

RESEARCH ACTIVITIES ON PROSPECTIVE FRUITS IN SARAWAK







ENGKAL

by: Lau Cheng Yuon Pearlycia Brooke Rajmah Muzli Razili &Margaret Abat





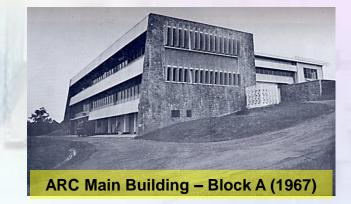




AGRICULTURE RESEARCH CENTRE, SEMONGOK Department of Agriculture Sarawak.

Add:

PUSAT PENYELIDIKAN PERTANIAN SEMONGOK, P.O. Box 977 Jalan Puncak Borneo, 93720 Kuching, Sarawak. Tel: 082-611171, Fax: 082-611178



Germplasm Collection

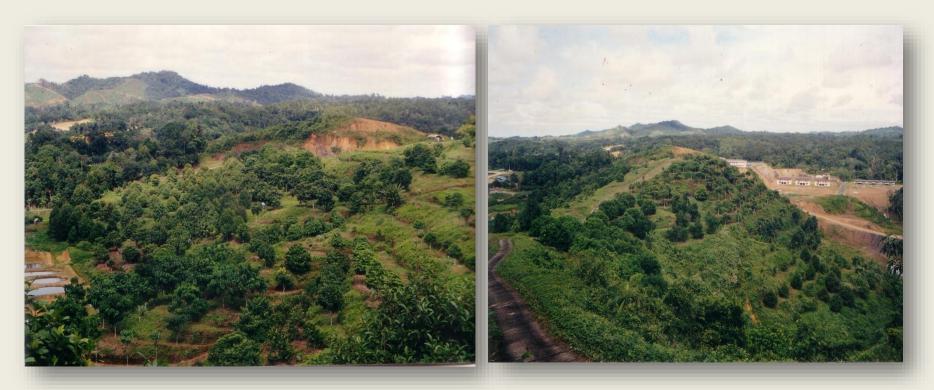
- Ex-situ germplasm plot at ARC, Semongok and Layar Integrated Station are maintained and monitored.
- Records of 75 spp of indigenous fruits = 18 plant families.

• Four new in-situ germpasm plots established, namely;

- 1. Kpg Kakeng, Serian, Kuching Nephelium spp.
- 2. Kpg Bungai, Sibuti, Miri Mangifera spp
- 3. REDEEMS, Bau, Kuching Durio spp and local herbs
- 4. Long Peluan, Baram, Miri Indigenous fruit types

*Note: 1 & 2 under UNEP/GEF Program.

Ex-situ Conservation: Layar Integrated Agriculture Station



- Located in Layar, Betong
- Conservation and germplasm collection activities were conducted since the 90's
- 1512 accessions consisted of 54 fruit species and 13 plant families

In-situ Conservation: Kpg. Kakeng, Serian (UNEP-GEF Project)















Landscaping (non-food)

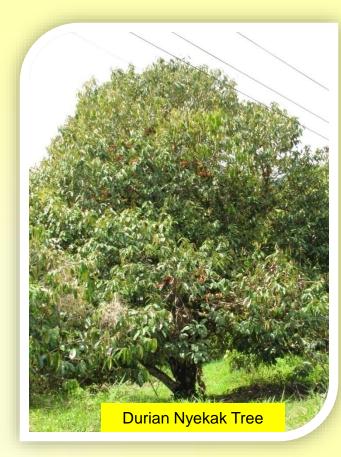
25 Local fruit trees have been identified with
-attractive plant formations,
-beautiful flowers and unique fruits,
-peculiar leaf color, form and shape

Recommended for beautifying and landscaping resorts, parks, town and city.

