HOST:

ORGANIZER:

The Need for Stringent Quality Guidelines for Local Stingless Bees End-Products

Assoc. Prof. Dr Mahaneem Mohamed

Department of Physiology, School of Medical Sciences,
Universiti Sains Malaysia

International Stingless Bess Conference & Workshop 2017
Hotel Permai, Kuala Terengganu, Terengganu,
MALAYSIA
18 – 20 Julai 2017

Outline:

- Types, composition and biological properties
- End-products
- Traditional Medicine/ Natural products
- Quality
- Safety
- Efficacy
- Cosmetics

honey

wax

pollen

apilarnil

Honey bees

Bee bread

venom

Royal jelly

propolis

honey

Stingless bees

Bee bread

propolis

Composition (honey)

- carbohydrates (fructose, glucose, maltose, sucrose)
- proteins – enzyme glucose oxidase
- minerals – calcium, iron, zinc
- vitamins – A, B, C, E, K
- phenolic compounds (flavonoids & phenolic acids)

Biological properties (honey)

- antioxidant (protects against free radicals)
- anticancer
- antibacteria
- antiulcer
- antidiabetes

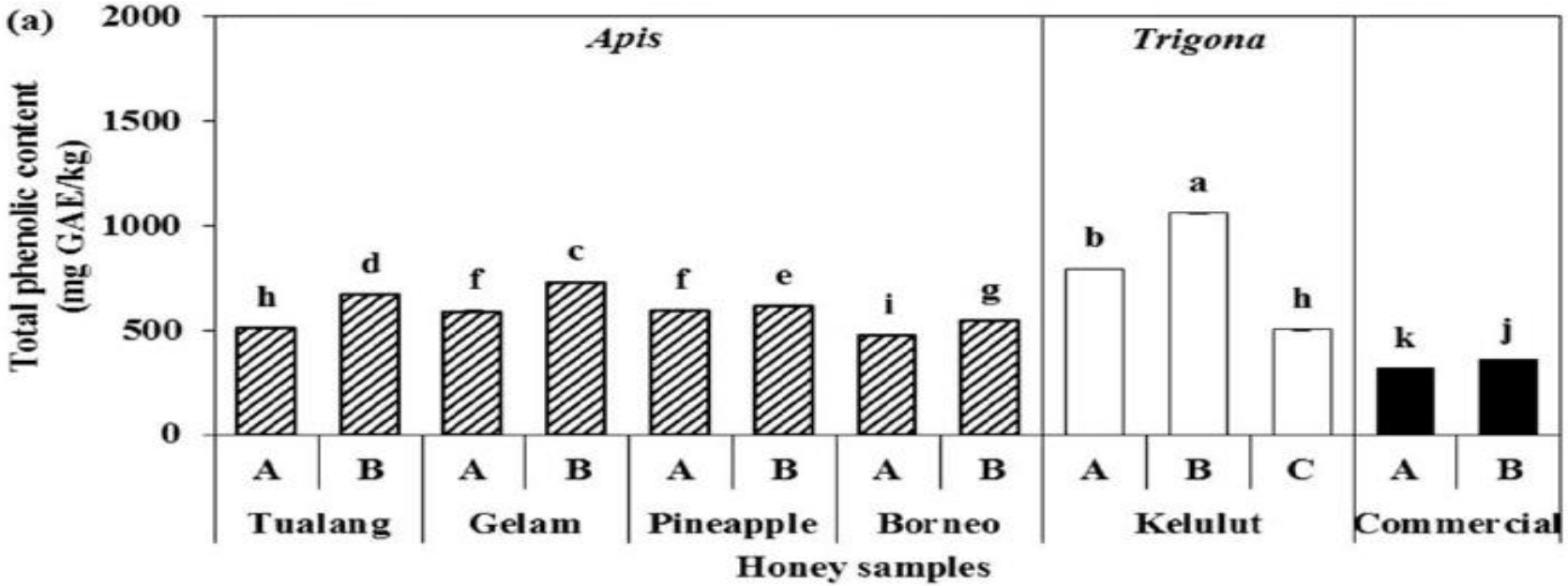
ELSEVIER Agriculture and Agricultural Science Procedia 2 (2014) 150 – 155

"ST26943", 2nd International Conference on Agricultural and Food Engineering, CAFEi2014"

Total Phenolic Contents and Colour Intensity of Malaysian Honeys from the *Apis* spp. and *Trigona* spp. Bees

Siok Peng Kek[a], Nyuk Ling Chin[a,*], Yus Aniza Yusof[a], Sheau Wei Tan[b], Lee Suan Chua[c]

[a]*Department of Process and Food Engineering, Faculty of Engineering, Universiti Putra Malaysia, 43400 UPM Serdang, Selangor, Malaysia*
[b]*Laboratory of Vaccines and Immunotherapeutics, Institute of Bioscience, Universiti Putra Malaysia, 43400 UPM Serdang, Selangor, Malaysia*



International Journal of GEOMATE, Sept., 2017, Vol. 13, Issue 37, pp. 28-33
Special Issue on Science, Engineering & Environment, ISSN: 2186-2990, Japan
DOI: http://dx.doi.org/10.21660/2017.37.2703

