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ASIAN ETHNIC DIETS AND TRADITIONAL HERBAL MEDICINES IN THE PERSPECTIVE OF FUNCTIONAL FOODS AND HEALTH PROMOTION

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An overview of Asian ethnic diets and traditional herbal medicines in the perspective of functional foods and health promotion. These days, Asian diets become more favorable internationally. It is undeniable that one of the reasons for the popularity is Asian diets have developed an image of giving positive effects toward health and body fitness. Asian culinary generally is less in animal source foods but it is rich of vegan-based foods. Moreover, many Asian countries use a lot of spices and/or herbs which are well known for their active functionalities.

The role of Chinese culinary in medicinal world is recorded in the history and the famed modern functional foods developed by Japan have been globally accepted. The availability of various food ingredients, supplemented with the diversity ethnic groups as well as the ancient cultures for combining food and medication has made the Asian diets being able to create opportunities to provide functional foods with a wide array of physiological activities that are interesting for further research.

Indonesia with 17,504 islands, 1,128 ethnic groups, 3,025 animal species, and 47,000 plant species promises a diversity of functional foods valuable to be studied. Furthermore, along with China with its Traditional Chinese Medicine (TCM), India with its Ayuverda, Indonesia has “jamu” as its traditional herbal medicine. “Jamu”-type functional foods become more favorable and easy to find in Indonesian food markets. This presentation will highlight the potentiality of Asian diet and TCM in the world of functional foods and health promotion, in particular by using exploration results and studies conducted in Indonesia.
Asian Ethnic Diets and Traditional Herbal Medicines in the Perspective of Functional Foods and Health Promotion

Focus on Indonesian Standpoint

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Outline

Asian Diets
Diversity in Indonesian Diets
What is “Jamu”?
Current Functional Foods in Indonesia

Introduction

Many Asian do benefit from their traditional diet.

Asian diet become more favorable

Special Report in Food Pacific Manufacturing Journal
September 2009

The Traditional Healthy Asian Diet Pyramid

Emphasizes traditional ingredients and is based on balance and harmony in foods

A healthy eating guide should track back to tradition but acknowledge the challenges of modern lifestyles

Towards an Asian Food Pyramid, Food Pacific Manufacturing Journal, Sept 2009

11/29/2010
Rich in vegan-based food
Uses a lot of spices and herbs

Diversity in Indonesian Diets

With its various ethnic groups, Indonesia is rich in culinary cultures

Various in Staple Foods
Red rice
Colored by curcuma
Flavored by coconut milk and spices
Flavored by spices and "Oncom"

Young coconut shell
Banana stem
No Waste

Urapan
Semanggi
Gado-gado
Rujak cingur

Indonesian culinary having strong relationship to religion, ritual, or cultural ceremony
**Tempe (tempeh)**

Tempe has been known and produced by Indonesians for centuries, found in many parts of Indonesia, particularly important in Java and Bali.

Advantages of tempe arose during World War II when many prisoners of Japanese had to rely upon tempe as a major protein source—even malnourished prisoners suffering from dysentery were able to digest and tolerate the beans in the form of tempe while the unfermented soybeans were undigestible (Stahel, 1946; Smith and Woodruff, 1951; Grant, 1952).

**Functional Benefits**

- Medium-chain peptides (5-10 amino acids) of tempe hydrolysate showed hypotensive ability by inhibiting the activity of Angiotensin I Converting Enzyme (ACE). Tempe fermented with mixed-wild cultures (lau pasar) has higher activity comparing to the pure-innoculum.
- Transformation of isoflavon during tempe fermentation producing daidzein and genistein contributed to the anti-oxidation and anti-angiogenic activities.
- 6,7,4-trihydroxy isoflavon from tempe has been reported as a compound with anti-hemolysis role. This compound has also been reported as an active compound which able to reduce the cholesterol level as well as inhibiting the LDL (Low Density Lipoprotein) formation.
- Tempe with its beta-sitosterol content also showed hypocholesterolemic potency
- Wang et al. (1995) reported that R. Oligosporous NRRL 2710 produces an antibiotic active against a number of Gram-positive bacteria including Staphylococcus aureus and Bacillus subtilis

**Newly Listed as 100 Indonesian Innovations**

- Tempeh smoothie
- Tempeh club sandwich
- Tempeh fajitas
- Asparagus and tempeh dijonnaise salad
- Pan roasted tempeh with white bean broth

