



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





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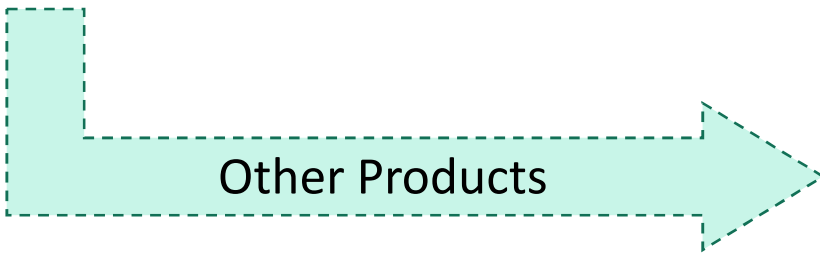


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Introduction



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



Nata de Coco

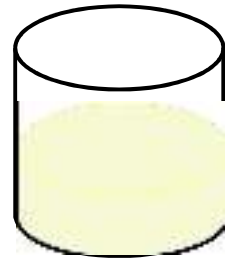
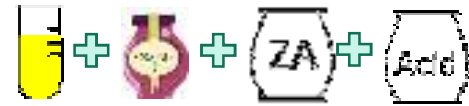
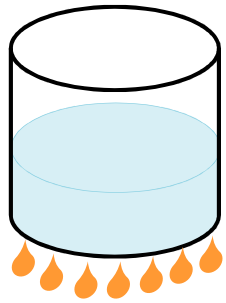


- Terminology : “nata”(Spanish) → floating
- Food science → Bacterial Cellulose (BC) in gel form
- Water and **pure** cellulose, no hemicellulose, no lignin
- High crystallinity
- High water absorption
- High mechanical strength
- Delicious gel...!!!
- Fiber source



Production (traditional static method)

Sterilization of
filtrated coconut
water



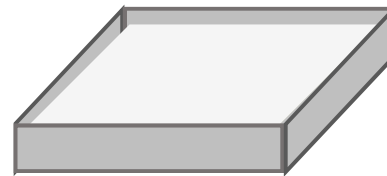
- Nata starter
- Sugar
- Ammonium Sulfate
- Citric acid



Molding



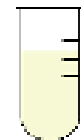
(15-20 days incubation)



Washing &
Boiling



New starter



Cutting



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)



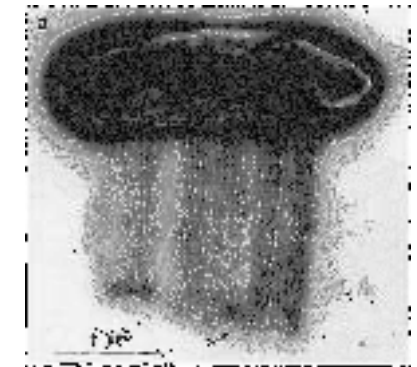
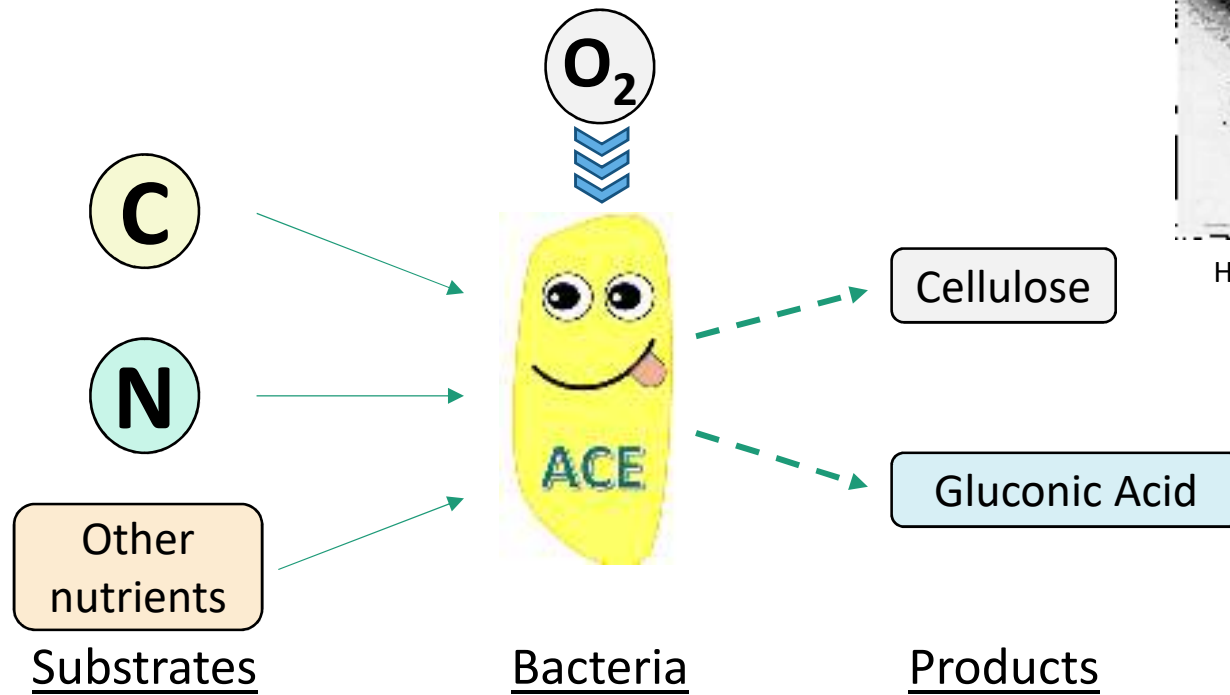
Influencing factors:

- Strain of the bacteria (strain type, purity)
- Fermentation condition (eq. medium composition, T, pH)



Production (the bacteria)

Acetobacter xylinum (*Komagataeibacter xylinus* / *Glucoacetobacter xylinus*):



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



Substrates

C

- Sucrose
- Fructose
- Glucose
- Ethanol
- Glycerol
- Etc...

N

- $(\text{NH}_4)_2\text{SO}_4$
- Peptone
- Yeast extract
- MSG
- Etc...

Other nutrients

- Minerals
- Vitamins

Production (Product)



Cellulose

- Full coverage of the pellicle on the surface → **less O₂** for the bacteria
- Less synthesis

Gluconic Acid

- Decreasing the pH → less optimal synthesis



Isolation of Bacteria (simple method)



Pineapple Peel



- Sugar (500 grams)
- Water (200 mL)
- Glacial acid (50 mL)
- $MgSO_4$ (0.5 grams)
- KH_2PO_4 (3 grams)
- ZA 9 (9 grams)



Mixing with blender



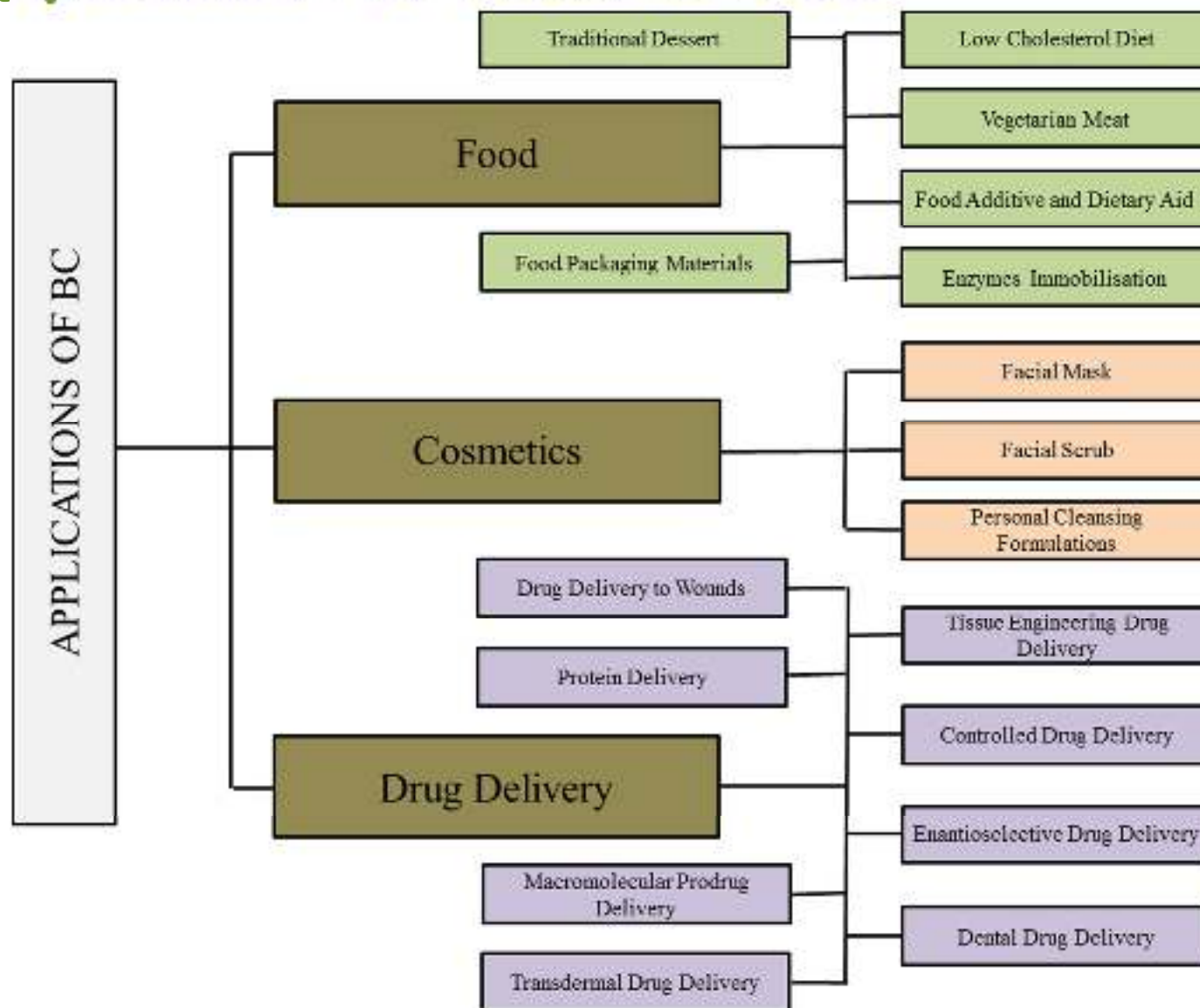
Incubation in a sterile glass container for 2 – 3 weeks