ANTIOXIDANT PROPERTIES AND INHIBITORY EFFECTS OF TRIGONA HONEY AGAINST *Staphylococcus aureus* PLANKTONIC AND BIOFILM CULTURES

*Wen Jie Ng[1,2], Yek Jia Chan[1], Zhi Khoon Lau[1], Ping Ying Lye[1] and Kah Yaw Ee[1,2]

[1]Faculty of Science, Universiti Tunku Abdul Rahman, Malaysia; [2]Centre for Biodiversity Research, University Tunku Abdul Rahman, Malaysia

*Corresponding Author, Received: 9 May 2016, Revised: 22 Aug. 2016, Accepted: 9 Dec. 2016

ABSTRACT: Trigona honey was analyzed for bactericidal and antibiofilm potencies using plate count and spectrophotometry methods, respectively, against different *Staphylococcus aureus* isolates, including ATCC 25923 strain, ATCC 33591 methicillin resistant strain (MRSA), and two clinical isolates from wounds. Besides, the relationship between anti-staphylococcal effects and antioxidant capacity of Trigona honey was discussed. All *S. aureus* isolates were highly susceptible to the antibacterial action of Trigona honey. Lysis of the planktonic bacterial cells was observed using scanning electron microscopy. Despite moderate levels of phenolic content (106.62 mg GAE/kg), DPPH free radical scavenging activity (40.94% RSA), and FRAP value (419.50 μM Fe (II)/100g), Trigona honey exhibited potent inhibitory effect (75-90%) on biofilm formation, especially in 20% (v/v) honey. Additionally, the effects of functional phytochemicals and acidity (pH 2.31) in 20% (v/v) honey were suggested to contribute up to 70% reduction on established biofilm. In short, Trigona honey exhibited high antibacterial and antibiofilm activities, suggesting a potential therapeutic agent in staphylococcal wound infection.

Keywords: Stingless bee honey, Antioxidant, Antibacterial, Antibiofilm, Trigona

Biomedicine & Pharmacotherapy 89 (2017) 135–145

Available online at
ScienceDirect
www.sciencedirect.com

Elsevier Masson France
EM|consulte
www.em-consulte.com/en

Original article

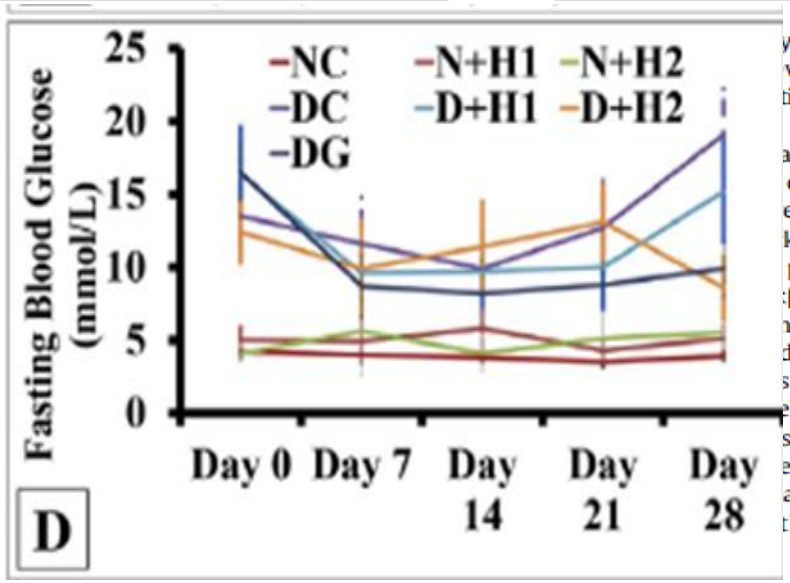
Pancreatoprotective effects of *Geniotrigona thoracica* stingless bee honey in streptozotocin-nicotinamide-induced male diabetic rats

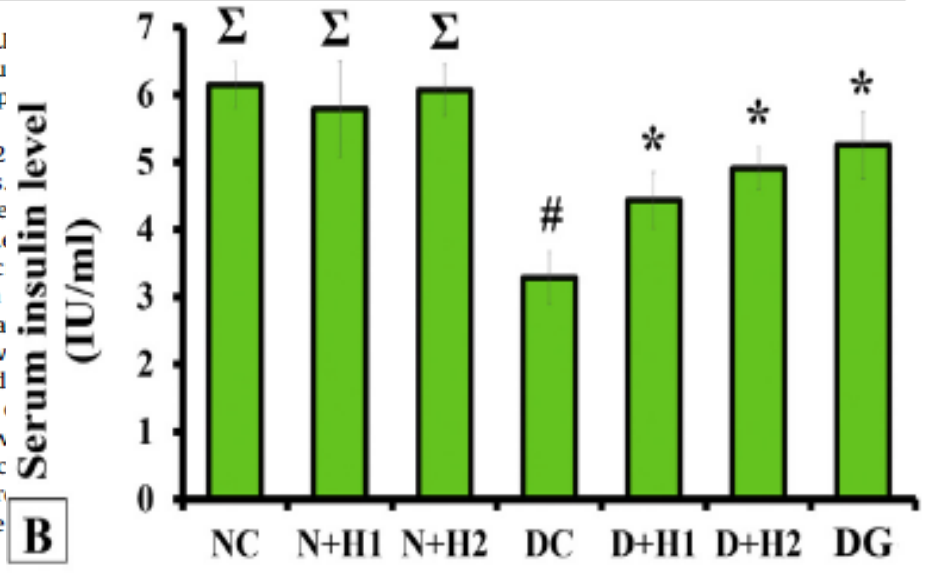
Muhammad Shakir Abdul Aziz[a], Nelli Giribabu[b], Pasupuleti Visweswara Rao[a,c,**], Naguib Salleh[b,*]