- Tempeh Milk Formula for Juvenile

- Tempeh Ice Cream
**Sorts of tempe**

- Tempe benguk: fermented velvet bean (Mucuna pruriens) seeds; *Rhizopus oryzae, R. oligosporus, R. arizus*; solid, greyish white with a violet tint; typical smell, slightly sweet sour.
- Tempe gembus: fermented solid residue of soybean curd; *Rhizopus sp., R. Oryzae, R. oligosporus*; solid, soft, greyish white, slightly beany smell, bland taste.
- Tempe kecipir: fermented Winged bean (Canavalia ensiformis) seeds; *R. oryzae, R. arizus, R. oligosporus, R. achlamyadosporus*; solid, yellowish to brownish white, sharp beany smell, bland taste.
- Tempe koro pedang: fermented Jack bean seeds, *R. oryzae, R. arizus*; *R. achlamyadosporus*; solid, light yellowish white, typical beany smell, bland taste.
- Tempe lamtoro: fermented wild tamarind bean (*Leucospora leucocaphala*); "regi tempe" (traditional tempe starter).
- Tempe kedele: fermented soybean—soybean, tapioca flour, maize grits, young papaya fruit, cassava, coconuts press cake; *Rhizopus sp., R. oligosporus, R. oryzae*; solid, white to greyish white, pleasant aroma, bland taste.

**Oncom**

Oncom is a cake-like product prepared by fermenting a soaked, cooked substrate consisting of peanut press cake as the major ingredient, along with solid waste of tapioca and solid waste of tofu, using cultures of microorganisms with *Rhizopus* or *Neurospora* species predominating. Oncom is produced mainly in West Java. It is an important ingredient of the daily menu of Sundanese, particularly those of the lower class of the community.

- Oncom hitam: black fermented peanut press cake; solid greyish black, pleasant smell, bland taste; *Mucor sp., Rhizopus spp.*
- Oncom merah: orange fermented peanut press cake; solid, orange to reddish-orange, pleasant smell, bland taste; *Neurospora spp.*
- Oncom merah Bogor: orange fermented solid residue of soybean curd; solid, orange to reddish, pleasant smell, bland taste; *Neurospora spp.*

**Indonesian Functional Drinks**

- Slimming tea: various composition ex: *thea folium* (60%) plus extract of paramelia (5%), extract of guazumae (5%), extract of foeniculi (4%), extract of curcumae (4%).
- Jelly grass: "cincau hijau" (green), "cincau hitam" (black).
- Newly introduced: aloevera, wild-horse milk.
- Mix-spices type: "bir pletok", "cinna-ale", "madal"
**Indonesian Functional Drinks**

- Ginger-based type: "wedang jahe", "bajigur", "bandrek", "sarabba"
- Natural sources: coconut water, piper betle decoction, coriander decoction, "wedang jeruk nipis" (local-lemon juice), tamarind juice, "secang" tea, ylang-ylang tea
- Jamu type: "beras kencur", "kunir asam", "galian singset", "sari temulawak"

**What is “Jamu”?**

**Jamu**

- is well-known as Javanese herbal medicines as well as traditional functional drinks
- has been practiced for many centuries in the Indonesian community to maintain healthiness & to treat diseases

Jamu recipes were passed down orally, some special ones were even immortalized in songs and chants, such as those found in Saraf Cantini (A. Sumardono and M. Hanuaz, 2007)
Jamu-type Functional Drinks
Traditionally divided as:

- **Bitter Type**
  - contains ingredients with peculiar property, such as *pegal linu* (stiffness-relief) and *galian singset* (body shape-purpose)

- **Sweet Type**
  - tend to be used as "threat-drink" in order to mask the bitter after taste, i.e. *beras kecur* and *kunyit kunir asam*

Serving Jamu

Jamu stalls

Jamu Café
Technology implementation

- Capsule
- Sachet
- Candy
- Complete package

Transformation of Appearances

Standardization Policy and Direction of Natural Ingredient Medicines Development in Indonesia

- Therapeutic effects
- have to be supported by empirical data
- Efficacy has to be proved in pre-clinical trials and requires standardization on actives ingredients
- Clinical trials

Functional Drink with the Labelling

PERATURAN KEPALA BADAN PENGAWAS OBAT DAN MAKANAN REPUBLIK INDONESIA NOMOR HK 00.04.32.06/85 TENTANG KETENTUAN POKOK PENGAWASAN PANGAN FUNGSIONAL
Challenges in Jamu

1. Over-claimed
2. Limited Scientific Approves
3. Fluctuation in Quality
4. Second Class Image – lower income society

Current Functional Foods in Indonesia

`Lalapan`?? (West Java’s traditional salad)
a side-dish including several kind of raw, boiled, or steam vegetables, served with chili sauces

"Lalap" has been believed as a daily diet with a lot of beneficial impact on human health and beauty.