(Voon, 1998)



Belimbing Hutan





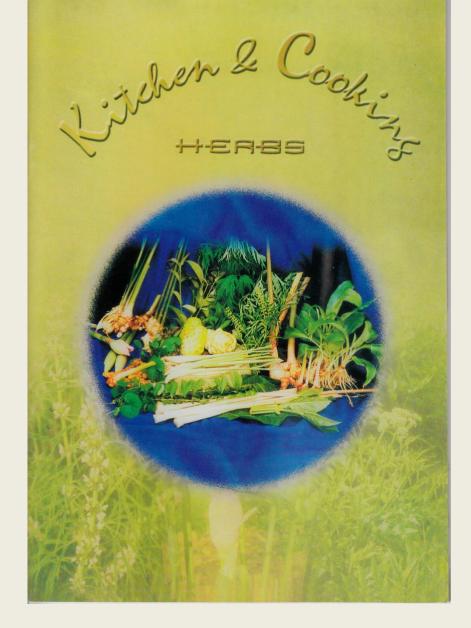
Durian Nyekak Flower

DOCUMENTATION

EDIBLE WILD PLANTS IN SARAWAK

Compiled by:

Paulus Amin Det Lau Cheng Yuon Shariah bt, Umar Pearlycia Brooke Rajmah Muzil bt, Razili Hairani bt, Ismawi Liew Siew Meng

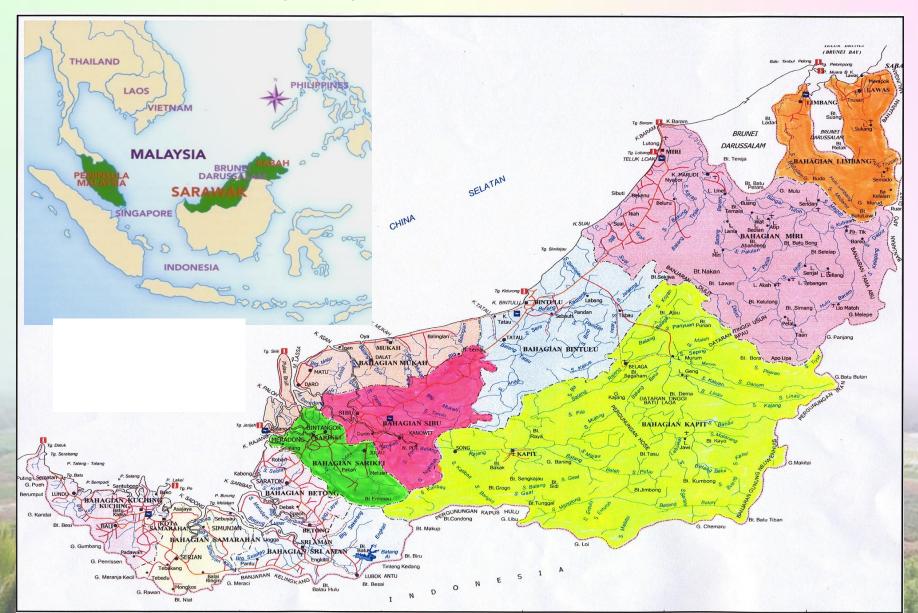


PUBLISHED IN 2013

PUBLISHED IN 2003

Dabai and its Choice

• Found naturally only in Sarawak.





Dimocarpus longan

- Dabai one of the six most popular local indigenous fruits in Sarawak that have good potential for commercialisation (Voon, 2003).
- Relatively pest and disease free.
- Has the 'green marketing' advantage and can be produced under the Integrated Fruit Production (IFP) system **(Lau, 2011).**









DABAI AND NUTRITIONAL COMPOSITION



Nutritional composition per 100 g of Dabai fruit

Energy (kcal)	339
Moisture (%)	41.3
Protein (g)	6.5
Fat (g)	26.2
Carbohydrate (g)	22.1
Fibre (g)	4.3
Ash (g)	2.3

per 100 g of Dubui huit	
Mineral Potassium (mg)	810
Sodium (mg)	200
Calcium (mg)	200
Magnesium (mg)	106
Ion (mg)	13
Managanese (mg)	8
Cuprum (mg)	7

Dabai is a nutritious and high energy fruit. It has **high antioxidant** capacity and rich in minerals such as potassium, sodium, magnesium and calcium.

Cold storage of dabai fruit (*Canarium odontophyllum* Miq.): Effect of packaging methods and storage duration on quality

Lau, C.Y. and Fatimah, O.

Department of Agriculture, Sarawak, 2007

- DOA research led to a major breakthrough in 2006.
- Frozen dabai retained acceptable appearance, flavor and taste up to a year.
- Prepared for consumption by 'cooking' in boiling water for about 5 minutes.
- Available fruit supply during off-season.