[a] Bio-Industrial Technology Program, Faculty of Agro-Based Industry, Universiti Malaysia Kelantan, Campus Jeli, 17600 Jeli, Kelantan, Malaysia
[b] Department of Physiology, Faculty of Medicine, University of Malaya, 50603, Lembah Pantai, Kuala Lumpur, Malaysia
[c] Institute of Food Security and Sustainable Agriculture, Universiti Malaysia Kelantan, 17600, Malaysia

ARTICLE INFO

ABSTRACT





Composition (propolis)

- phenolic compounds (flavonoids & phenolic acids)
- wax
- minerals – calcium, magnesium, phosphorus

Biological properties (propolis)

- antioxidant
- antibacteria
- anticancer (breast, oral)
- antidiabetes

International Journal of Pharmacy and Pharmaceutical Sciences

ISSN- 0975-1491 Vol 8, Issue 5, 2016

Short Communication

PHYTOCHEMICAL SCREENING AND COMPARISON OF ANTIOXIDANT ACTIVITY OF WATER AND ETHANOL EXTRACT PROPOLIS FROM MALAYSIA

UMAR ZAYYANU USMAN, AINUL BAHIYAH ABU BAKAR, MAHANEEM MOHAMED*

Department of Physiology, School of Medical Sciences, Universiti Sains Malaysia, 16150 Kubang Kerian, Kelantan, Malaysia
Email: mahaneem@usm.my

Received: 11 Jan 2016 Revised and Accepted: 15 Mar 2016

ABSTRACT

Table 2: Antioxidants property of Malaysian propolis extracts

Antioxidant property	WEP	EEP
Radical scavenging activity (%)	70.69±0.49	82.44±0.05*
Total phenolic content (mg gallic acid Eq per g)	119.00±7.00	646.67±30.44*
Total flavonoid content (mg quercetin Eq per g)	87.58±5.20	209.83±1.42*

Data are mean±standard deviation (n=3). WEP: water extract propolis, EEP: ethanol extracts propolis. *P<0.05 compared to WEP (Independent *t*-test).

Biomedical Research 2016; 27 (1): 46-51

ISSN 0970-938X
www.biomedres.info

Phytochemical composition and activity against hyperglycaemia of Malaysian propolis in diabetic rats.

Umar Zayyanu Usman, Ainul Bahiyah Abu Bakar, Mahaneem Mohamed*

Department of Physiology, School of Medical Sciences, Universiti Sains Malaysia, 16150 Kelantan, Malaysia.

Abstract

Diabetes mellitus (DM) is a disease associated with hyperglycaemia and loss of body weight. Brazilian propolis is shown to have hypoglycaemic effect in diabetic rats. However, the role of Malaysian propolis on food intake, body weight gain and fasting blood glucose in diabetes has

Groups	Fasting blood glucose (mg/dl)	
	Before treatment	After treatment
Non-DM	92.17 (3.19)	91.17 (2.56)
DM	435.50 (90.52)[a]	533.17 (70.37)[a]
DM+300EEP	446.17 (31.67)[a]	308.67 (39.38)[a, b]
DM+600EEP	425.00 (81.48)[a]	243.00 (82.00)[a, b]
DM+metformin	519.00 (58.87)[a]	252.50 (63.82)[a, b]

Results are expressed as mean ± SD and n= 6 for each group.

Hindawi
Evidence-Based Complementary and Alternative Medicine
Volume 2017, Article ID 5370545, 11 pages
https://doi.org/10.1155/2017/5370545

Research Article

Antioxidant Properties and Cardioprotective Mechanism of Malaysian Propolis in Rats

Romana Ahmed,[1] E. M. Tanvir,[2] Md. Sakib Hossen,[1] Rizwana Afroz,[1] Istiyak Ahmmed,[1] Nur-E-Noushin Rumpa,[1] Sudip Paul,[1] Siew Hua Gan,[3] Siti Amrah Sulaiman,[4] and Md. Ibrahim Khalil[1,3]

