Physiological—Active Potentials of Treated Food Ingredients
immune system as well. "Buah Merah" (Pandanus consoides), a tropical fruit originated from Papua, is becoming the hottest issue for its capability in giving physiologically active potencies. This fruit is used by Papua ethnic group as part of their daily diet which is believed in improving their vitality and energy from the severe climate and to maintain their immunity from low hygiene condition. Advanced research showed that "Buah Merah" contains high carotenoids, tocopherols, potassium, and iron compounds. This fruit was also reported to have the ability in diabetic prevention.

Indonesia is also rich for its fermentation products. The tropical climate gives benefit for microorganisms to thrive and grow, also gives more opportunity for us to develop and use those microbes to produce the products which with higher physiological effects. Waste or useless materials can be developed into better food ingredients which can give additional value of nutrition and functional properties. Fermentation process gives physiologically active potency on food ingredients which is formerly inactive. "Tempe", Indonesian indigenous food, has been well recognized in the world for its potency in improving physiologically effects. "Tempe" which is made from soybean is the most popular product in the world wide. Aside from that, "tempe" actually can be made from other sources such as even from waste. Just name several products of tempe: tempe gentas, which is made from solid tofu waste. The use of other microorganisms as agent of fermentation results different products, like "onecom". Oneon products are well recognized especially in West Java, with two kinds of variety; onecom merah and onecom hitam. There are many other fermented products from different tropical area, like "dadih"- spontaneous fermented product made from buffalo’s milk which is stored in "bambung bambu" or bamboo pole. This product can also be considered as probiotic because of its valuable active Lactic Acid Bacteria.

There are many other tropical food ingredients which can give physiologically active potencies, which is still under utilized. It will be an unfortunate if those "precious treasures" lost along with the "trap-carriers"- our "mini-scpah" or great grandparents who bring the knowledge and information which had been distributed orally for ages. This information is not well documented. It will give a big loss for the scientific world. Many things we can dig and develop, waiting for researchers to play the role, based on research etiquette codes, not only based on profits.
Tropical Food Ingredients

Physiologically-active Potencies of...
Traditional drinks

- Beras kencur (curcuma-rice based)
- Wedang jahe (ginger tea)
- Kunir asam (tamarind-curcuma based)
- Bandrek (mix-spices based)
- Bir pletok (temulawak-based)

Unfortunately most of the researches are still in the early stage of exploration and have not yet fully overcome.

There are numbers of food ingredients are reported as having physiological activities. Hundreds of scientific researches and experiments on their bio-active potencies have been conducted.

Next further, more comprehensive investigation to obtain reliable data and scientifically stand as well as to back up their responsible utilization.
Some Researches on Food's Bio-activities


Sari, 2005. Dietary Product which is a fermental traditional yang ayurvedic herbal product.


Rokaprada, H. 2003. Antimicrobial activity of selected spices (Euphorbia niger) of the West.


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.

Beneficial claims

- anti-inflammatory
- anti-diabetes
- anti-atherosclerosis
- anti-cancer
- anti-ageing
- anti-wrinkle
- anti-oxidant
- smoothing the skin

Vegetables well-known as lalap in West Java:

- Cucumber
- Tomato
- Leunca
- Kedondong leaves
- Spondias cyriformis

- Lycopersicum esculentum Mill.

- Solanum nigrum

- (Spondias cyriformis Sonn.)
Vegetables well-known as lalap in West Java:

- Long bean (Vigna sinensis L. Walp)
- Cassava leaves (Manihot esculenta crantz)
- Pohpahan (Pilea trinervia L.)
- Kemangi (Ocimum americanum L)
- Cabbage (Brassica oleracea var. capitata L.)
- Lettuce (Lactuca sativa L.)

### Maximum Platelet Aggregation of Various Lalap

<table>
<thead>
<tr>
<th>Lalap</th>
<th>Max. Aggregation (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lettuce</td>
<td>48.2</td>
</tr>
<tr>
<td>Kemangi</td>
<td>49.1</td>
</tr>
<tr>
<td>Pohpahan</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>Kedangdong 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 Sigma Platelet Aggregation

<table>
<thead>
<tr>
<th>Name of Lalap</th>
<th>D50 (mg extract/ml PRP)</th>
<th>Yield (% lb)</th>
<th>NIA (mg FG)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kemang leaves</td>
<td>20.06</td>
<td>21.70</td>
<td>92</td>
</tr>
<tr>
<td>Kedondong leaves</td>
<td>5.11</td>
<td>11.95</td>
<td>42</td>
</tr>
<tr>
<td>Papaya leaves</td>
<td>27.95</td>
<td>29.47</td>
<td>94</td>
</tr>
<tr>
<td>Tomato</td>
<td>13.23</td>
<td>44.70</td>
<td>29</td>
</tr>
</tbody>
</table>

### Utilization as Functional Ingredients

Extract of kemang leaves, long bean, and tomato were suitable for jelatins. Extracts of many extracts up to 8% into the solution were still accepted by panelists. The long bean extract gave un-acceptable results.
**D<sub>50</sub> OF LALAP WITH SIGNIFICANT ANTIPLATELET AGRGATION ACTIVITY**

