県立広島大学
Prefectural University of Hiroshima

# CERTIFICATE

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## R I N I

**Andalas University-INDONESIA**

Has orally presented a paper entitled

***Nutritional Component of Rendang***

At mini-symposium on **Utilization of Bioresources**
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**Organized by:**

Faculty of Life and Environmental Sciences
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***In collaboration with***
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King Mongkurt Universty of Technology Thornburi-Thailand
KhongKaen University-Thailand
Kassetsart University-Thailand

Kohei Irifune

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Dean

# Mini-Symposium

# 「Utilization of Bioresources」

# ABSTRACTS

24th、Octorber, 2013
Shobara campus
Prefectural University of Hiroshima
Japan

Organized by
Faculty of Life and Environmental Sciences,
Prefectural University of Hiroshima

# NUTRITIONAL COMPONENTS OF RENDANG

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***Abstract***

Rendang is a traditional food of Minang Kabau ethnic in Indonesia which is basic ingredients are consist of beef meat, coconut milk and many kind of spices. The cooking process of rendang will take hours (5-7 hours). During the process, all the ingredients should be carefully stirred until all the liquids evaporated and allowing the meat absorb the spicy condiments. Spices used in rendang are known as aromatic component, natural antimicrobial, antioxidant substances and as organic preservatives. The numerous type of spices used make rendang having complex and unique taste. Rendang can last for one week stored in room temperature, even last in about a month if stored in refrigerator, and up to six months if frozen.

The main objective of the research is to evaluate the nutritional values, to characterize the aromatic components in rendang and to study the shelf life of rendang in different condition.

This paper is presenting the preliminary results of the research. The result shown that the nutritional components of rendang are changes, the content of protein, fat, ash and carbohydrate are going up compare to the fresh meat. The findings indicated that the cooked rendang contained oleic acid (ω9) 6,95%, linoleic acid (ω6) 1,47%, dokosahexaenoat acid (ω3) 0,18%, free faty acid contents 0,28%, the peroxside number and trans fatty acid are not detected.

***Key words**: beef meat, coconut milk, spices, rendang, nutrition.*

## NUTRITIONAL COMPONENT OF RENDANG

(*MINANGKABAU ETHNIC FOOD* )

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## INTRODUCTION


Rendang is the spicy meat dish wich originated from Minangkabau ethnic in Indonesia, and now commonly served across the country. In 2011 Cable News Network (CNN) viewers choose rendang as number one dish of their "World's" 50 Most delicious Foods.

The basic ingredient of rendang are: meat, coconut milk and many kind of spices such as: redpepper, onion, garlic, ginger, galangal, coriander, blackpepper, clove, nutmeg, cumin, turmeric leaf, bay leaf, kaffir lime leaf, and lemon grass

## CULTURAL AND HISTORICAL ASPECS OF RENDANG

In Minangkabau tradition rendang is a requisite dish for special occasion in traditional Minang ceremonies, such as giving birth ceremonies, marriage, religious festival and is served to honor special guests.

Rendang began to spread across the region when Minangkabau merchants and migrant workers began to trade and migrate to Mallaca in 16th century. Because the journey took much time (river waterways), so rendang is suitable for long journey (Prof. Gusti Asnan)

Rendang Minangkabau if cooked properly still good to consume until 3 weeks in room temperature , even last months stored in refrigerator and up to six months if frozen.

## LITERATURE REVIEW

Food processing aim to convert the raw food into edible food and to increase the shelf life of product.

Food processing can change the nutritional component into positive and negative in nature, because they are sensitive by heat, acid, and alkaline .

The nutritional changes happened because of the chemical reaction process in food especially protein and fat, such as denaturation, amino acid cross linkage, amino acid rasemation, lisinolalanin formed, oxidation of fatty acid, hidrolysis, trans fatty acid formed, browning reaction ect.

## PROTEIN AND FAT CHANGE WHILE COOKING PROCESS

PROTEIN → DENATURATION AND HYDROLYSIS → INCREASING THE PROTEIN DIGESTIBILITY

X MAILARD REACTION, RESEMATION AMINO ACID, LAL , TRANS AMINO ACID → DECREASING THE PROTEIN NUTRITION VALUE

COCONUT MILK → COAGULATION THE PROTEIN, YIELD THE OIL AND DISSOLVING THE ESSENTIAL OILS AND OLEORESIN OF THE SPICES into COCONUT OIL → SPECIFIC FLAVOUR OF RENDANG

X FAT OKSIDATION → FFA, MDA, ALDEHID, KETON → OFF FLAVOUR →unhealthy

ESSENTIAL OILS AND OLEORESIN → AROMATIC COMPONENTS, NATURAL ANTIMICROBIAL, NATURAL PRESERVATIF AND ATIOXIDANT

Herbs and spices known as natural antioxidant, antimicrobial, natural organic preservatives and even as a functional food.

Herbs and spices have a volatil (essential oil) and non-volatil (oleoresin) component where can absorb by the meat and disolved in creamy souce and oil.

The generous and numerous of herbs and spices used in Rendang Minangkabau make the rendang have a complex and unique taste and durable food or perishable food.

