PILI (Canarium ovatum Engl.)
A Promising Indigenous Crop of the Bicol Region in the Philippines for Food and Nutrition

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- Philippines, stretching 1,839 kms. north to south off the Southeast coast of Asia has a total land area of 300,000 sq. kms;

- It’s 7,107 islands comprise one of the largest island groups in the world;

- Philippines is a tropical country with an average temperature of 32 °C (89.6 °F);
Pili scientifically known as *canarium ovatum* *Engl.* is considered a tree of hope; a premium crop; “The Majestic Tree”; Indigenous crop and “Flagship Commodity of the Bicol Region in the Philippines”.

![Image of pili nuts](image)

**CHosen Pili**

"In a nutshell, it's perfect!"
Pili trees are attractive symmetrically shaped evergreens, averaging 20 m tall with resinous wood and resistance to strong wind.
The pili fruit is a **drupe**, 4 to 7 cm long, 2.3 to 3.8 cm in diameter, and weighs 15.7 to 45.7 g. The skin (**exocarp**) is smooth, thin, shiny, and turns purplish black when the fruit ripens; the pulp (**mesocarp**) is fibrous, fleshy, and greenish yellow in color, and the hard shell (**endocarp**) within protects a normally dicotyledonous embryo.
The basal end of the shell (endocarp) is pointed and the apical end is more or less blunt; between the seed and the hard shell (endocarp) is a thin, brownish, fibrous seed coat developed from the inner layer of the endocarp. This thin coat usually adheres tightly to the shell and/or the seed. Much of the kernel weight is made up of the cotyledons, which are about 4.1 to 16.6% of the whole fruit; it is composed of approximately 8% carbohydrate, 11.5 to 13.9% protein, and 70% fat. Kernels from some trees may be bitter, fibrous or have a turpentine odor.
Pili is a tropical tree preferring deep, fertile, well drained soil, warm temperatures, and well distributed rainfall. It can not tolerate the slightest frost or low temperature.

Most pili kernels tend to stick to the shell when fresh, but come off easily after being dried to 3 to 5% moisture (30 °C for 27 to 28 h). Shelled nuts, with a moisture content of 2.5 to 4.6%, can be stored in the shade for one year without deterioration of quality (Coronel et al. 1983).
✓ Although they are grown as ornamental trees in many areas of the Old World tropics of Indonesia, Malaysia and the Philippines, only the Philippines produces and processes pili nuts commercially.

✓ Bicol Region in the Philippines is the major producer of pili in the country with a share of 78% domestic production;

✓ It has an existing area of 7,754 hectares with 617,317 bearing trees and 160,483 non-bearing trees. Regional production for CY 2011 was approximately 23,221 metric tons.
FACTS AND HIGHLIGHTS

- **Pilinut** is considered superior to almond (West, 1993). It has a long shelf life. Processed pili kernel are delicious and can be used in the preparation of many food products, and is also the source of edible oil of excellent quality.

- **Pilinut pulp and kernel** are extremely nutritious, are excellent sources of minerals, vegetables fats and proteins;
Phil Pesto Angel Hair Pasta

2 cups loosely packed ballad leaves
1/4 cup Parmesan cheese, grated
1 pc garlic, clove halved
1/4 tsp salt
1 tsp sherry powder
1/4 cup pili nuts, toasted
c 1/2 cup olive oil
1/2 tsp anise

Cook the pasta in boiling salted water following packaged directions. Drain and set aside.

Make the bulk, cheese, garlic and salt in a food processor, then cover and pulse until chopped. Add half of the nuts, cover and process until well blended. While processing, gradually add oil in a steady stream.

Toss cooled pasta with the paste until well combined. Top with parmesan cheese and the remaining pili nuts and serve.

Farfalle & Broccoli Salad with Honey Roasted Pili

170 g broccoli, trimmed and coarsely chopped
1 tbsp olive oil
235 g leek (bowtie pasta)
butter
46 g honey roasted pili nuts, coarsely chopped
35 g white cheddar cheese
salt
pepper

Preheat oven to 400°F. On a baking sheet, toss the broccoli in olive oil. Season with salt and pepper then roast for about 15 minutes until well cooked.

