Soybean Processing For Food

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Rationale

Problems

- Expensive traditional sources of protein
- Low consumption of economical sources of protein and calories
- Protein–calorie malnutrition
Soybean Products

- Soymilk
- Taho
- Tokwa / Tofu
- Soy ice cream
- Textured vegetable proteins
## Composition soymilk and cow’s milk

<table>
<thead>
<tr>
<th>Components</th>
<th>Soymilk</th>
<th>Cow’s milk</th>
</tr>
</thead>
<tbody>
<tr>
<td>Moisture</td>
<td>87.60%</td>
<td>87.40%</td>
</tr>
<tr>
<td>Protein</td>
<td>2.75%</td>
<td>3.30%</td>
</tr>
<tr>
<td>Fat</td>
<td>0.90%</td>
<td>3.60%</td>
</tr>
<tr>
<td>Total CHO</td>
<td>8.40%</td>
<td>5.00%</td>
</tr>
<tr>
<td>Fiber</td>
<td>0.00%</td>
<td>0.00%</td>
</tr>
<tr>
<td>Ash</td>
<td>0.40%</td>
<td>0.70%</td>
</tr>
</tbody>
</table>
## Composition of Tofu, and Taho

<table>
<thead>
<tr>
<th>Components</th>
<th>Tofu</th>
<th>Taho</th>
</tr>
</thead>
<tbody>
<tr>
<td>Moisture</td>
<td>78.00-84.30%</td>
<td>92.70%</td>
</tr>
<tr>
<td>Protein</td>
<td>8.40-12.90%</td>
<td>2.90%</td>
</tr>
<tr>
<td>Fat</td>
<td>5.30-6.80%</td>
<td>1.40%</td>
</tr>
<tr>
<td>Total CHO</td>
<td>1.20-1.60%</td>
<td>2.40%</td>
</tr>
<tr>
<td>Fiber</td>
<td>0.00%</td>
<td>0.00%</td>
</tr>
<tr>
<td>Ash</td>
<td>0.70-1.10%</td>
<td>0.60%</td>
</tr>
</tbody>
</table>
ADVANTAGES OF SOYBEAN

- It is cheap
- It contains large amount and high quality proteins (high level of sulfur containing amino essential amino acid called lysine which is deficient in cereal product like rice. Soy protein consumption under low fat diet can prevent cardiovascular disease
- It contains high level of essential fatty acids (polyunsaturated fatty acids)
- Contains vitamin E which is a good antioxidant
- It is a good source of dietary fiber. It contains oligosaccharides which can normalize the environment in the intestine by controlling pH and production of organic acids and shortchain fatty acids in the intestine.
ADVANTAGES OF SOYBEAN

- It contains anti-cancer (isoflavones) and anti-inflammatory (lunasin) factors
- It contains components for prevention of diabetes and cardiovascular diseases
- It contains components which help increase bone density thus preventing osteoporosis
Food Soybean

Elmer E. Enicola
Researcher
Institute of Plant Breeding-CSC-CA
UP Los Baños
Traditional Soyfoods
Milk-based Products
Soymilk and Tofu

- Large seeds
- Clear hilum
- High soluble protein content
- Acceptable color
- Acceptable firmness of tofu
- Acceptable flavor and aroma
Soymilk, tofu, etc.

- **Soybeans**
  - **Soymilk**
    - **Taho**
    - **Okara (Wet Meal)**
  - **Tokwa**
Soybean

Clean/wash

Soak in water

Grind with cold or boiling water

Filter

Filtrate

Boil for 10 minutes

Add sugar

Cool to 75°C add flavor

Pack/sterilize or refrigerate/store in freezer. **SOYMILK**

Pour in calcium sulfate soln.

Let set/stand

Serve soycurd with sugar syrup and sago pearl. **TAHO**

Transfer curd in mold lined with cheesecloth

Press for 20-30 min.