## COOKING PROCESS OF RENDANG

All ingredients (meat, coconut oil, spices ) put in the pan and heat slowly with temperature (80 – 93 °C) and (5-7 hours)

GULAI

While cooking process the all ingerdients stirred and turn over untill the liquid evaporated and the dish became dry and the color turn to dark brown or black.

KALIO

Base on the water content there are 3 types of product :

GULAI → water content about 60 – 65%

KALIO → water content about 45– 50%

RENDANG → water content about 28– 32%

RENDANG

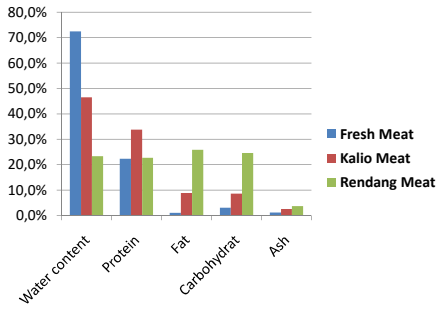
## Objective of the research

1. Evaluate the nutrirional value of rendang
2. Charaterize the flavour components
3. Characterize the chemistry, physic, microbiological, and organoleptic change after reheated.
4. Study the shelf life of rendang in different condition.

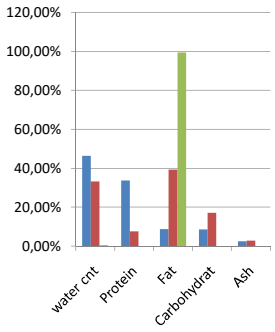
→ Research still on-going (in progress), this is a presentation of PRELIMINARY RESULTS.

## PRELIMINARY RESULT

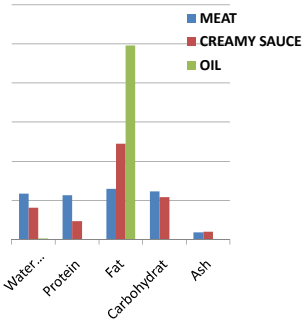
PROXIMATE ANALYSIS OF FRESH MEAT, KALIO MEAT AND RENDANG MEAT




PROXIMATE ANALYSIS OF KALIO




PROXIMATE ANALYSIS OF RENDANG

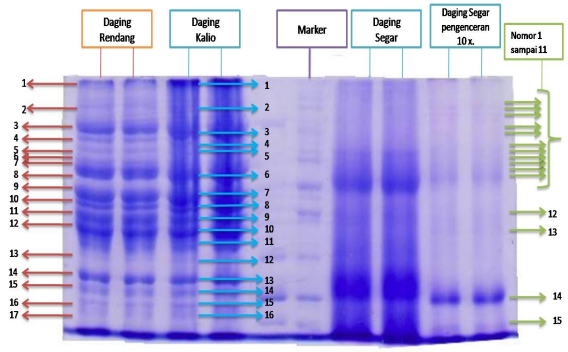



## Free fatty acid, peroxide value and trans fatty acid

| | KALIO | RENDANG |
|---|---|---|
| FREE FATTY ACID (Trimetri) | 0,21% | 0,28% |
| PEROXIDE VALUE (Trimetri) | 0 meq O2/KG | 0 meq O2/KG |
| TRANS FATTY ACID (GC) | NOT DETECTED | NOT DETECTED |

## PROTEIN DIGESTIBILITY (in-vitro)

| | FRESH MEAT | KALIO | RENDANG |
|---|---|---|---|
| PROTEIN DIGESTIBILITY | 74.5% | 71.80% | 73.14% |




## Fatty acid (GC)


| FATTY ACID | KALIO | RENDANG |
|---|---|---|
| ACID (C: 4) | | |
| ACID (C: 6) | | |
| ACID (C:8) | | |
| ACID (C:10) | | |
| LAURIC ACID (C: 12) | 44,94% | 43 % |
| MIRISTIC ACID (C: 14) | 18,47% | 17.72% |
| KAPRILIC ACID (C:8) | 8,31% | 8.18% |
| OLEIC ACID (C:18:1) | 6.88% | 6.95% |
| LINOLEIC ACID (C:18:2) | 1.45% | 1.47% |
| LINOLENIC ACID (C:18:3) | 0,04% | 0.01% |

## CONCLUTION

1. The nutritional components of “kalio” and “rendang” are changes, the protein, fat, ash and carbohydrat are going up compare to the fresh meat. The nutritional components of fresh meat are: water content 72,5%, protein 22,36%, fat 0,95%, ash 1,16 and carbohydrate 3,06%. The nutritional components of Kalio are water content 46,43%, protein 33,71%, fat 8,76%, ash 2,48 and carbohydrate 8,62%. And the nutritional components of Rendang are water content 23,37%, protein 22,66%, fat 25,80%, ash 3,60 and carbohydrate 24,57%.
2. The free faty acid contents are 0,21% in kalio and 0,28% in rendang .
3. The peroxside number and trans fatty acid not detected
4. The digestibility of protein (in-vitro) are 74,5% (fresh meat), 71,8% (kalio) and 73,14% (rendang)

**THANK YOU**

**TERIMAKASIH**