[1] *Laboratory of Preventive and Integrative Biomedicine, Department of Biochemistry and Molecular Biology, Jahangirnagar University, Savar, Dhaka 1342, Bangladesh*
[2] *Veterinary Drug Residue Analysis Division, Institute of Food & Radiation Biology, Atomic Energy Research Establishment, Savar, Dhaka 1349, Bangladesh*
[3] *Human Genome Centre, School of Medical Sciences, Universiti Sains Malaysia, 16150 Kubang Kerian, Kelantan, Malaysia*
[4] *Department of Pharmacology, School of Medical Sciences, Universiti Sains Malaysia, Kubang Kerian 16150, Kelantan, Malaysia*

Parameters	Treatment			
	Control	MP	ISO	MP + ISO
SOD (units/mg of protein)	1.53 ± 0.15^{a}	1.96 ± 0.04^{a}	0.13 ± 0.02^{c}	0.31 ± 0.05^{b}
GRx (nmol NADPH oxidized/min/mg of protein)	96.23 ± 6.70^{a}	94.32 ± 1.74^{a}	71.07 ± 4.78^{b}	89.13 ± 9.28^{a}
GPx (nmol NADPH oxidized/min/mg of protein)	2.95 ± 0.57^{a}	2.27 ± 0.52^{a}	0.90 ± 0.02^{b}	1.98 ± 0.51^{a}
GST (nmol CDNB conjugated/min/mg of protein)	2.08 ± 0.20^{a}	2.55 ± 0.43^{a}	1.29 ± 0.18^{b}	2.13 ± 0.63^{a}

Data are presented as means ± SD, $n = 8$.
^{a,b,c}Values in the same row that do not share superscript letters (a, b, and c) indicate significant difference at $p < 0.05$.
MP: Malaysian Propolis. ISO: isoproterenol.

Composition (bee bread)

- carbohydrate (fructose, glucose, sucrose)
- proteins (amino acid essentials & non-essentials)
- minerals (calcium, iron, zinc)
- vitamins (A, B, C, D, E, K, Folic acid)
- phenolic compounds (flavonoids & phenolic acids)

Biological properties (bee bread)

- antioxidant
- antibacteria
- anticancer (breast, oral)
- antidiabetes

- pH 3.5 – 4.2 (lactic acids; fresh pollen pH ~ 7.2)

Journal of Apicultural Research, 2017
Vol. 56, No. 2, 130–135, http://dx.doi.org/10.1080/00218839.2017.1287996

IBRA INTERNATIONAL BEE RESEARCH ASSOCIATION

Taylor & Francis
Taylor & Francis Group

ORIGINAL RESEARCH ARTICLE

Total phenolic content, total flavonoid and antioxidant activity of ethanolic bee pollen extracts from three species of Malaysian stingless bee

Nurdianah Harif Fadzilah[a], Mohd Fahimee Jaapar[b], Rosliza Jajuli[b] and Wan Adnan Wan Omar[a]*

[a]*Advanced Medical and Dental Institute, Universiti Sains Malaysia, Bertam, Malaysia;* [b]*Agrobiodiversity and Environment Research Centre, Malaysian Agriculture and Research Institute, Serdang, Malaysia*

(Received 13 July 2016; accepted 17 January 2017)

Bee pollen consists of flower pollen mixed with bee digestive enzymes and preserved with some honey and nectar. It contains high antioxidant activity due to the presence of polyphenols and flavonoids. This study was aimed at investigating the chemical profiles of bee pollen extracts from three species of Malaysian stingless bee, *Trigona (Tetrigona) apicalis*, *Trigona (Heterotrigona) itama* and *Trigona (Geniotrigona) thoracica*. Chemical profiles analyzed were total phenolic content

Table 2. Summary of TPC, TFC and antioxidant activity (EC50) in different species.

Species	TPC (mg/g GAE)*	TFC (mg/g QE)*	EC50 (mg/ml)*
T. apicalis	135.93 ± 0.02	25.72 ± 0.17	1.05 ± 0.01
T. itama	33.46 ± 0.02	15.28 ± 0.04	3.24 ± 0.03
T. thoracica	103.62 ± 0.04	31.80 ± 0.13	0.86 ± 0.01
Mean value of the three stingless bee species	91.00 ± 0.03	24.27 ± 0.11	1.72 ± 0.02

*Results are given as mean and standard deviation of three replicates; $n = 1$.

HOSTED BY
ELSEVIER

Contents lists available at ScienceDirect

Asian Pacific Journal of Tropical Biomedicine

journal homepage: www.elsevier.com/locate/apjtb

Entomological research http://dx.doi.org/10.1016/j.apjtb.2015.12.011

Bee pollen extract of Malaysian stingless bee enhances the effect of cisplatin on breast cancer cell lines

Wan Adnan Wan Omar*, Nur Asna Azhar, Nurdianah Harif Fadzilah, Nik Nur Syazni Nik Mohamed Kamal

Advanced Medical and Dental Institute, Universiti Sains Malaysia, Bertam, 13200, Penang, Malaysia

ARTICLE INFO

Article history:
Received 10 Nov 2015
Received in revised form 30 Nov 2015
Accepte
Availab