Frozen dabai on sale during offseason





ARC Superior clones-Laja & Lulong



Launching of dabai clones by Sarawak's DCM Datuk Patinggi Tan Sri Dr. George Chan Hong Nam in 2006.

A CARD BOAT DE BRAND DE BARBARCHET BEN KANA, CARD BOAT DE BRAND DE BARBARCHET BEN KANA, CARD BOAT DE BRAND DE BARBARCHET BEN KANA.

• Launched in 2006.

• Vigorous and they begin to bear fruits as early as 3 years after planting.

• Initial yield- 10 kg/tree and can gradually increase to 80-100 kg/tree when the tree reaches 10 years and above (Lau and Voon, 2007)

• 'Laja' is triangular with concave sides while the seed of 'Lulong' is more rounded or convex on its sides.

NEW SUPERIOR DABAI CLONES

Table 3: Nutritio	nal Value	s of Fruit
COMPONENT (%/100 gm)	LAJA	LULONG
Protein	6.8	5.5
Fat	44.3	33.9
Carbohydrate	37.2	45.6
Fibre	8.1	11.6
Ash	3.8	3.4
Table 4: Physical C	haracteris	stics of Fruit
PARAMETER	LAJA	LULONG
Individual fruit weight (g)	18.9	13.9
Fruit length (cm)	4.5	3.6
Flesh th <mark>ickne</mark> ss (cm)	0.35	0.31
Seed weight (g)	7.7	5.0
Edible portion (%)	61.5	64.0

Post-Harvest & Food Technology R&D

Objectives:

- Optimize the quality & suitability of produce for market requirements
- Improve application & efficiency of post-harvest system for food
- Assure food security & safety, improve trade & market access
- Product development & process optimization



Post-Harvest & Food Technology Centre

DABAI PRODUCTS







PITTED DABAI

DABAI PASTE



DABAI MAYONNAISE

DABAI KEY CHAIN

DABAI NUT

DABAI CHARCOAL

DABAI USES



Mode In Malaysia

DABAI SOAP

DABAI SOAP (extended to Biosynergy Sdn. Bhd. & Borneo To The World)



DABAI USES



DABAI FRIED RICE (extended to Riverside Majestic Hotel and Serapi Corner)

DABAI FRIED RIGE

DABAI USES













LULUN KUNDEA (PANSUH)

Assimilating local preparation style

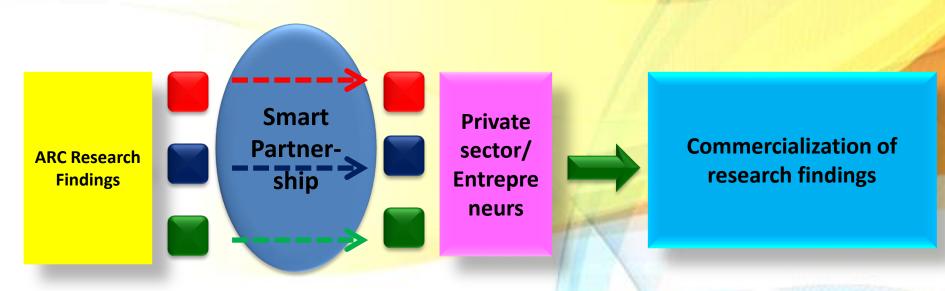
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PULUT PANGGANG KUNDEA

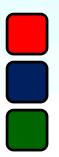
LEMPIS KUNDEA (PAIS DABAI)