MAX. PLATELET AGGREGATION ACTIVITIES OF VARIOUS LALAP

<table>
<thead>
<tr>
<th>Lalap</th>
<th>Max. Aggregation (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Control</td>
</tr>
<tr>
<td>Lettuce</td>
<td>48.2</td>
</tr>
<tr>
<td>Kemangi</td>
<td>49.1</td>
</tr>
<tr>
<td>Pohpohan</td>
<td>63.2</td>
</tr>
<tr>
<td>Leunca</td>
<td>42.3</td>
</tr>
<tr>
<td>Kemang leaves</td>
<td>48.2</td>
</tr>
<tr>
<td>Kedongdong leaves</td>
<td>64.5</td>
</tr>
<tr>
<td>Papaya leaves</td>
<td>51.8</td>
</tr>
<tr>
<td>Tomato</td>
<td>48.2</td>
</tr>
<tr>
<td>Long bean</td>
<td>64.5</td>
</tr>
<tr>
<td>Cucumber</td>
<td>51.8</td>
</tr>
<tr>
<td>Cassava leaves</td>
<td>51.8</td>
</tr>
<tr>
<td>Cabbage</td>
<td>46.8</td>
</tr>
</tbody>
</table>
**D₅₀ of Lalap with Significant Anti Platelet Aggregation Activity**

<table>
<thead>
<tr>
<th>Name of Lalap</th>
<th>D₅₀ (mg extract/ml PRP)</th>
<th>Yield (%)</th>
<th>Nilai D₅₀ (mg lalap/ml PRP)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kemang leaves</td>
<td>20.05</td>
<td>21.70</td>
<td>92.40</td>
</tr>
<tr>
<td>Kedondong leaves</td>
<td>5.11</td>
<td>11.95</td>
<td>42.76</td>
</tr>
<tr>
<td>Papaya leaves</td>
<td>27.95</td>
<td>29.47</td>
<td>94.84</td>
</tr>
<tr>
<td>Tomato c</td>
<td>13.23</td>
<td>44.70</td>
<td>29.60</td>
</tr>
</tbody>
</table>

**Utilization as Functional Food Ingredients**

Extract of kemang leaves, kedondong leaves and tomato were suitable for jelly products. Additional of extracts up to 8% into the jelly agar formula were still accepted by panelists. Papaya leaves extract gave unacceptable bitter taste.

**Objective:**

- Mixture-based formula drink with higher antioxidant activity comparing to the other commercialized traditional functional drinks as well as acceptable in its flavor and colour

**1. Preparing extract of each ingredients**
**2. Formulation & model drinks**
**3. Optimization the selected formula by Mixture Experiment approach using Design Expert 7.08 software**
**4. Storage stability in different level of temperature**

- Sensory evaluation
- Antioxidant activity
- Proximate tests
- Total polyphenols content
- Total microbes
### Sensory properties of model drink with different levels of total plants extract concentration (% b/v)

<table>
<thead>
<tr>
<th>Total plant extract conc. (% b/v)</th>
<th>Sensory properties (per 100 ml)</th>
</tr>
</thead>
<tbody>
<tr>
<td>3 g/100 ml</td>
<td>Dominant in sweet, spicy flavor very weak-almost undetectable</td>
</tr>
<tr>
<td>5 g/100 ml</td>
<td>Still dominant in sweet, stronger spicy flavor, preferable</td>
</tr>
<tr>
<td>10 g/100 ml</td>
<td>Sweet, detectable spicy flavor, slight bitter after-taste, preferable</td>
</tr>
<tr>
<td>15 g/100 ml</td>
<td>Sweet, strong spicy flavor, strong bitter after-taste, un-preferable</td>
</tr>
<tr>
<td>20 g/100 ml</td>
<td>Dominant in bitter, spicy flavor strongly detectable, bitter after-taste &quot;jamu&quot;-like, un-preferable</td>
</tr>
</tbody>
</table>

### Three selected formulation based on the optimization using Design-Expert 7.0® software

<table>
<thead>
<tr>
<th>Solutions</th>
<th>Jute</th>
<th>Sesang Ramie Issuing</th>
<th>Temulawak</th>
<th>Lemon</th>
<th>Antioxidant</th>
<th>Citrus</th>
<th>Desirability</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>15.006</td>
<td>10.000</td>
<td>85.000</td>
<td>2.000</td>
<td>10.000</td>
<td>50.550</td>
<td>0.548</td>
</tr>
<tr>
<td>2</td>
<td>15.000</td>
<td>36.500</td>
<td>36.500</td>
<td>2.000</td>
<td>10.000</td>
<td>442.888</td>
<td>3.72386</td>
</tr>
<tr>
<td>3</td>
<td>42.077</td>
<td>10.000</td>
<td>35.728</td>
<td>2.000</td>
<td>16.000</td>
<td>441.767</td>
<td>3.19727</td>
</tr>
</tbody>
</table>