Keywor
Bee pol
Antioxi
Antipro
Synergi
Malaysi

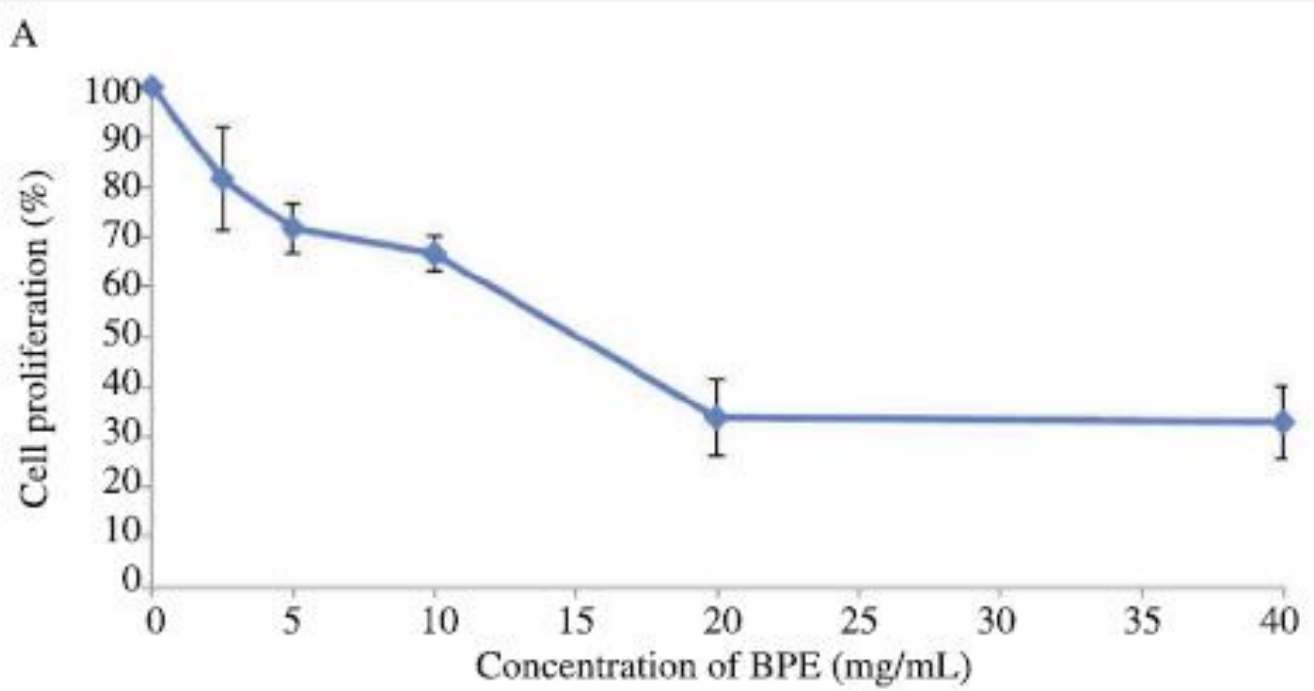
ABSTRACT

Objective: To evaluate the antioxidant and antiproliferative effect of methanolic bee pollen extract (BPE) of Malaysian stingless bee [*Lepidotrigona terminata* (*L. terminata*)] and its synergistic effect with cisplatin (a chemotherapeutic drug) on MCF-7 cancer cell

l by using
ctivity at
MTT assay
nd antag-
based on

5 mg/mL.
l cell lines.
n vitro) of
g/mL. The
d cisplatin
tory effect
ancer cells
dex values
istic effect
cally with

gless bee,
olementary
the effect
drugs. The
be a much




CHD, Cardiac Fibrosis, Hypertension, Ischemia, Myocardial infarction
Heart
Macular degeneration, Retinal degeneration, Cataracts
Eyes
Skin Aging, Sunburn, Psoriasis, Dermatitis, Melanoma
Skin
Diabetes, Ageing, Chronic Fatigue
Multi-Organ
Chronic Kidney disease, Renal Graft, Nephritis
Kidney
Free Radical Oxidative Stress
Restenosis, Atherosclerosis, Endothelial Dysfunction, Hypertension
Blood Vessels
Rheumatoid, Osteoarthritis, Psoriasis
Joints
Immune System
Chronic Inflammations, Auto-immune disorders, Lupus, IBD, MS, Cancer
Lung
Asthma, COPD, Allergies, ARDS, Cancer
Brain
Alzheimer, Parkinson OCD, ADHD, Autism, Migraine, Stroke, Trauma, Cancer


DRONESS
Quality Assured Honey


MADU KELULUT
Trigona Honey


ECO Nest Farm
MADU KELULUT ASLI
100% TULEN & SEMULA JADI


YMR
MADU KELULUT
PURE TRIGONA HONEY


HURUN AIN SOAP
Sabun
Vitamin A, C dan E
DIPERKAYA DENGAN
MADU KELULUT


NuTrigona
SABUN
MUKA MADU & PROPOLIS LEBAH KELULUT
Facial Soap Propolis
KELANTAN BIOTECH CORPORATION SDN BHD
Berat 35gm


NuTrigona
KRIM MUKA
MADU & PROPOLIS LEBAH KELULUT
KELANTAN BIOTECH CORPORATION SDN BHD


LOSYEN MADU
23/09/2013


MANDIAN MADU

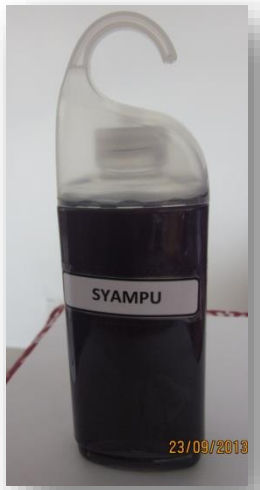

BALM
LIP


PROPOLIS


Propolis
Hand
&
Body
Lotion


40gm
Facial
Soap
Propolis
KELANTAN BIOTECH COPPROTION SDN. BHD.