Unmold, cut and soak in water. **TOFU/TOKWA**
Soaking
Draining
Grinding
Formulation and packaging
Soymilk
Large scale processing equipment for soybean processing
Large scale processing equipment for soybean processing
TOKWA

INGREDIENTS:
1 kg soybean 54 g calcium sulfate
20 liters water

PROCEDURES:
1. Prepare soybean as in the preparation of milk up to filtration step.
2. Put soymilk in a vat and heat to boil for minutes.
3. Stir from time to time.
4. Allow to cool to boil 70 degrees C.
5. Prepare calcium sulfate slurry in water and add to the soymilk.
6. Del monte vinegar can also be used as substitute for calcium sulfate at the rate of 1 tbsp per 1 cup of soymilk.
7. Put the vinegar when the soymilk reached the boiling point.
8. Stir and allow to gel.
9. Remove whey carefully
10. Transfer into the molder lines with cheese cloth until full.
11. Allow to drain
12. Wrap with, cheese cloth. Remove retainer.
13. File-up filled molds on top of the other or put weight on top to press the curds.
14. Cut the curd in 2” square and place in cold water.
15. Store in refrigerator.
SOYBEAN ICE CREAM

O.M. DEL Rosario and R.R. del Rosario
Flowchart for soy ice cream

- Soymilk preparation
- Weighing of other ingredients
- Preparation of starch gel
- Mixing and blending
- Ageing
- Freezing (soft ice cream)
- Placing in mold
- Freezing
Preparation of soymilk
Weighing of ingredients
Weighing of ingredients
Preparation of cassava gel
Mixing of ingredients
Place mixture in cream freezer
Freezing the mixture in ice cream freezer
Placing the soft ice cream in mold
Storing in freezer
Flour-based Products
TEXTURIZED VEGETABLE PROTEIN

- Vegetable or Texturized Vegetable Protein (TVP) is soybean processed as fiber or chunk and used as a food ingredient.
- Vegemead can be made into different sizes, shapes and colors.
- Frequently, they are made to look like meat, seafood or poultry when hydrated...
SOYBEAN FLOUR

**ingredients:**
1 kg soybean
5 L water

**Procedure:**
Clean and wash soybean thoroughly. Boil soybean for 10 minutes. Drain and remove seed coat. Sundry and put the seeds in an oven until crispy. Grind and shift. Store or keep in a sealed plastic bag or wide-mouthed bottle.
SOYBEAN POLVORON

Ingredients:
2 c soy flour
2 c powdered milk
½ c white sugar
6 tbsp margarine, melted

Procedure:
Roast flour for 15 min or brown. Mix with milk, sugar and margarine in a bowl. Form mixture with the use of molder. Wrap in Japanese paper.
**SOYBEAN COFFEE**

*Ingredients:*
1 c soybean

*Procedure:*
Clean the soybean. 
Remove dust and other foreign materials. Roast in a frying pan for 30 min at low heat until medium brown. Grind finely with a meat grinder or blender. Brew like ordinary coffee.
Okara (Sapal)-based Products
SKINLESS LONGANISA

Ingredients:
- ½ kg soybean sapal
- 100 g sugar
- ½ kg ground pork, lean meat
- ½ tsp vetsin

1 c corn starch
½ c garlic
½ c soy sauce
1 tsp salt
1 tsp ground pepper

Wrapping paper cut into 4x6 inches

Procedure:

Mix all the ingredients well. Wrap 36g mixture in the paper to produce 7 pc skinless longanisa per ¼ kg mixture.
SOY LUMPIANG SHANGHAI

INGREDIENTS:
- 5 cup soybean “sapal”
- 1 pc med.-sized singkamas, shredded
- 2 pcs eggs, slightly beaten
- 3 pcs onions, chopped finely
- Pepper to taste
- ½ cup carrots, shredded
- ½ lit. cooking oil (for frying)
- 1 pc med.-sized singkamas, shredded
- 2-3 stalks celery
- ½ cup corn starch salt to taste
- 50 pcs lumpia wrapper

PROCEDURES:
1. Put all ingredients in a bowl and mix well except cooking oil.
2. Wrap 1 tbsp of mixture with lumpia wrapper.
3. Deep fry until golden brown.
SOY EMBUTIDO

INGREDIENTS:
1 kg soybean “sapal”
1 kg ground pork
1 kg ground hotdog
¼ kg raisins
4 pcs onion, finely cut
4 pcs egg, beaten
1 bot pickle relish, 500 g
4 pcs carrots
6 cup flour or bread crumbs
1 box cheese, small
6 tbsp salt
½ lit cooking oil
8 tbsp soy sauce
2 pcs bellpepper, finely cut
¼ cup sugar
½ cup garlic
½ cup catsup

PROCEDURES:
1. Toss all ingredients in a bowl except for the cooking oil and mix thoroughly.
2. Wrap in an aluminum foil at least 10” long and 2.5” in diameter.
3. Steam for 10-15 minutes or until cooked.
4. Without removing the foil, fry in hot cooking oil.
5. To check if it is cooked, embutido should be golden brown.
6. Serve with catsup or sauce.
## Ingredients:

<table>
<thead>
<tr>
<th>Ingredient</th>
<th>Quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 kg soybean sapal</td>
<td></td>
</tr>
<tr>
<td>1 pc coconut, grated</td>
<td></td>
</tr>
<tr>
<td>2 tbsp baking powder</td>
<td></td>
</tr>
<tr>
<td>2 c flour</td>
<td></td>
</tr>
<tr>
<td>2 c sugar</td>
<td></td>
</tr>
<tr>
<td>cooking oil</td>
<td></td>
</tr>
</tbody>
</table>

## Procedure:

Mix all the ingredients together and form into patties. Deep-fry the mixture until golden brown.
SOYBALLS

**INGREDIENTS:**
5 cup soybean “sapal”
3 pcs onion, chopped
2 cup bread crumbs
½ cup flour
2 pcs egg, beaten
1 pc red bellpepper
½ lit cooking oil

**PROCEDURES:**
1. Toss all ingredients in a bowl except oil and flour.
2. Mix thoroughly.
3. Form the mixture into balls approximately 2 tbsp.
4. Roll the balls into flour.
5. Fry until golden brown.

**INGREDIENTS:**
3 cup water or meat broth
2 tbsp tomato catsup
6 tbsp vinegar
3 tbsp sugar
3 tbsp cooking oil

**PROCEDURES:**
1. Mix water, catsup, vinegar, soy sauce, sugar and salt. Set aside.
2. In a casserole, heat the oil and add the onions.
3. Put the red and green bellpepper.
4. Add the mixed ingredients and cook for 3-6 minutes.
5. Add the flour dissolved in 6 tbsp water.
6. Simmer for 2 minutes.
SOY UKOY

Ingredients:

½ kg soybean sapal
1 c shrimp
1 c soybean flour
1 potato/squash, grated
Cooking oil
2 pc onion, chopped
2 pc sweet potato/squash, grated
2 stalks celery
Salt, pepper and vetsin to taste

Procedure:

Mix all ingredients and form into patties. Deep-fry the mixture until golden brown.
Other Products
Fermented Soyfoods

Tempeh (Indonesia)  Natto (Japan)
Vegetable Soyfoods

Sprouts (togue)  Green vegetable (edamame)
Green Vegetable

- Edamame in Japan
- Bigger seeds
- Sweeter and more tender

Photo credit: AVRDC
Green Vegetable

- Locally available varieties suitable for edamame or green pods
Tokwa-based Products
Tokwa con Shrimps Chinese Style

Ingredients:
¼ kg tokwa cut into cubes, fried
¼ kg fresh shrimp, shelled
¼ tbsp leek, finely cut
1 pc onion, sliced
5 cloves garlic, minced
2 pc carrots, slices thinly
3 stalks celery, fine cut
cooking oil
Patis and vetsin to taste

Procedure:
Saute garlic, onion and patis.
Add the other ingredients. Simmer until cook.
Tokwa’t baboy sisig

Ingredients:
1 kg pork mascara (balingit)
½ kg tokwa, fried and diced
3 pc green onion, sliced
1 pc onion, diced
10 pc calamansi
1 tsp black pepper, ground
1 tsp sugar
Salt and vetsin to taste
chili

Procedure:
Clean the pork mascara thoroughly.
Boil in water with salt and vetsin until soft.
Dice into small pieces. Mix all ingredients and
serve.
Tokwa Adobo

**Ingredients:**
12 pc tokwa, cubed, fried
½ tsp black pepper
2 pc onions
siling labuyo
3 tbsp vinegar  salt to taste
  3 tbsp soy sauce
  vetsin to taste

**Procedure:**
Mix all ingredients. Serve.
Tokwa Balls

**Ingredients:**
2 pc tokwa, mashed
1 pc egg
100 g pork
salt to taste
200 g snap bean (green)
2 tsp flour plus for coating
1 stalk green onion

**Procedure:**
Soak tokwa for 30 mins then mash. In a bowl, mix all ingredients. Form the mixture into balls then roll into flour. Deep-fry the balls until golden brown. Serve tokwa with sautéed snap bean.
Take care of your BODY ORGAN...

EAT Soybean!!!
GOD BLESS & MABUHAY!!!

Soybean market outlets/Suppliers in Region 02
- CORDEV (Cooperative for Rural Development), Cordon, Isabela
- MGSK (Masaganang Gabay sa Kalusugan), Bayombong, nueva Vizcaya
- Tubungan’s Women Association, Kayapa, Nueva Vizcaya
- Esperanza, MPCI, Aurora, Isabela

For more info, pls contact:

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