Cook the pasta in boiling salted water following packaged directions. Drain and set aside. 1/3 cup of pasta cooking water. Return pasta and reserved cooking water to the pot, and stir in the butternut and broccoli.

Transfer the pasta mixture to a serving bowl. Toss in the pili nuts and top with crumbled white cheese.

Pili, Bacon & Caramel Popcorn

3 tbsp lightly popped corn kernels
2 tbsp vegetable oil
180 g bacon bits and minced
1/2 cup unsalted pili
1 tbsp onclick salt
1/4 cup cayenne pepper
1/3 cup whipping cream
1/4 tsp sugar
1/4 tsp water

Cook bacon in pan over medium heat until almost crisp and drain on paper towels to cool. Add bacon and pili to the popcorn, sprinkle with cayenne salt and cayenne. Toss to coat.

Bring cream and onion to a boil over medium heat. Remove from heat, and let steep for 5 minutes, occasionally pressing on tea bag to release flavor.

To make the caramel, combine sugar, water and corn syrup in a large saucepan over medium heat until sugar dissolves. Increase heat to high until without stirring, using tongs or deep spoon, remove from heat, and add caramel immediately. Stir until well blended. Deseed caramel over popcorn mixture, and toss with glazed pili until evenly coated.

Transfer caramel popcorn to a foil-lined and greased baking sheet. Bake in oven until caramel is shiny and coated. Set aside until cool.

For the vegetables in a small bowl and cover with hot water. Soak for 15 minutes, and drain in a colander.

In a bowl, combine the vegetables, mustard, brown sugar and salt. Slowly pour in the remaining salad oil while whisking vigorously.

Combine the salad greens and shelled pili in a large bowl. Toss with just enough of the dressing to coat lightly. Toss gently and portion on small plates with pili, potato and pear slices over the greens. Drizzle with more dressing as desired.

Pili Energy Bar

2 tbsp honey
1 cup oat meal, toasted
1/4 cup chopped walnuts
1/2 cup pili
1/4 cup skimmed milk powder
10 tsp orange juice

Place the honey in a small saucepan. Add the orange juice and stir until well combined. Bring to a simmer and add the pili, nutmeg, and milk powder. Stir for 5 minutes or until thickened. Add to a piping bag and pipe onto the pili mixture. Serve with sour cream and pili.

In a large pan, heat the butter until it sizzles, then add the beans. Season with salt and pili pepper. Stir over high heat for about 3 minutes, stirring until tender.

Sprinkle the pili nuts and lime zest over the beans. Toss well to mix the flavors. Serve with fresh lime wedges and pili.
Experimented on New Recipes and Preparations

*Mazapan de pili or Salcichon de pili*

*Pili Nut in Bitter Valrhona Chocolate Sponge*

*Pili Nut Pesto*

**PILI NUT GOURMET PREPARATIONS**
Stuffed Salmon Topped with Pili

Pili Stuffed Chicken

Sauteed Okra with Pili
Coconut Pili Rice  Pili Energy Bar
New Pili Recipes for mid- to high-end cuisine developed with Via Mare

Bacon Pili Caramel Corn

Pesto with Pili

“In a nutshell, it’s perfect!”
Uses of Pili

- Kernel
  - Kernel Oil/Pulp Oil
  - Fatty Acids
  - Esters
    - Oil for hydraulic systems & lubricants
    - Bio diesel
  - Alcohol
  - Amides
  - Soap
    - Ploatum additives
    - Surfactants for cleaning agents
  - Ground Meat
    - Cakes, breads, ice cream
    - Confectioneries & candies
    - Industrial and chemicals manufacturing, cosmetics and food industry

- Pulp
  - Oil, vegetable dishes pickles
  - Feeds
  - Food industry
    - Livestock industry

- Testa
  - Dye & compost material
    - Activated carbon
    - Water purification, air pollution control, deodorizer
    - Shell powder
    - Filter for resins, adhesive and paints, car wash, cleanser formulation
    - Abrasive grits (granules)
      - Sandblasting agents & substitute to apricot hulls
      - Fuel, growth medium, for orchids, anthuriums & handicrafts
    - Pharmaceuticals, lacquer, varnish, adhesives and manila elemi

