Sustainable Supply Chain of Raw Materials for Coconut Sugar Production

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About IIFPT

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- Food Engineering
- Food Packaging and System Development
- Food Product Development
- Food Safety and Quality Testing
- Food Biotechnology
- Primary Processing, Storage and Handling
- Computational Modeling and Nanoscale Processing Unit
- Technology Dissemination
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Centers of Excellence
- Grain sciences
- Non-thermal processing
Coconut Production in India

Coconut is one of the oldest crops grown in India.

India stands 3rd in production in the world after Indonesia and Philippines.

Kerala, Tamil Nadu and Karnataka account for about 86% of coconut growing area.

Average yield is 80 nuts/palm/year.
Coconut: Utilization and Value Addition

- Coconut Water
- Desiccated Coconut Powder
- Coconut Milk
- Traditional foods such as pickles
- Coconut Oil
- Traditional foods such as pickles
- Coconut Chips
- Coconut Milk
- Coconut-based sweets
- Coconut Cream
- Coconut Sap Sugar
- Coconut Honey
Changing Consumer Preferences

- Customization
- Nutrition
- Novel product range and value
- Convenience and taste
- Ethical food choices
- Brand trust

Contains 80% Coconut oil!
Coconut Sugar

1. Made from coconut sap

2. Increasing global demands

3. Used as a traditional sweetener in the Southeast Asian region for 1000+ years.

- Lower GI vs. cane sugar and honey
- Several research trends on its use as a sucrose replacer
- High in mineral content: Fe, Mg, K (18 x higher than brown sugar), P (30 x higher than brown sugar), and Mn and vitamins such as B6, B2, B1, and B3
Global Trends: Coconut Sugar Production

The quest for healthier alternatives to table sugar...

Major producers: Philippines, Indonesia and Thailand (80% of global production)

Major international markets: New Zealand, South Africa, Australia, USA, France, Canada, and Norway.

High domestic + international market demands

High potential in sauce making and bakery industries, apart from cosmetics.

Coconut Sugar Import (volume) by European Union (2014 – 2018)

Source: Marketsandmarkets
The majority of the manufacturers are from the Philippines and Indonesia.

Key players in the industry:

- Bigtreefarms
- Treelife
- The Coconut Company Ltd
- Franklin Baker
- EcoBuddy
- Coconuts Secret Adon Exports
- Coco Sugar Indonesia
- Saudi Food Ingredients Factory
- Holos Integra
- Celebes Coconut Corporation
- Los Ricos Compania Corporation
- Madhava Sweeteners
- Earth Circle Organics
- Urmatt and SunOpta, Inc.
- TARDO Filipinas Inc.
Carbohydrate-containing foods can be classified as high- (≥70), moderate- (56-69), or low-GI (≤55) relative to pure glucose (GI=100).

The glycemic load (GL) is obtained by multiplying the quality of carbohydrate in a given food (GI) by the amount of carbohydrate in a serving of that food.
Coconut Sugar as a Sucrose Alternative?

- Role of GI in human health
- Estimating the GI of foods
- Asia’s first engineered human stomach and small intestinal system at IIFPT

Global perspective: Tax foods high in sugar and salt to improve nation’s health

Cost  Calories  Consumer Acceptance
Case Study on Biscuits Export

Europe’s biscuit import in 2017 was US$ 3.7 Billion in which India exported ~US$1.2 Million

“If we could take it to even 5%, it could bring US$ 183.9 Million of additional revenue by simply processing wheat and sugar”

IIFPT’s Mission Coconut Program

- Hybrid solar dryer for copra
- Integrated coconut processing unit
- Blister packaging of coconut cubes
- Coconut spread
- Tender coconut water powder
- Bio-active infused coconut chips
- VCO blended cooking oil

**1. Integrated equipment for coconut processing**

**2. Value added products from coconut and neera (coconut sap)**

**3. Incubation facility for VCO**
Neera (coconut sap) Tapping Machine

The Approach

Collection gadgets under design and development for collection of the sap from the tree
Neera (coconut sap) Crystals Technology

- No chemicals or preservatives
- Coconut sugar granules with enhanced shelf-life
- Retained minerals and vitamins content

Patented technology (No. 201841035401) for neera sugar crystals production
Market Prospects

- Diabetic population
- Demand for sugars and the quest for alternative sugars
- Use of chemicals and heavy processing methods
- Preference towards plant-based foods
Challenges in the Coconut Sugar Supply Chain

- Raw material availability, quality, and price issues
- Policies for small-scale enterprises
- Consistency in product quality
- Resilient supply chains (post-COVID trends)
- Levels of digitalization and ICT applications
Critical Considerations

Raw material to production
1. Supply of coconut sap
2. Labour

Research and policy
1. Food processing
2. Nutraceutical/functional food
3. Sustainable strategies

Market and consumer
1. Quality standards
2. Branding and marketing
Sustainability Strategies

• Eco-friendly packaging
• Engineering designs
• Novel product ranges
• Zero-waste food processing
• Low energy, low water processes
• The role of women
• Livelihood transformation + support local farmers
Future Food Trends

01 Market Driven Food Products

02 Traceability in supply chains

03 ICT Applications including Virtual Marketing

04 Food for the Soul

05 Minimal and Non-thermal Processing

06 Advanced Quality Evaluation and Sensing Techniques
Thank you!

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