SMART PARTNERSHIP SYSTEM



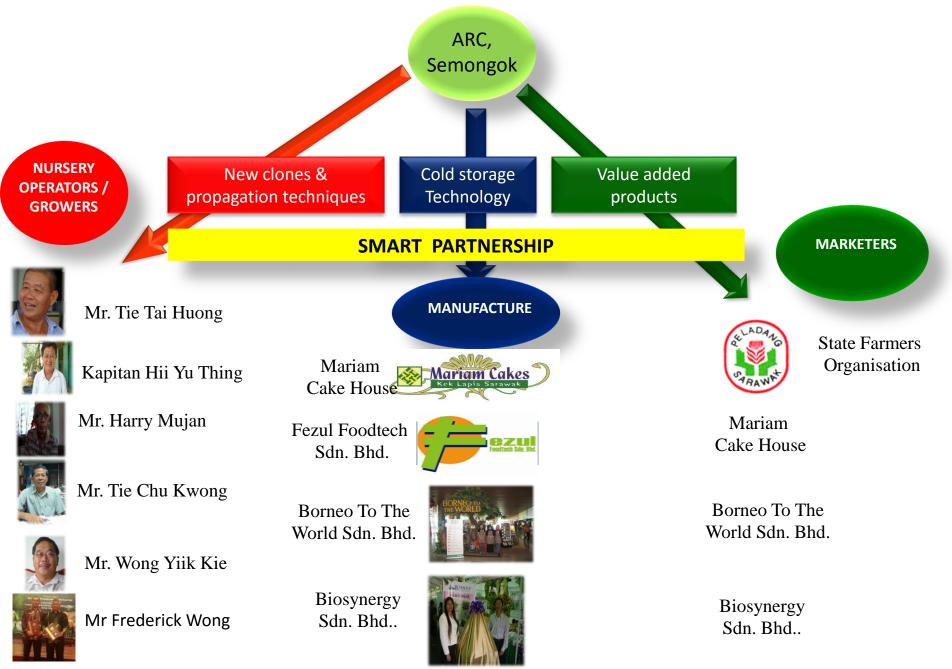
Supply chain stakeholders



Growers & Nursery operators Manufacturer & Entrepreneurs

Marketer

Collaboration between Public and Private Sectors on Dabai



Nursery Operators



Name: Mr. Harry Mujan. Address: Harry Mujan & Son Entreprise, Kampung Sg. Jerup, Bayai Undup, Sri Aman Clones Available: 3 Dabai clones (Lulong, Dabai Kapit , Dabai Song)



Name: Kapitan Hii Yu Thing Address: Hii Nursery, Durin, Sibu Clones Available: 2 Dabai clones (Pulau Keladi and Lulong)



Name: Mr. Tie Tai Huong Address: Perfect Nursery Farm, KM11, Jalan Repok ,Sarikei Clones Available: 6 Dabai clones (Laja, Lulong, Bayong, Egg Yolk, Intermediate and Rapok). 3 commercial nursery in Sarikei, Sibu and Sri Aman divisions were engaged and promoted as main producers of high quality dabai planting materials in the region.



Field Budding





Harry Mujan (Harry Mujan & Son Enterprise) – Sri Aman

Dabai varieties

 Other dabai varieties: 'Song', 'Kapit', 'Intermediate', 'Egg Yolk', 'Tarat', 'Red Dabai' and 'Pulau Keladi' (Brooke and Lau, 2013).





Red Dabai

Dabai Nucleus Suppliers

Total Area: ± 45 Acres (>380 points)



•Mr Lau Sie Jung •Mr Wong Yiik Ong •Mr Lau Ting Hua

• Mr Chu Ah Lik

• Mr Liong Ulei Ing

•Mr Chuo Tuck Lick

• Mr Yeo

Mr Tie Tai

Huong

(Leader)

•Mr Liew Nguk Kiaw

•Mr Wong Chiu Wong

•Mr Lung Siew Chou

5mt/season

Total estimated supply: 10mt/season

Kanowit



Mr Wong Choon Huat (Leader)

Kong Nee Kieu
Kong Shau Kuan
Tan Chin Soon
Kiew Yan Fui
Chia Fung Kiun
Kong Kim Chew

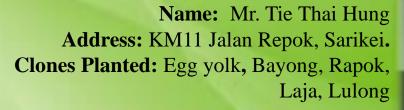
Lai Yee Hee
Sanau Ak Mumun
Luncha Ak Enchau
Kong Wun Kiong
Wong Siew Hii
Hii Hieng Chan

<u>5mt/season</u>

Growers – Clonal Plantings.

Name: Mr. Tie Chu Kwong Address: Sibu Clones Planted: Rapok, Lulong.

