ONLINE TRAINING: STAY HEALTHY AND PRODUCTIVE DURING COVID-19 PANDEMIC: NATA DE COCO
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Content

1. Introduction
2. Nata de Coco
3. Production
4. Isolation of the Bacteria
5. Application of Nata de Coco
6. Value Chain
Introduction

Main end-product

Other Products

- Coconut milk
- Desiccated coconut
- Tender coconut water
- Coconut sugar
- Nata de coco
- Etc....
Nata de Coco

• Terminology: “nata” (Spanish) → floating
• Food science → Bacterial Cellulose (BC) in gel form
• Water and pure cellulose, no hemicellulose, no lignin
• High crystallinity
• High water absorption
• High mechanical strength
• Delicious gel...!!!
• Fiber source
Production
(traditional static method)

Sterilization of filtrated coconut water

New starter

Molding

(15-20 days incubation)

Washing & Boiling

Cutting

Nata starter
Sugar
Ammonium Sulfate
Citric acid
Production
(Basic recipe)

Verschuren et al. (2000):
• 1 L of Coconut Water
• 20 gr of Sucrose (sugar) / 2% (w/v)
• 5 gr of glacial Acetic Acid / 0.5% (w/v)
• 5 gr of Ammonium Sulfate / 0.5% (w/v)
• 5% (v/v) of Starter Culture

Embuscado et al. (1994):
• >5% of sugar levels **DO NOT** increase the efficiency
Production (optimization)

Influencing factors:
• Strain of the bacteria (strain type, purity)
• Fermentation condition (eq. medium composition, T, pH)
Production (the bacteria)

Acetobacter xylinum (Komagataeibacter xylinus / Glucoacetobacter xylnus):

Hirai, Tsuji & Horii (2002)
Production
(Coconut water)

What does coconut water provide for the growth of bacteria?

• 94.90% water
• 2.61% sucrose
• 3.71% other carbohydrates
• 0.72% protein
• 0.20% fats
• 2.00% minerals
• 1.00% vitamins
• 0.39% ash

It can provide all nutrients, but **still insufficient** for producing BC
Production
(Product)

Cellulose
- Full coverage of the pellicle on the surface → less $O_2$ for the bacteria
- Less synthesis

Gluconic Acid
- Decreasing the pH → less optimal synthesis
Isolation of Bacteria
(simple method)

- Sugar (500 grams)
- Water (200 mL)
- Glacial acid (50 mL)
- MgSO₄ (0.5 grams)
- KH₂PO₄ (3 grams)
- ZA 9 (9 grams)

Pineapple Peel

Mixing with blender

Incubation in a sterile glass container for 2 – 3 weeks

Filtration

AX starter

(Source: GAPNI)
Application of Nata de Coco

Ullah, Santos, Khan (2016)
Application of Nata de Coco
Value Chain
(an example from Vietnam)

Three main parties:
• Raw Nata Producer
• Refiner
• Local F&B Producer

Phisalaphong et.al. (2016)
Thank You