<table>
<thead>
<tr>
<th>Name of leaf</th>
<th>Dog (%)</th>
<th>Rabbit (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kedondong</td>
<td>39.60</td>
<td>92.40</td>
</tr>
<tr>
<td>Kenang leaves</td>
<td>52.02</td>
<td>92.40</td>
</tr>
<tr>
<td>Papaya leaves</td>
<td>57.95</td>
<td>44.70</td>
</tr>
<tr>
<td>Tomato</td>
<td>13.23</td>
<td>29.60</td>
</tr>
</tbody>
</table>

**Utilization as functional food ingredients**

Extracts of kenang leaves, kedondong leaves, and tomato were suitable for lalap preparation. Additional extracts up to 8% into the jelly agar formula were still accepted by panelists. Papaya leaves extract gave an unacceptable bitter taste.

**Extract Aggregation of LALAP**

<table>
<thead>
<tr>
<th>Sample</th>
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<th>Treatment 1</th>
<th>Treatment 2</th>
<th>Treatment 3</th>
<th>Treatment 4</th>
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</table>
**Cincau**

(West Java’s traditional dessert)

A green jelly made from the leaves extract of *Cycles barbata* L. Miers or *Premna oblongifolia* Merr.

Cincau gel has been proved as having a significant immune response, antioxidant and anti-cancer activities. The responsible compounds are including carotenoids, chlorophyll and flavonoids.

---

**Kedondong Leaves**

*Spondia sicythrea* Sonn.

- Young leaves freshly consumed to accompany main dishes such as grilled fish, & fried chicken or cooking vegetable.
- Antiplatelet aggregation (Wijaya et al, 2001)
- Active fraction (ethyl acetate) stable at high temperature-alkaloid, terpenoid or phenolic? (not yet fully identified)

---

**Picung**

*Pangium edule* Radlak

Traditionally used as:
- Spices (fermented picung)
- Black Colorant (fermented picung)
- Preservative for fresh fish
- Anti skin-parasite
Pingouin Fruit

- Anti-skin-potato
- Preservative for fresh fish
- Black Colognant (fermented Pingouin)

Traditionally used as:

Pingouin Seed

The extract

Kedondong leaves extract

Anti-platelet aggregation of

Blind

Kedondong leaves extract
Antioxidant in Fermented Picung Seed

- 1-p-hydroxyphenyl-7-aminophenyl
- Methanol Extract
- Conc. 0.01% → higher than BHT
- Needle shape
- White crystal, mp 127°C

Mechanism of Antioxidant Activity of Fermented Picung

Background photo: Antioxidant Crystal of Fermented Picung

Petai is rich in phosphorus, vitamin A and K.

Claims:
- Gives an instant, sustained boost of energy; two servings of petai provide enough energy for a strenuous 90-minute workout.
- Helps to overcome or prevent a substantial number of illnesses and conditions.
- Eating petai regularly can cut the risk of death by strokes by as much as 49%.
- Mosquito bites: the inside of petai skin reduces swelling and irritation.

Petai crude extract has renoprotective nephrotoxicity on rats.
- Petai seeds and pods showed high contents of phenolic contents.

- Petai helps to keep blood sugar levels up to high in B vitamins that help calm the nervous system.
- Petai contains the natural mood enhancer, tryptophan, which is known to make relax, improve mood and for the treatment of Affective Disorder (AD).
- The B6 and B12 vitamin, potassium and mineral nicotine withdrawal.
- Potassium helps normalize the heartbeat, regulate body's water balance, and good for stress.
- Petai is also high in iron which can stimulate red blood cells and good for anemia-care.
- High potassium yet low in salt, making it can prevent high blood pressure.
- Petai is also high in iron which can stimulate red blood cells and good for anemia-care.
- Fiber in petai can control normal bowel activity, constipation without resorting to laxatives.
**Andaliman**

*Zanthoxylum acanthopodium DC*

- Wild plant at Northern Sumatra. Fruit is utilized by Mandailing and Angkola ethnic groups especially in "naniura" (raw meat dishes)
- Trigeminally active compound
- Potent odorant
  - citronellal
  - limonene
- 2E, 6Z, 8E, 10E-N-(2'-methylpropyl)-dodecatetraamide
- Antioxidant, anti-microbes and immunoregulator activity

---

**Antioxidant Activity of Andaliman**

- highest at aqueous system
- slightly good on emulsion and oily system
- relatively resistant on high temperature
- polar fraction

---

**Ginger**

![Ginger graph]

- Fresh Ginger
- Dried ginger
- Control

---

**Buah Melati**

*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: Opi or barugum, muller, wonna, bullar or woggeen (yellow, highest in active compounds content), kanen, kwambar, mui etc.

**Claims:**
- tonic
- HIV/AIDS prevention
- immune enhancement, anti-cancer
- reducing high blood pressure
- stroke-prevention, anti-osteoporosis
- diabetes mellitus healing, eye health, improving brain-power
Tempe has been known and produced by Indonesians for centuries, found in many parts of Indonesia, particularly in Java and Bali.