Name: Mr. Wong Yiik KieAddress: KM 9, Jalan RepokClones Planted: 2 Dabai clones (Laja and Lulong)







Name: Mr Frederick Wong Address:Sg. Mador, Meradong District. Clones to be planted: Lulong, Rapok

DABAI PRODUCTS MANUFACTURERS



ENTREPRENEURS





FEZUL FOODTECH SDN. BHD NO. 20 LOT 1291, BLOK 3, KILANG TERES MTLD, JALAN BAKO, 93050 KUCHING, SARAWAK EMAIL : fezulfoodtech@yahoo.co m TEL : 082-475294 FAKS : 082-

475289







BORNEO TO THE WORLD SDN. BHD.



Biosynergy Sdn. Bhd.

DABAI SOAP

(p)

DABAI SOAP

的

TARATAN PERT

BORNEO

DABAI SOAP

SERAPI CORNER & MAMA BAKERY









DABAI OMELLETTE

DABAI FRIED RICE

DABAI ICE CREAM





Manufactured by / Dibuat Oleh:

SEE LIAN HUAT ICE CREAM SDN. BHD. (126305-V) Lot 761 Blk 8 MTLD, Phase 3, Demak Laut Industrial Park, Jalan Bako, 93050 Kuching, Sarawak, East Malaysia. Email: mayhua.aiskrim@gmail.com Website: www.mayhuaicecream.com





Always Keep Frozen. (-20°c) Content Approx: 55 ml.



Driginal Flavour



MS 1500 : 2009 1 120-03/2014 **AeST**



Original Flavour

RAMUAN:

Air Filter, Gula, Sarawak Dabai (Canarium Odontophyllum Mig), Minyak Kelapa Sawit, Serbuk Susu, Serbuk Whey, Segar Santan Kelapa, Pengemulsi dan Penstabil Sebagai Kondisioner, Mankanan yang Dibenarkan, Perisa dan Pewarna Asli yang Dibenarkan (Mengandungi Tartrazin).

CONTAINS:

Filtered Water, Sugar, Sarawak Dabai (Canarium Odontophyllum Mig), Palm Oil, Fresh Coconut Milk, Milk Powder, Whey Powder, Emulsifiers, Stabilisers as Food Conditioners and Approved Flavouring and Natural Colourings (Contains Tartrazine).

Nutrition Facts Serving Size: 100g Serving Per Package: 1	
	Per 100g
Energy 259.2 Kcal	(1085 KJ)
Protein	5.8 g
Carbohydrate	45.9 g
Fat	5.8 g
Sugar	5.5 g

SEE LIAN HUAT ICE CREAM SDN. BHD.



DABAI CHOCOLATE DOA/MCB/SIAS COLLABORATION 2016



PROMOTION OF DABAI PRODUCTS

- DOA Sarawak continues to pursue industry development in its desire to improve the dabai supply chain and boost commercialisation.
- Favourable environment was created to encourage involvement of private sector in the supply chain operations of dabai fresh fruits and products.









gets its day

Dabai has huge market potential — Ja

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Compulsory licence for

Launching of Dabai Month by Deputy Chief Minister YB Datuk Patinggi Tan Sri (Dr.) Alfred Jabu (12th July 2012)



Dabai Festival in Kapit (13th-14th November 2012)

Launching of dabai as a signature fruit of Sarawak during MAHA International by Governor of Sarawak (November 2012)

LAUNCHING OF DABAI MONTH

4 (KFA4/2012) JABATAN PERTANIAN SARAWAK

FRED JABU ANAK NUMP

RI PEMODENAN PERTANI

MCARAN BULAN DABAI BERSEMPENA DENGAN

2012

CI TAN SR

Date: 12th July, 2012 venue: riverside majestic hotel

DABAI FESTIVAL IN KAPIT 14th NOVEMBER 2012



Dabai Pansuh Machine



LAUNCHING OF DABAI AS A SIGNATURE FRUIT OF SARAWAK DURING MAHA 2012, SERDANG BY

TUAN DI-PERTUA NEGERI SARAWAK, TUAN YANG TERUTAMA TUN DATUK PATINGGI ABANG HAJI MUHAMMAD SALAHUDDIN



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IN OPACING

MARCO ADDRESS TO

PERISHABLE Dabai Promotion at Hangzhou, China on 13th January 2010.