SABUN


SYAMPU
23/09/2013

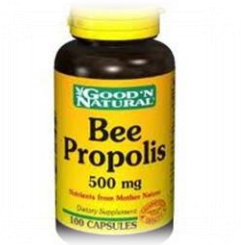

KRIM MUKA


SABUN
PROPOLIS


BALM
PROPOLIS


Shower Gel
Hair
Revived


PROPOLIS
EXTRACT
Alcohol Free
25ml


GOOD'N
NATURAL
Bee
Propolis
500 mg
100 CAPSULES


Throat
Spray
Propolis


Bounty of Nature
Honey with Propolis


BEE BREAD


nutrigona
Coklat IQ
25 gm


salton
VitaPro

dehydrator


BEEBREAD
FERMENTED POLLEN


BEE BREAD
BEE BREAD
BEE BRE


Bee Bread
Pollen Pasta
100% MURNI

Risk

- Allergic reaction
  - itchiness (throat, mouth)
  - numbness especially lips & face
  - swollen face
  - breathlessness
  - acute renal failure (propolis, bee pollen)

CASE REPORT

Acute Renal Failure Induced by a Brazilian Variety of Propolis

Yi-Jung Li, MD, Ja-Liang Lin, MD, Chih-Wei Yang, MD, and Chun-Chen Yu, MD

• Propolis is a resinous substance collected by honeybees and used in hive construction and maintenance. Cumulative evidence suggests that propolis may have anti-inflammatory, antibiotic, antioxidant, antihepatotoxic, and antitumor properties. In addition to topical applications, products containing propolis have been used increasingly as dietary supplements. Although reports of allergic reactions are not uncommon, propolis is reputed to be relatively nontoxic. Its systemic toxicity is rarely reported and hence may be underestimated. This is the first report of propolis-induced acute renal failure. A 59-year-old man required hemodialysis for acute renal failure. The patient had cholangiocarcinoma and had ingested propolis for 2 weeks before presentation. Renal function improved after propolis withdrawal, deteriorated again after reexposure, and then returned to a normal level after the second propolis withdrawal. This case indicates that propolis can induce acute renal failure and emphasizes the need for vigilance and care when propolis is used as a medicine or dietary supplement. *Am J Kidney Dis* 46: E125-E129.

INDEX WORDS: Propolis; acute renal failure.

Therapeutic Apheresis and Dialysis

Therapeutic Apheresis and Dialysis 14(1):93–97
doi: 10.1111/j.1744-9987.2009.00707.x

A Case Report of Acute Renal Failure Associated With Bee Pollen Contained in Nutritional Supplements

Tsuchida Akiyasu,[1] Bishnuhari Paudyal,[1,2] Pramila Paudyal,[2] Matsumoto Kumiko,[1] Ueki Kazue,[3] Naruse Takuji,[3] Kuroiwa Takashi,[4] Nojima Yoshihisa,[4] and Komai Minoru[1,3]

[1]Internal Medicine and Kidney Dialysis, Sanshi Group Hikari Clinic, Isesaki, Departments of [2]Diagnostic Radiology and Nuclear Medicine, and [4]Medicine and Clinical Science, Gunma University Graduate School of Medicine, Maebashi, and [3]Sanshi Group Toho Hospital, Midori, Japan

Abstract: We report a case of renal failure associated with the ingestion of bee pollen containing nutritional supplement. A 49-year-old male patient who had been ingesting a nutritional supplement for more than five months had breathing difficulties, anuria, exceptional weight gain (20 kg) due to systemic edema, and loss of appetite. A renal biopsy confirmed interstitial nephritis with the presence of eosinophils, which is suggestive of drug-induced acute renal failure. The nutritional supplement was ceased and hemodialysis begun. The patient's condition improved after several hemodialysis sessions, which were then stopped. Current information regarding the adverse effects of bee pollen is not very robust, therefore potential damage should be kept in mind before ingesting nutritional supplements in which it is contained. This report serves as an important reminder to the public as well as healthcare providers of the potential of renal failure related to nutritional supplements. **Key Words:** Acute renal failure, Bee pollen, Hemodialysis, Nutritional supplement, Proteinuria.