Advantages of tempe:
- World War II
  - Japanese had malnourished, dysentery-tolerant, the body while the un-digestible (Edible, Wood)

Tempe benguk: fermented velvet bean (Mucuna pruriens)
- Rhiizopus oryzae, R. oligosporus, R. arrhizus
- white, with a violet tint, typical smell, white, slightly sweet

Tempe gemius: fermented solid residue
- Rhiizopus spp, R. Orzyae, R. oligosporus
- white, slightly beany smell, bland taste

Tempe keclpter: fermented Winged bean (Caesalpinia)
- R. olgiosorus, R. arrhizus, R. olgiosorus
- solid, yellowish to brownish white, sharp beany smell, bland taste

Tempe koro pedang: fermented Jack bean
- R. arrhizus, R. olgiosorus, solid, light yellow, beany smell, bland taste

Tempe lamtoro: fermented wild taro (Colocasia esculenta)
- "ragi tempe" (traditional tempe)

Tempe hede: fermented soybean-soyable
- young papaya fruit, cassava, coconut, olsogosorus, R. orzyae; solid, white to gray
Tempeh (Tempeh)

Voodoni. 1991. (Gmail, 1992)
un-digestible (starch) 40%, simple and
where the unmodified polysaccharide were
coarse into the beans in the form of tempe
ester the beans is in the form of tempe
modified by the enzymes from
modified by the enzymes from
modified by the enzymes from
modified by the enzymes from
modified by the enzymes from

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Wijaya, M. 1984. (Gmail, 1992)

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in juga and bed

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products for information on
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Tempeh (Tempeh)
**Tempe Kedele**

**Known as “tempe” as “tempeh”**

Tempe is a white, mold-covered cake produced by fungal fermentation of dehulled, hydrated (soaked), and partially cooked soybean cotyledons (figure 1). Packets of traditional tempe wrapped in wadded banana leaves as shown as they appear on the market in Indonesia (figure 2).

**Fig. 1.**

**Fig. 2.**

**Tempe Kedele**

- The best quality tempe is made solely from soybean, but lower-cost, lower-quality tempe may contain young papaya nuts grits, cassava grits (tapioca waste), soybean seedcoats, soy milk or tofu residue (okara).

Freshly fermented tempe has a clean, mushroom-like aroma. Following deep frying, the flavor becomes nutty and peppery due, in part, to the presence of free fatty acids. In soups, tempeh reflects the flavors of the other ingredients.

---

**Nutrients**

- All commercial tempes so far examined have low B12 activity. The bacterium responsible, Klebsiella pneumoniae (Curfies et al., 1997), was isolated from tempe and has been shown to have a greater apparent protein utilization.
- Tempe has increasing riboflavin, pyridoxin, and thiamine.
- Murata (1977) attributed the improved nutritional value of the oil by antioxidants present during fermentation and synthesis of B vitamins.
- Soybean phytic acid, which may exacerbate iron malabsorption in some people by hindering absorption in the gut, is reduced during fermentation. The reduction is attributed to Oligosporus (Sudarmadi and Markaki).

---

**Functions**

- Medium-chain peptides (5-10 amino acids) of Angiotensin I Converting Enzyme with mixed-wild cultures (Garita et al., 1999) reduce the activity of this enzyme.
- Transformation of isoflavon during tempe production into daidzein and genistein oxidase and anti-angiogenic activities.
- 6,7,4-trihydroxy isoflavon from tempe compound with anti-hemolytic role reported as an active component in cholesterol level as well as inhibits the formation of Lipoprotein.
- Tempe with its beta-sitosterol content has a hypocholesterolemic potency.
- Wang et al. (1996) reported that P. Oxidase antibiotic activity against a number of Staphylococcus aureus and Bacillus.
Oncom

Oncom is a cake-like product prepared by fermenting soaked, cooked substrates consisting of peanut press-cake as the major ingredient, along with solid waste of tapioca and solid waste of tofu, using culture of microorganism 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, Aspergillus sp, Rhizopus sp
Oncom merah: orange fermented peanut press cake; solid, orange, to reddish orange; pleasant smell, bland taste; Neurospora sp
Oncom merah Bogor: orange fermented solid residue of soybeans, green, solid, orange to reddish, pleasant smell, bland taste; Neurospora sp

Oncom merah—Total protein content remains constant during fermentation; total fat content decreases slightly; Calcium content increases significantly; from 204 to 228 mg/100 g; substrate and carbon increase from 10.3 to 22.0 IU/100 g substrate (Garita and Stansel, 1972)

Dadih

Fermented Buffalo Milk.

Semi-solid, white, acid taste

Fresh buffalo milk is put into cut fresh bamboo stems, the tops of which are then covered tightly with banana leaves. They are kept at room temperature for 24-48 hr.

Rich in lactic acid microbes (LAB) which produced metabolite as bacteriocin. The polysaccharides, the cell components, have exhibited anti-mutagen and anti-cancer capability.
There are many potential tropical food ingredients with significant physiological activity compounds. Earlier handling will still uncover local culinary- and animal products

An image of a sloth holding a fruit and another of a sloth with a sign that says "Kashima, Terima."