- Shell
  - Resin
  - Leaves
    - Salads relishes
    - Human consumption
  - Tree
    - Lumber/materials for furniture & panel boards
    - Wood industry
# NUTRITIONAL COMPOSITION OF PILI
(100 gm edible portion)
Food and Nutrition Research Institute, Philippines

<table>
<thead>
<tr>
<th>Composition (Raw Pili)</th>
<th>Amount (g)</th>
<th>Micronutrients</th>
<th>Amount (mg)</th>
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<tr>
<td>Water</td>
<td>8.0</td>
<td>Calcium</td>
<td>135.0</td>
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<tr>
<td>Protein</td>
<td>14.2</td>
<td>Iron</td>
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<tr>
<td>Fat</td>
<td>68.5</td>
<td>Magnesium</td>
<td>606.0</td>
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<tr>
<td>Ash</td>
<td>2.9</td>
<td>Phosphorus</td>
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<tr>
<td>Dietary Fiber</td>
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<td>Potassium</td>
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<tr>
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<td></td>
<td></td>
<td>Copper</td>
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<td></td>
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<td>Thiamin</td>
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<td></td>
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<td>Riboflavin</td>
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<td></td>
<td></td>
<td>Niacin</td>
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<tr>
<td></td>
<td></td>
<td>Ascorbic Acid</td>
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POTENTIALS AND PROSPECTS

- Availability of production and processing technologies;

- Superior and accredited varieties are available for propagation and distribution which are high yielding, easy to propagate asexually, bears fruit all year round and resistant to pest and diseases, and responsive to low production inputs;

- Technical Experts and skilled technicians are available in the region;

- The Regional Pili Research and Training Center was established to develop new propagation techniques, evaluate performance of promising cultivars, identify, index and collect elite pili varieties;

- New propagation techniques was develop which reduces the gestation period from 7 to 4 years;
POTENTIALS AND PROSPECTS

- Pili Foundation Scion Groves, Germplasm Bank, Technology Demonstration Farms and nurseries are maintained in strategic location for the production of quality planting materials;

- Pili trees can be planted in remote rural areas without fear that the fruits will spoil or rot if not marketed immediately. Once the nut is properly dried it can be stored for one year under ordinary room temperature;

- Production cost per hectare = US $ 795.00 and ROI = 35%

- Strong government and private sector partnership. The Regional Pili Board was organized to serve as a vehicle and link the various key commodity players in order to ensure the sustainability of the industry;
Thank You!

The Bicol region is composed of four contiguous provinces: ALBAY, CAMARINES SUR, CAMARINES NORTE, and SORSOGON; two island provinces of CATANDUANES and MASbate with seven cities: Legazpi City, Naga City, Iriga City, Tabaco City, Lipa City, Sorsogon City, and Masbate City.

Mountainous and hilly, Bicol is endowed with fantastic gulls, bays and active volcanoes, most prominent and among the most active among them Mayon Volcano. Rich in history and natural resources, the Bicol Peninsula offers itself to exciting exploration for business, adventure, historical research, and a joyful voyage into incredible food trips.

Organized by
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A GLOBAL BUSINESS HUB, AN ADVENTURE DESTINATION, A RICH HISTORICAL RESOURCE, AND HOME TO THE EXCITING PILI NUT
Future Prospects

According to Richard A. Hamilton, University of Hawaii at Manoa, the current status of the pili is equivalent to that of the macadamia some 30 years ago. It has great potential to develop into a major industry. The immediate concern in pili production is the difficulty of propagation. The lack of an effective clonal propagation method not only hampers the collection of superior germplasm but also makes it almost impossible to conduct feasibility trials of this crop. Selected pili cultivars (such as 'Red', 'Albay', and 'Katutubo') were selected in the Philippines. The National Clonal Germplasm Repository at Hilo, USDA-ARS, has initiated studies in vitro and vegetative propagation for the multiplication and long-term preservation of pili. A recently released pili cultivar in Hawaii, 'Poamoho', may further stimulate the interest in this crop. Besides the desirable production and quality attributes, its kernels separate easily from the hard shell without the need of prior drying (30°C for 27 to 28 h). This is an important cost saving feature for processing.

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