Natural/ Traditional Products Required To Be Registered as Traditional Medicine (not new drug) (National Pharmaceutical Regulatory Agency (NPRA), Ministry of Health (MOH), Malaysia)

- Traditional medicine in pharmaceutical dosage form with claims.
- eg: pill/ tablet, soft gel, capsule, tea bag, powder




NPRA-Product Codes:

- A: Scheduled Poisons
- X: Non-scheduled Poisons (over the counter products)
- T: Traditional Medicines
- K/KE: Cosmetics
- C: Contract Manufactured
- E: Export Only
- R: Repacked
- S: Second source

- Traditional Medicines (label) MALXXXXXXXT
- Cosmetics (Label) NOTXXXXXXXXXK

- Traditional medicine is defined as any product used in the practice of indigenous medicine, in which the drug consists solely of one or more naturally occurring substances of a plant, animal or mineral, or parts thereof, in the unextracted or crude extract form and a homeopathic medicines.

Natural/ Traditional Products : Not Required to be Registered as Traditional Medicine

- Extemporaneous medicine – prepared and given directly to patient by traditional practitioner.
- Herbal medicine containing plants produced only through drying, grinding or blending (raw herbs).
- A herbal preparation containing plants normally taken as food and consumed as a drink/beverage with no medicinal claim.
- a preparation used for a cosmetic purpose (eg. to whiten the skin) shall be registered as a cosmetic product.

Evaluation of Traditional Medicine/ Natural products

- Quality
- Safety
- Efficacy - based on the claimed benefits and documented use as folk medicines based on philosophy of the respective traditional medicines .

Quality

- Raw material
- Finished product (excipient? dosage?)
- Extraction – good manufacturing practice certified company, solvent?
- Heavy metal analysis
- Microbial analysis
- Stability testing
- Disintegration test (tablet)

Safety

- Does not contain banned ingredients
- Warning statements/adverse effects on product label
- Contains substances in allowable limits/dose
- Limits for heavy metals, limits for microbial contamination, no adulterants

Men' health – sildenafil, tadanafil & its analogue

Slimming – fenfluramine

Muscle & joint pain – NSAIDS, steroids

Cough & cold - antihistamine

Examples of indication allowed (low & medium claims)

Traditionally used……

GENERAL HEALTH MAINTENANCE/ KESIHATAN AM

- for general health maintenance / for general well being
- for health and strengthening the body

BLOOD & BODY FLUID / DARAH & CECAIR BADAN

- for improving blood circulation
- to improve urination
- for improving bowel movement

BONE, MUSCLE AND JOINT / TULANG, OTOT & SENDI

- for strengthening muscle and bone
- for relieving muscular ache .
- for relieving waist ache and backache

SKIN AND EXTERNAL USE

- for symptomatic relief of pain and itch associated with insect bites

Examples of indication allowed

Traditionally used…….

PAIN & FEVER / SAKIT AM & DEMAM

- to relieve / alleviate pain
- for relieving headache

COUGH & COLD

- to relief cough and cold
- to relief of nasal congestion

DIGESTIVE SYSTEM

- for relief of stomachache, mild diarrhea
- for relief of flatulence, stomach ache, mild diarrhea and
- loss of appetite

WOMEN'S HEALTH / MEN'S HEALTH

- to relief menstrual pain, headache,
- to relief vaginal discharge
- for energy and men's health/ for vitality

Non-permissible Indications

1. Penyakit atau kecacatan ginjal / Disease or defects of the kidney
2. Penyakit atau kecacatan jantung / Disease or defects of the heart
3. Kencing manis / Diabetes
4. Epilepsi atau sawan / Epilepsy or fits
5. Kelumpuhan / Paralysis
6. Tibi / Tuberculosis
7. Asma / Asthma
8. Kusta / Leprosy
9. Kanser / Cancer
10. Kepekakan / Deafness

Non-permissible Indications

11. Ketagihan dadah / Drug addiction
12. Hernia atau pecah / Hernia or rupture
13. Penyakit mata / Disease of the eye
14. Hipertensi (Darah Tinggi) / Hypertension
15. Sakit otak / Mental disorder
16. Kemandulan / Infertility
17. Kaku / Frigidity
18. Lemah fungsi seks atau impoten / Impairment of sexual function or impotency
19. Penyakit venerus / Venereal disease
20. Lemah urat saraf atau aduan atau kelemahan lain timbul daripada atau berhubungkait dengan perhubungan seks / Nervous debility or pother complaint of infirmity arising from or relating to sexual intercourse.

e) Example of label approved by the Authority:

This is a traditional medicine

Please consult your pharmacist/ doctor before taking this product

Jauhkan daripada kanak-kanak
Keep out of reach of children

Indication: Traditionally used for women's health

Warning: Pregnancy and breastfeeding: Insufficient reliable data

Keep below 30 ° celcius
Protect from light and moisture

Manufacturing date:
Expiry date:
Batch No.:

KAPSUL PQR
500MG

MALXXXXXXXXT

50 CAPSULE

Hologram

Each Capsule (Vegetable capsule) contains :

