According to Gandhi, coconut blossom sugar provides a way to solve the world’s poverty, as an antidote against misery.

“The juice of the coconut tree can be transformed into a sugar as soft as honey... Nature created this product such that it could not be processed in factories. Palm sugar can only be produced in palm tree habitats. Local populations can easily turn the nectar into coconut blossom sugar. It is a way to solve the world’s poverty. It is also an antidote against misery.”

Mohan das K. Gandhi 3.5.1939

Mahatma Gandhi largely experimented with food; it was important to him. His personal diet was vegetarian and consisted of 1 litre of goat’s milk; 150g wheat and rice; 75g leaf vegetables; 125g other vegetables; 25g lettuce; 40g ghee and 40-50g coconut blossom sugar.

Excerpts from Internet: http://www.noble-house.tk

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**Physical Properties**
- Color: light yellow to dark brown
- Odor: free of burnt odor
- Taste: free of burnt taste

**Chemical Properties**
- Moisture Content (%): ≤ 4.0
- Glucose Content: 2.8 - 3.0
- Fructose Content: 1.0 - 4.0
- Sucrose: 78.0 - 89.0
- Ash: ≤ 2.4

**Microbiological Properties**
- Salmonella: Negative
- E. coli: Negative
- Coliform Count: < 10 cfu/g
- Total Plate Count: < 10 cfu/g
- Mold and Yeast: < 10 cfu/g

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**Comparative nutritional values of the coconut sap sugar vs. brown sugar**

<table>
<thead>
<tr>
<th>Element (ppm or mg/L)</th>
<th>Coconut Sap Sugar</th>
<th>Brown Sugar</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nitrogen</td>
<td>2,020</td>
<td>100</td>
</tr>
<tr>
<td>Phosphorus</td>
<td>790</td>
<td>35</td>
</tr>
<tr>
<td>Potassium</td>
<td>10,300</td>
<td>650</td>
</tr>
<tr>
<td>Magnesium</td>
<td>290</td>
<td>None</td>
</tr>
<tr>
<td>Chloride</td>
<td>4,700</td>
<td>180</td>
</tr>
<tr>
<td>Sodium</td>
<td>450</td>
<td>None</td>
</tr>
<tr>
<td>Sulfur</td>
<td>260</td>
<td>None</td>
</tr>
<tr>
<td>Copper</td>
<td>2.3</td>
<td>None</td>
</tr>
<tr>
<td>Manganese</td>
<td>1.3</td>
<td>None</td>
</tr>
<tr>
<td>Boron</td>
<td>6.3</td>
<td>None</td>
</tr>
<tr>
<td>Zinc</td>
<td>21.3</td>
<td>2.0</td>
</tr>
<tr>
<td>Iron</td>
<td>21.5</td>
<td>12.6</td>
</tr>
</tbody>
</table>
Introduction

The nutritious coconut sap sugar is a novel product and an important addition to the numerous products that can be derived from the coconut tree.

It is made purely from coconut sap or toddy, locally known as ‘tuba’, the oyster-white liquid oozing out from the unopened inflorescence technically termed as “spathe”.

The sap contains 12-18% sugar in its natural form with important vitamins and amino acids.

It has very low Glycemic Index (GI) of 35, making it an important functional food – a natural sweetener for diabetics and those who have family history of diabetes.

The spathe of coconut trees in good stand can yield an average of two (2) liters of sap per tree per day. An average of one (1) kg of sugar can be produced from four (4) coconut trees per day.

Eight (8) liters of coconut sap is equivalent to one (1) kg of sugar.

The production volume and the sugar content of the sap, however, is dependent on the location and variety of the tree, season, nutrition, as well as the tapping time and method.

Transforming the coconut sap to sugar granules is simple and requires basic equipment that is why it is appropriate and best adapted to farm-level or medium-scale enterprise.

It is an immediate source of income for coconut farmers and at the same time the demand is getting bigger both in the local and international markets.

An initial investment of P1.42 M can yield an average annual net profit amounting to P203,762.48.

Based on the projected 10-year Income statement and cash flow before financing, income is realized on the first year of operation.

The initial investment can be fully recovered in 3.64 years.

In addition, the estimated internal rate of return (IRR) is 28% while the net present value (NPV) is at P648,676.86 at the discount rate of 15%.

**Initial Capital**

- P1.42 M

**NPV (based on a 10-year cash flow projection at 15% discount rate)**

- P648,676

**IRR (based on a 10-year cash flow projection)**

- 28%

**Payback Period**

- 3.64 years

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**COCONUT SAP SUGAR PRODUCTION**

**Step 1. Selection of tree and mature spathes for tapping**

- Select bearing trees with healthy spathes for tapping.
- Bend the mature spathes downwards for 1 week to allow the flow of sap after tapping by tying the spathe with plastic twine and slowly pull downwards.
- Using a sharp knife, cut the spathe at least 6 mm from the tip to allow the flow of sap.

**Step 2. Collection of coconut sap**

- After slicing the spathe, collect the liquid sap oozing out with the use of a plastic vessel.
- To avoid the fermentation of the fresh sap, collect the sap five (5) hours after tapping. A total of 850 L of fresh sap for processing can produce 100 kg of sugar.

**Step 3. Heat evaporation**

- Boil the collected fresh sap up to 115°C in a metal “wok” using a brick-fabricated oven locally known as ‘pugon’, with improvised chimney for the smoke outlet to produce smoke odor-free sugar.
- When the liquid is already boiling, remove the “scum” to avoid dark residues on the final product.
- The boiling of the sap will take about 3-4 hours to remove water, leaving only the sugar content of the coconut sap.

**Step 4. Conversion of sap syrup to coco sap sugar**

- Transfer the liquid to food grade stainless wok or “kawa” when it turns into syrup.
- Stir the syrup continuously to avoid burning and to ensure granulation. At this phase, the liquid will change into solid form, hence temperature change is critical. Stirring allows air to enter the sticky syrup that will cause the gradual cooling resulting to granulation.
- Remove “wok” from the fire while continuously stirring the sugar until granules are formed.

**Step 5. Sieving and drying the coconut sap sugar**

- Let the sugar cool and press with wooden spatula to break the lumps.
- Sieve the sugar to have uniform particle sizes.
- Put the sugar granules in a food grade stainless tray and dry in oven for 1 hour to achieve moisture content of less than 4%.

**Step 6. Weighing and packaging**

- Collect the sugar in a big airtight container and store overnight.
- Weigh and pack the sugar in transparent polyethylene plastic bags (0.03 In x 8 In x 5 In).
- Packaged sugar in plastic bags are ready for storage in cool place.