AX starter

(Source: GAPNI)

Application of Nata de Coco



Application of Nata de Coco



LA LLUVIA[®]
Coconut Jelly Mask

ลา ลูเวีย
โคโคเนต เจลลี่ มาส์ก

เป็นผลิตภัณฑ์เจลลี่ที่ทำจากน้ำมะพร้าว 100%

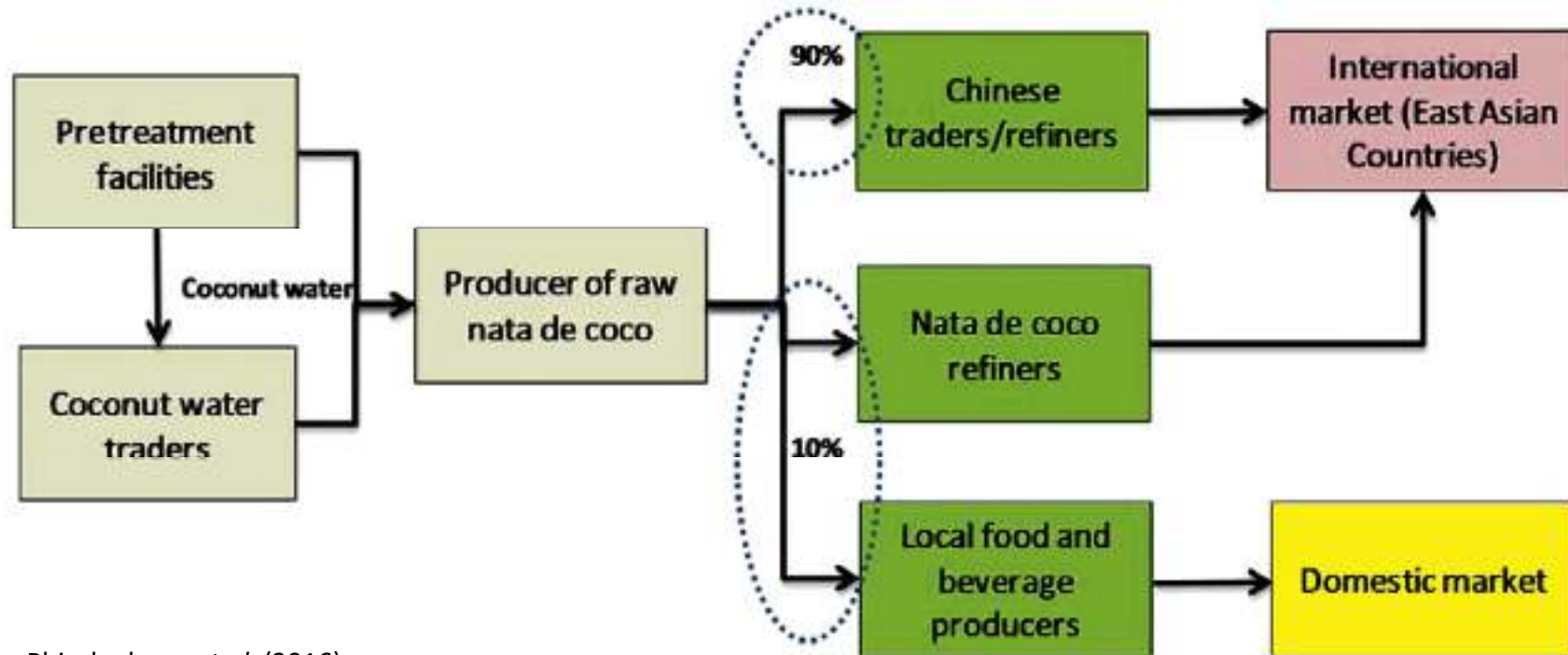
- เติบความสดชื่น
- กระชับผิว
- กระจับผิวสวย
- ฤดูร้อนเยาะวุ้น

100% natural coconut juice for skin rejuvenating.



Value Chain

(an example from Vietnam)



Phisalaphong *et.al.* (2016)

Three main parties:

- Raw Nata Producer
- Refiner
- Local F&B Producer



Thank You

