Product Description

Coconut vinegar is a natural product obtained from a natural process of fermentation of coconut sap or coconut water, with no preservatives or chemicals added. Vinegar production involves the fermentation of sugar (10-12%) into ethanol (alcoholic) by *Saccharomyces cerevisiae* (yeast) and the oxidation of ethanol into acetic acid (acetous) by *Acetobacter aceti* (bacteria).

Sukang tuba is a product of natural alcoholic and subsequent acetous fermentation of sap from the inflorescence of the coconut palm. Coconut water vinegar is the product of alcoholic fermentation and acetous fermentation of sugared coconut water (Sanchez, 2008).

Table 1. Physico-chemical Characteristics of Coconut Water Vinegar

PARAMETER	VALUE
Moisture	98%
Fat	0.1%
Ash	0.3%
Total Carbohydrates	1.4%
Calcium	24 mg
Phosphorus	34 mg
Iron	0.1 mg
Riboflavin	0.01 mg

Source: Coconut as Food, Banzon, J. et al., 1990

Table 2. Physico-chemical Characteristics of Coconut Sap/Toddy Vinegar

PARAMETER	VALUE
Acidity	5.0-6.0 %
Alcohol	0.5 %
Total Solids	0.77-1.33 %
Ash	0.37-0.45 %
Potash	0.15-0.22 %
Density	1.010-1.015

Source: Technical Data Handbook on Coconut, 2013

Coconut Water Vinegar Production

Materials:

4 cups coconut water
3/4 sugar
1/4 tsp yeast
1 cup vinegar starter

Utensils:

stainless casserole
stove
dry cheesecloth
band
rubber tubing
stainless/wooden spoon
wide mouth container
plastic twine/rubber

Procedure:

1. Strain freshly collected coconut water using a cheesecloth.
2. Dissolve 3/4 cups sugar in 4 cups coconut water.
3. Pasteurize by heating at 60-65°C for 10-15 minutes to kill the microorganisms.
4. Transfer in sterilized glass jars, half filled. Cool and add 1/4 teaspoon dry yeast.
5. Cover the container with a clean cheesecloth.
6. Allow the sugar solution to ferment for 2-3 weeks or until there are no more bubbles of carbon dioxide formed to allow alcoholic fermentation.
7. Decant the alcoholic solution to remove the yeast and other solid materials. Pasteurize the alcoholic solution and cool immediately.
8. To 4 cups alcoholic solution, add 1 cup vinegar starter. Cover with clean cloth/paper to start acetic acid formation.
9. Set aside for 1 month or until maximum sourness is obtained. For the development of desirable aroma and flavor, allow the vinegar to age in barrels or earthen jars which are filled to full capacity.
10. Filter the vinegar and then pasteurize before bottling the product. To clear the vinegar, stir it with well-beaten egg white and heat until egg white coagulates (optional). Filter vinegar.

Coconut Sap/Toddy Vinegar production

Materials:

Fresh coconut sap/toddy

Utensils:

stainless casserole
stainless ladle
stove
wide large container
dry cheesecloth
plastic twine/rubber band
rubber tubing
thermometer
glass bottles with lid

Procedure:

1. Collect the coconut sap by tapping (making a small incision) on the tender unopened inflorescence. For easy collection, the inflorescence is slowly bent downward.
2. Pour the collected sap in a wide large container. Cover with a clean net to allow aeration and prevent contamination. Allow the sap to ferment naturally for 60 days.
3. Pasteurize the mixture by boiling for 5-10 minutes at 60-65°C to maintain the desired quality of the matured vinegar with at least pH 4.
4. Allow to cool before placing in sterile bottles. Cover tightly and seal.
5. Age the sap vinegar for one year. The color of the vinegar changes as it ages, from cloudy white to light yellow to a clear light brown as it further matures.

Mother Vinegar Preparation

Materials:

4 cups coconut water
3/4 cups sugar
1/4 tsp yeast
1 cup Acetobacter

Procedure:

A. Alcoholic Fermentation

Perform steps 1-5 on the coconut vinegar production and allow to ferment for 4-7 days.

B. Acetification

1 test tube culture of 3-day old *Acetobacter aceti* per 250 ml fermented coconut water

1. Decant the fermented coconut water into two sterilized 1000 ml bottle.

2. Aseptically add approximately 2 tsp (10 ml) sterile fermented coconut water to sterile test tube.

3.Scrape the surface using an inoculating rod and dispense to 1 cup fermented coconut water.

4. Add another 2 tsp fermented coconut water, shake to get the remaining organism (*A. aceti*) and transfer the same to the batch aseptically in an inoculating chamber or a clean enclosed room.

5. After 3 days, the implanted fermented coconut water can be used as mother vinegar. Two weeks should be the maximum fermentation period.

6. To reproduce mother vinegar, repeat the alcoholic fermentation steps and mix this with an equal amount of 3-14 day old mother vinegar. Use this initially prepared mother vinegar for the mass production.

Uses and Applications

⇒ **Food preparation**
As a condiment seasoning for meat, fish, and vegetables on the table or during cooking.

⇒ **Food preservation**
Used in the manufacture of vegetable pickles, catsup and other tomato products, mayonnaise, mustard, dressings, sauces, and additive in many manufactured foods to enhance flavor.

⇒ **Medicinal use**
Used as an antimicrobial agent to treat infections. Lowers cholesterol and aids in weight management

⇒ **Cleaning agent**
For toilets, kitchen sinks, pots, wood panels, windows, grills, greasy ovens and hardened paintbrushes.

⇒ **Deodorizer**
For refrigerator and microwave ovens

Standard for Vinegar

Titratable Acidity = 4%
(4 grams acetic acid/ 100 mL vinegar)

Source: Philippine Food and Drug Administration

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COCONUT PROCESSING TECHNOLOGIES

Coconut Vinegar