results and Data Analysis". Please refer to
letter attached for detailed explanation.

- ii) Lain-lain:
Others

9. **Peralatan yang Telah Dibeli:**
Equipment that has been purchased

Nil



Tandatangan Penyelidik
Signature of Researcher

18/10/2012


Tarikh
Date

Komen Jawatankuasa Penyelidikan Pusat Pengajian/Pusat
Comments by the Research Committees of Schools/Centres

Project was not been completed and
only one abstract delivered.

DVC (PAT) has been notified
with regard to the procedure
by one PT who has taken
over the project from the
another PT who has left
work.

In view of the status, PTJ
PTD committee has agreed to
recommend this report.


PROFESOR AHMAD SUKARI HALIM
Timbalan Dekan (Penyelidikan)
Pusat Pengajian Sains Perubatan
Kampus Kesihatan
Universiti Sains Malaysia
16150 Kubang Kerian, Kelantan.

TANDATANGAN PENERUSI
JAWATANKUASA PENYELIDIKAN
PUSAT PENGAJIAN/PUSAT
Signature of Chairman
[Research Committee of School/Centre]


Tarikh
Date

BORANG LAPORAN HASIL PENYELIDIKAN

PPSP

Tajuk geran: Effect of Sago Starch Paste Ingestion during Steady-State Cycling on Subsequent Time Trial Performance

Penyelidik: Dr. Chen Chee Keong/Prof. Madya Asok Kumar Ghosh

Jenis geran: USM Short Term Grant

Tempoh geran: 2 tahun

Jenis laporan: Laporan Kemajuan Alatan di beli Ya:nyatakan.....

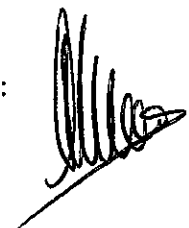
Laporan Akhir*: Tidak

OBJEKTIF SPESIFIK KAJIAN (sama spt dalam proposal asal)	SECARA RINGKAS TERANGKAN PENCAPAIAN/HASIL	OBJEKTIF TERCAPAI ATAU TIDAK
1. To determine the glycemc and insulinemic responses of sago starch paste ingestion and comparing these responses with those of a placebo	An abstract regarding the finding on differences in work output during the time-trial following the ingestion of sago starch and a placebo from this research project is attached. It has been presented in the 6 th Sports Science Conference, Kota Bharu, 2006. However, the Comprehensive Technical Report for this project does not include the blood parameters that were measured because all the data with blood analysis is still with the PhD candidate (Mr. Hishamuddin b. Ahmad) who was involved in this project	Not Achieved
2. To determine the differences in work output during the time-trial following the ingestion of sago starch and a placebo		Achieved

- *Laporan Akhir perlu disertakan salinan manuskrip dan surat yang dihantar kepada mana-mana jurnal untuk penerbitan.*

Nama Penyelidik Utama (PI): Dr. Chen Chee Keong
Tarikh: 18 April 2012

t.t.:



UNIVERSITI SAINS MALAYSIA
 JABATAN BENDAHARI
 KUMPULAN WANG PENYELIDIKAN GERAN USM(G04)
 PENYATA PERBELANJAAN SEHINGGA 31 JULAI 2009

Jumlah Geran:	RM	19,737.00	Ketua Projek:	DR CHEN CHEE KEONG
Peruntukan 2006 (Tahun 1)	RM	9,868.00	Tajuk Projek:	Effect of Sago Starch Paste Ingestion During Steady-State Cycling on Subsequent Time-Real Performance
Peruntukan 2007 (Tahun 2)	RM	9,869.00		
Peruntukan 2008 (Tahun 3)	RM	0.00	Tempoh:	15 Mac 2007 - 14 Mac 09
			No. Akaun:	304PPSP/6131477

Kwag	Akaun	PIJ	Projek	Donor	Peruntukan		Langgungan		Bayaran		Belanja		Baki Projek
					Projek	Semasa	Tahun	Semasa	Tahun	Semasa	Tahun	Semasa	
304	11000	PPSP	6131477	-	-	-	-	-	-	-	-	-	-
304	14000	PPSP	6131477	-	-	-	-	-	-	-	-	-	-
304	15000	PPSP	6131477	-	-	-	-	-	-	-	-	-	-
304	21000	PPSP	6131477	-	2,807.86	-	(2,807.86)	-	-	-	-	-	(2,807.86)
304	22000	PPSP	6131477	-	-	-	-	-	-	-	-	-	-
304	23000	PPSP	6131477	-	249.64	-	(249.64)	-	-	-	-	-	(249.64)
304	24000	PPSP	6131477	-	-	-	-	-	-	-	-	-	-
304	25000	PPSP	6131477	-	-	-	-	-	-	-	-	-	-
304	26000	PPSP	6131477	-	-	-	-	-	-	-	-	-	-
304	27000	PPSP	6131477	9,868.00	7,473.00	2,395.00	-	1,864.00	1,782.00	3,646.00	-	(1,251.00)	
304	28000	PPSP	6131477	-	-	-	-	-	-	-	-	-	-
304	29000	PPSP	6131477	9,869.00	5,588.00	4,321.00	-	-	-	-	-	-	4,321.00
304	32000	PPSP	6131477	-	-	-	-	-	-	-	-	-	-
304	35000	PPSP	6131477	-	-	-	-	-	-	-	-	-	-
304	A11559	PPSP	6131477	-	-	-	-	-	-	-	-	-	-
				19,737.00	16,078.50	3,658.50	-	1,864.00	1,782.00	3,646.00	-	-	12.50

Effect of Sago Starch Paste Ingestion during Steady-State Cycling on Subsequent Time Trial Performance

ABSTRACT

This study was undertaken to determine the effects of ingesting a specific form of a sago starch preparation before and during prolonged steady state cycling exercise in the heat on subsequent time-trial performance. Fifteen, heat acclimatised recreational cyclists completed two separate, randomised trials of 90 minutes cycling at 60% of VO_{2max} , followed by a 15-min performance ride in a temperature and humidity controlled chamber maintained at $\sim 31^{\circ}C$ and a relative humidity of $\sim 70\%$. Pre-exercise feedings consisted of sago starch paste (SBEx) amounting to 0.75g carbohydrate (CHO/kg body weight or a similarly flavoured, coloured and textured placebo (PBEx). During the steady state ride, subjects either consumed liquid sago starch paste supplying 15g CHO (SDEx) or a placebo (PBDex) at 20-minute intervals. To promote thermoregulation, subjects were fan cooled throughout both exercise periods. Core body temperatures were measured and recorded at 10-minute intervals during the steady-state ride and on completion of the performance ride. The amount of work produced in kilojoules (kJ) during the performance ride was taken as a measure of performance. Results indicated that the SBExSDEx trial produced significantly higher mean work output during the performance ride (146.9 ± 21.5 kJ or 33.2 % improvement, $p < 0.001$) compared to the PBExPDEx trial (110.3 ± 26.2 kJ). Core body temperatures prior to exercise were similar for both trials ($p = 0.45$) but at completion of the steady state ride, it was significantly higher during the PBExPDEx trial ($38.4 \pm 0.4^{\circ}C$) compared to the SBExSDEx trial ($38.1^{\circ}C$, $p = 0.001$). Similarly, core body temperature at the end of the time-trial was significantly higher during the PBExPDEx trial ($38.5 \pm 0.4^{\circ}C$) compared to SBExSDEx trial ($38.3 \pm 0.3^{\circ}C$, $p = 0.017$). This present study indicated that sago starch paste feedings before and during prolonged sub-maximal exercise can improve time-trial performance while at the same time attenuating the rise in core body temperature.