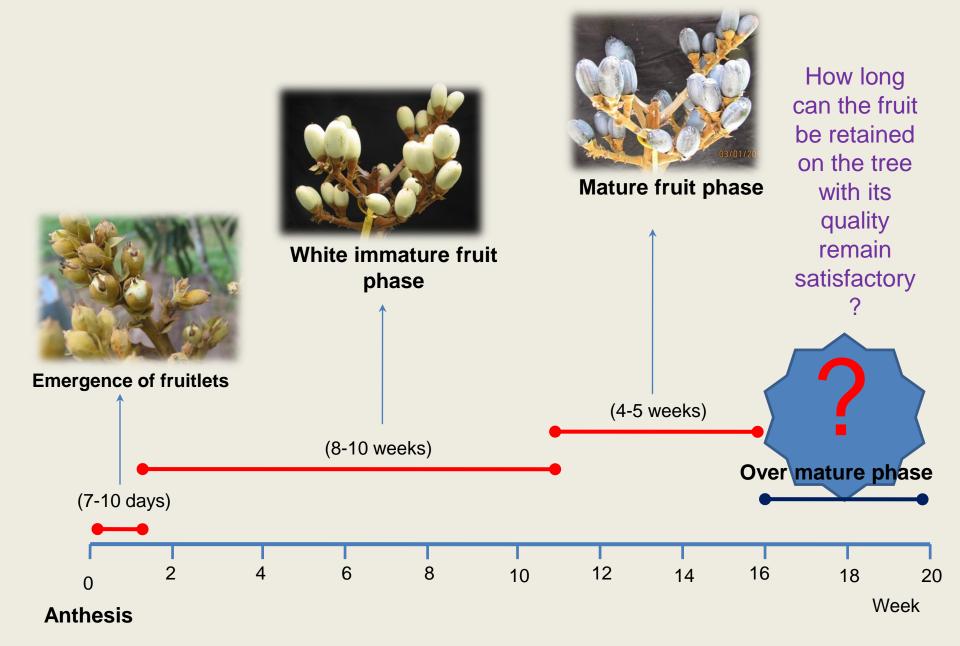
TERUNG ASAM JUICE

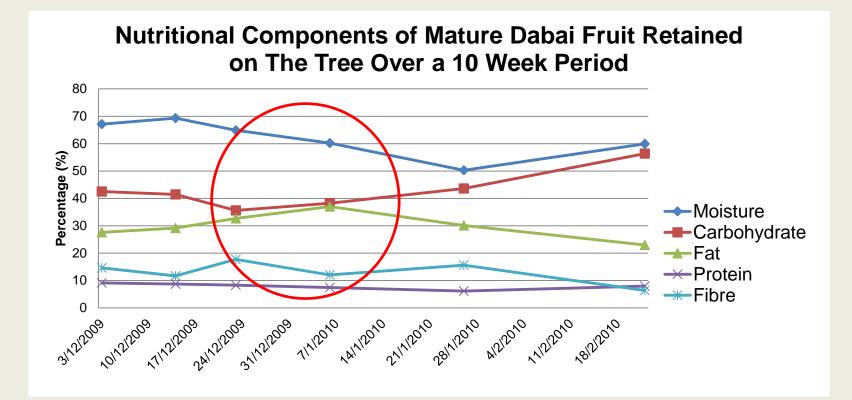
DABAI FRIED RICE

RESEARCH FINDINGS (PUBLICATIONS) ON DABAI

- × ARC & UPM, Serdang = 28 papers & articles to-date, namely;
- International papers = 12
- × National = 2
- × Local = 14.

Timeline Chart of Dabai Fruit during Maturation Process





- Harvested earlier at about 2 weeks after full maturity.
- Harvest when mature fruit have most favorable levels of fat and protein and optimal physical appearance.

CONCLUSION

- Fruit mature after about 4 months from anthesis.
- White immature fruit phase: 9-11 weeks
- Semi-mature to mature: 4-5 weeks
- Mature fruits can be retained on the tree for up to 5 weeks and quality remains satisfactory.
- Recommended harvest time is about 2 weeks after full maturity

GI Certification of Dabai

- Dabai been granted Geographical Indication (GI) protection certification by the Malaysian Intellectual Property Corporation (MyIPO).
- The certification gives dabai the recognition necessary to the creation of a high quality product.