Folium XX	200mg
Fructus QY	300mg

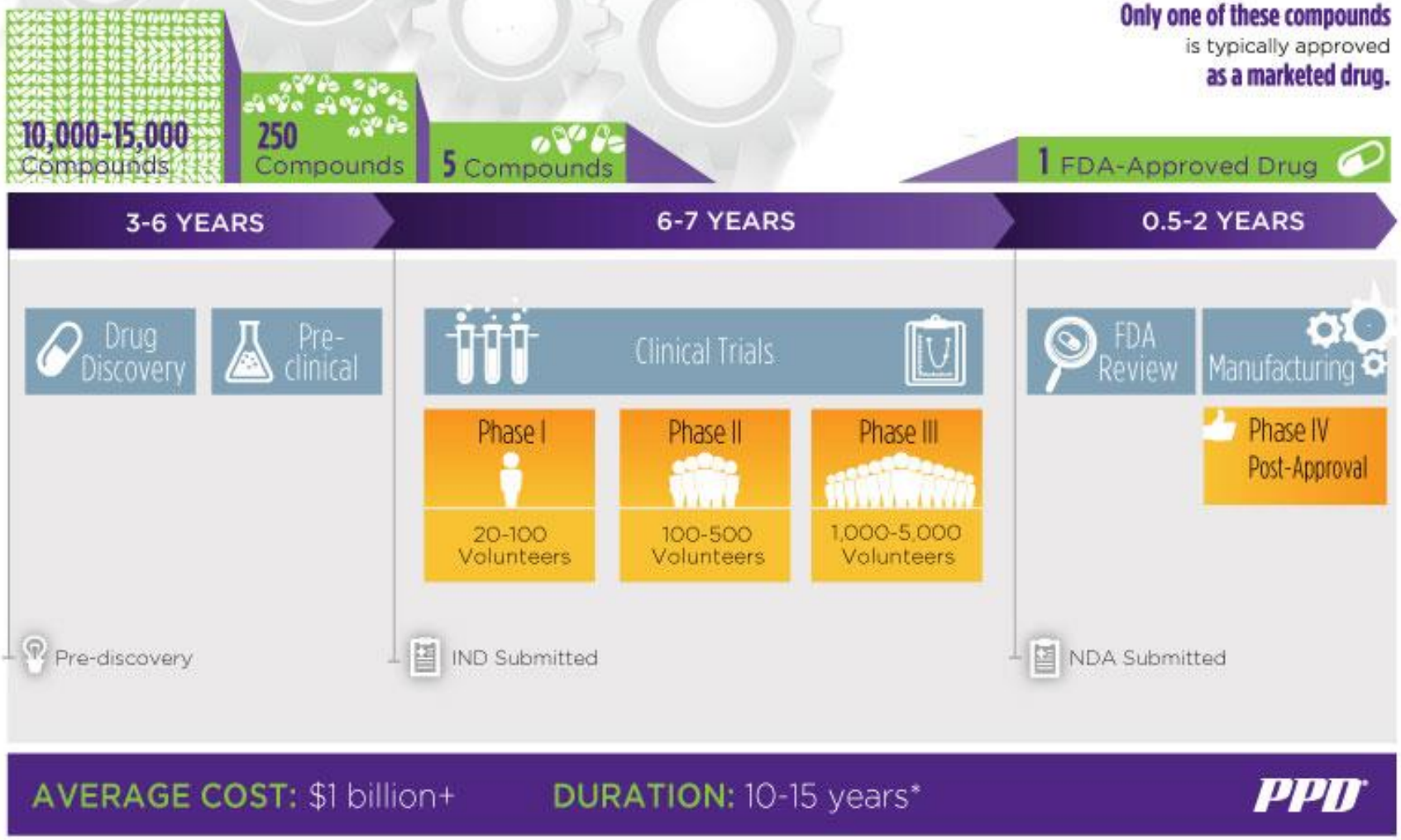
Dosage : 2 capsule taken twice a day after food

Marketing authorization holder:
Syarikat XYZ Sdn Bhd
18, Jalan Utama
47000 Sungai Buloh
Selangor

Manufactured by:
Syarikat ABC Sdn Bhd
3, Jalan Universiti
46730 Petaling Jaya

DRUG DEVELOPMENT PROCESS

Out of every 10,000–15,000 new compounds identified during discovery, **five are considered safe for testing** in human volunteers. **Only one of these compounds** is typically approved **as a marketed drug.**



AVERAGE COST: $1 billion+ **DURATION:** 10-15 years*

PPD

*Source: ACRO

Challenges??

- Analysis & standardization of finished products
- Safety and side effects of the formulation (toxicity studies)
- Correct dose & duration of treatment (pre- and clinical studies)
- Mode of action (mechanism of action)
- Drug-natural product interaction

Cosmetics (Quality)

- good manufacturing practice certified company (contract manufacturing)
- heavy metal analysis
- microbial analysis
- does not contain banned ingredients (mercury, hydroquinone, tretinoin)
- product registration (NOTXXXXXXXXXK)
- halal?

Summary

- stingless bee products have medicinal properties and needs further research, budget??
- many end-products can be developed
- challenges – fulfill the requirement
- important to meet the stringent quality guideline
- the sustainability of stingless bee industry
- protect the public from any harmful effects

HOST:

ORGANIZER:

International Institute of Plantation Management

Thank you

mahaneem@usm.my