### As an Anti-diabetic Drink as well?

1. 943 Formulated drink
2. Commercial Ginger-tea
3. Commercial Java-tumeric drink
4. Commercial tumeric-tamarind drink
5. Commercial ginger based drink
6. Commercial Vit-C supplement drink with lemon-taste
7. Commercial vit-C enriched soft drink with orange-taste

Comparison of the antioxidant capacity of the formulated drink (943) with the commercially available products
**Pennyworth (Centella asiatica)**

Others name are pegagan or pegaga.

It is believed by Sasak ethnic in Indonesia that Centella asiatica can be used to improving their memory.

Centella asiatica also can be found in Sundanese Traditional Salad.

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**Pennyworth (Centella asiatica)**

Mechanism of *Centella asiatica* in improving brain ability

- Dendritic Aborization
- Increase AChE
- Inhibit Phopholipase A2
- Preventing Oxidative Damage


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**Katuk leaf (Sauropus androgynus)**

*Sauropus androgynus* is traditionally consumed by Indonesians and is believed to increase breast milk production during lactation.

- Young Katuk Leaves
  - Prolactin 9.04 fold
  - Oxytocin 2.25 fold
- Mature Katuk Leaves
  - Prolactin 15.75 fold
  - Oxytocin 25.77 fold

Soka et al., 2010

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**Andaliman (Zanthoxylum acaanthopodium DC)**

- Fruit is utilized by Mandailing and Angkola ethnic groups especially in "naniura" (raw meat dishes)
- Potent odorant: Citronellol, Limonene
- Trigeminally active compound: αE, 6Z, 8E, 10E-N-(α-methylpropyl)-dodecetraamide
- Antioxidant, anti-microbes and immunoregulator activity

Irene Triyanti Hadiprodjo, and C. Hanny Wijaya (2000)
Andaliman

Assessing physiological functions of substances of andaliman by determining the changes in autonomic nerve activities after administration or after olfactory stimulation of the extract in urethane-anesthetized rats using electrophysiological technique.

Having potencies:
- Anti-diabetic
- Anti-hypertensive action
- Induce relaxation
- Anti-obesity (scent)

(Dr. K. Nagai's report, 2008)

Jambolan (Syzygium cuminii L.)

- Known with many different names: Eugenia cuminii, Java plum, black plum, jambolan, jamblang, jamun, etc.
- Containing anthocyanins pigment: cyanidin rhamno glucoside, petunidin and malvidin (Swadesi, 2004; 2007)
- Having moderate antioxidant activities equivalent with BHT activity – correlate with the anthocyanins availability, higher during the maturity (fruit color from green to dark purple) (Lesterio, 2003)
- Knowing as traditional medicinal plant – folklore as: anti-diabetic, anti-diarrhea, anti-cholesterol

Potential natural colorant with antioxidant activities?

Jambolan fruits

Extract of fruit's peels

Most stable at pH 3

Buah Merah (Pandanus conoideus)

Papua native consuming this fruit in their staple food (mixing of tubers and vegetables)—baked and squeezed to obtain the oil and paste.

Types of fruit: Ogi or barugum, malier, wonna, bullur or wangi (yellow, highest in active compounds content), karenen, kwambir, muni etc.

Claims: tonic, HIV/AIDS prevention, immunity enhancement, anti-cancer, reducing high blood pressure, stroke-prevention, anti-osteoporosis, diabetes mellitus healing, eye health, improving brain-power

Photo from: H Machmud Yahya and Benard T. Wahyu Wiranta
Buah Merah

Non-nutritive active compounds P

Recently Marketed Functional Foods

Involvement of Medium-Big Company
"Jamu"
National Day Declaration
May, 2008
**Today's consumers**

- 90% agree that certain foods have benefits that go beyond basic nutrition
- 79% believe that some foods contain active components that can help with current health problems
- 76% think these substances can reduce the risk of disease and improve long-term health
- 56% feel that foods can also be used to reduce their use of drugs and other medical therapies

(Data sources: 2009 International Food Information Council, 2007 USA HealthFocus Trend Report)

Courtesy of Prof. Zhou Weibiao

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**Khaawp khoon kha Terimakasih Thank you**

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Journals Publication and Seminars

How to compromise the healthiness of Asian traditional diets into a modern lifestyle?

How to harmonize the bioactivities' dose with the flavor and other functionalities in foods?

How to save the valuable ingredients and the local wisdom from vanishing?

Healthy and Tasty Foods → Basic Human Request?