Dabai, terung asam get protection

KIICHING: Two more indigenous products have been granted the Geographical Indications (GI) protection by the Malaysian Intellectual Property Corporation (MyIPO). The products are the Sarawak

Dabai (effective from 9 March, this year) and the Sarawak Terung Asam (effective from 30 June)

The GI certificates for the two products were presented to Minister of Modernisation of Agriculture Datuk Patinggi Tan Sri Alfred labu when he officiated at the opening of Agriculture Research Officers' Meeting 2011 held at Four Points by Sheraton Kuching here yesterday. Three local traditional rice vari-

eties had earlier been granted the Geographical Indications protec-tion by MyIPO.

They are the Beras Bario (effec tive from 22 February, 2008), Beras Biris and Beras Baiong (effective from 17, February 2009).

State Agriculture Departm Director Lai Kui Fong said the department's research officers had been instrumental in registering local indigenous products for protections under the Geographical Indications, which is a form of product branding.

"GI protection will ensure authenticity, consistency and Division of the State Agriculture quality of the products. It will Department, being a generaadd value to the products and effectively increase farmers' income and subsequently cre- of seminars and conference proates greater demands for the ceedings, pamphlets, technical

(Front, from left) Deputy Chief Minister Datuk Patinggi Tan Sri Alfred Ja and Marketing) Datuk Mong Dagang, Assistant Minister of Agricultu Modernisation of Agriculture Datu Dr Ngenang Janggu giving the thur products at home and abroad." reports on crop techn

he said. According to Lai, the Research tor of technology, has produced many publications over the years

ages, and the annual re esearch Division. "Our research offic written bimonthly/m cles on crop researc newspaper. Since this in 2007, a total of 90 a been published," he

SARAWAK DABAI

TING 201

dik 2011)

G12018-00001 , Sarawak Informat Pⁿ day of March 2010 Pⁿ day of March 2020 in respect of the following goo

MyIPO

Sarawak Dabai: Fresh fruit, frozen fruit and value added (

Perbadanan Harta Intelek Malaysia

Intellectual Property Corporation of Malaysia

GEOGRAPHICAL INDICATIONS ACT 2000 GEOGRAPHICAL INDICATIONS REGULATIONS 2001

CERTIFICATE OF REGISTRATION

[Subregulation 29(3)



ISAU and NEYKAK have also been granted GI in 2016 "A Method of Maintaining Healthy Blood Cholesterol Levels and Improvement of Antioxidant Status" Patent Application No.: PI2010005011 Filing Date : 25 October 2010 "An Edible Oil As $m{\psi}$ ocoa Butter Substitute for Maintaining Healthy Blood Cholesterol Level and Improvement of Antioxidant Status" Filing Date : 25 November 2010 Patent Application No.: PI2010005584 "A Vegetables Oil And/Or Fats" Filing Date : 19 December 2012 Patent Application No.: PI20085159 For Official Use Patents Form No. 16 PATENTS ACT 1983 For For Official Use Patents Form No. 16 Patents Form No. 16 APPLICATION NO: PATENTS ACT 1983 PATENTS ACT 1983 REQUEST TO AMEND APPLICATION APPLICATION NO: PPLICATION NO FOR GRANT OF PATENT Filing Date PLICATION REQUEST TO AMEND APPLICATION FOR GRANT OF PATENT (Regulations 46 and 45(3)) Filing Date Request received or Riquest (Regulations 46 and 45(3)) To: The Registrar of Patents Patents Registration Office Request received on Fee received on To: The Registrar of Patents Kuala Lumpur, Malaysia Patents Registra Patents Registration Office Fee received on Amount Kuala Lumpur, M Kuala Lumpur, Malaysia *Cheque / Postal Order / Money Order / Draft / Amount: Cash No. *Cheque / Postal Order / Money Order / Draft / *Cheque / Postal Order / Money Order / Draft / Cash No. Cash No. Date of mailing Please submit of opy of this Form together Date of mailing: with prescribed f Applicant's or Agent's file reference Date of mailing ov of this Form together Please submit one Please submit one copy of this Form toge Applicant's or Agent's file reference with prescribed fe Applicant's or Agent's file reference with prescribed fee IN THE MATTER OF Patent Application No.: PI20083159 Filing Date : 19 December 2012 IN THE MATTER OF IN THE MATTER OF Filing Date : 25 November 2010 Patent Application No.: PI2010005584 Filing Date : Certificate Application No.: Filing Date : 25 October 2010 Patent Application No.: PI2010005011 Certificate Application No.: Filing Date : _ Other documents (identify) Certificate Application No.: Filing Date : ____ ERSON(S) MAKING REQUEST Other documents (identify) : Other documents (identify) II PERSON(S) MAKING REQUES Universiti Putra Malaysia Name : Universiti Putra Malaysia Address : Putra Science Park, Universiti Putra Malaysia, 43400 UPM Serdang, Name : Universiti Putra Malaysia Selangor Name Address : Putra Science Park, Universiti Putra Malaysia, 43400 UPM Serdang, Address : Putra Science Park, Universiti Putra Malaysia, 43400 UPM Serdang, Address for service in Malaysia Selangor Universiti Putra Malaysia, 43400 UPM Serdang, Selangor, Malaysia Selangor Address for service in Malaysia Universiti Putra Malaysia, 43400 UPM Serdang, Selangor, Malaysia Address for service in Malaysia Telephone Number (if any) Universiti Putra Malaysia, 43400 UPM Serdang, Selangor, Malaysia 03-89471286 Telephone Number (if any) Fax Number (if any) Telephone Number (if any) 03-89471286 03-89471286 03-89464121 Fax Number (if any) Fax Number (if any) 03-89464121 03-89464121 III REQUEST The person (s) above-identified request(s) the Registrar that, after *his/their paying the prescribed fee, the clerical error or obvious mistake in the document identified above may, III. REQUEST The person (s) above-identified request(s) the Registrar that, after *his/their paying the III. REQUEST in accordance with Section 79 of the Patents Act 1983, be corrected as attached. prescribed fee, the clerical error or obvious mistake in the document identified above may The person (s) above-identified request(s) the Registrar that, after *his/their paying the in accordance with Section 79 of the Patents Act 1983, be corrected as attached. prescribed fee, the clerical error or obvious mistake in the document identified above may, in accordance with Section 79 of the Patents Act 1983, be corrected as attached.

Terung asam products



TERUNG ASAM CHEESE CAKE



TERUNG ASAM JUICE



Terung Asam Sarawak (Solanum lasiocarpum)

Food Microbiology Laboratory

Real time
 microbiological shelf life
 study to assure that
 products remain safe and
 acceptable for
 consumption in a certain
 period of time.

• Determine the potential shelf life during storage.



Chemistry Laboratory at ARC (MS ISO/IEC 17025:2005 accredited)

- Assay of phytochemicals and antioxidant capacity – total phenolic content (TPC), total flavonoid content (TFC), total anthocyanin, DPPH, ABTS and FRAP
- Profiling of fatty acid methyl esters (FAMEs) – method development is in progress.







Chemistry Laboratory at ARC (MS ISO/IEC 17025:2005 accredited)

- Major and trace elements, metal contaminants
- Proximate nutrition analyses







Flow injection mercury a system (FIMS)

TG of Dabai

- Test Guidelines of Dabai was prepared by ARC/DOA, Sarawak and submitted to PVP office in April, 2013.
- On 3rd December 2014, Dr Sim S.L. presented Dabai TG at a PVP Technical meeting, KL.
- Dabai TG was presented at a workshop held on 2-4 March 2015, KL.
- A test run on Dabai TG was executed together by ARC team and MOA team at Mr Tie Thai Hung farm, Sarikei on 1st week December 2015.

ARC/UPM/a Japanese Company – Exploring the prospect of Dabai patents 15th March 2016, Serdang.





"FRUIT BASKET" project – SPU LOW HANGING FRUITS"project–MOARE/DOA













R

ATAN



N. SEMBILAN 55, PERLIS 45

Utusan Sarawak

Hasil pertanian Sarawak catat sejarah baru tembusi pasaran antarabangsa Mata Naga dieksport

2,676 ASKAR AS MATI PERANG

mjukkan bush Mata Naga segar yang MAS Kargo, di Lapangan Terbang An



MoA signing DOA/MALESIANA TROPICALS



Meristem culture of banana







