



Sustainable Supply Chain of Raw Materials for Coconut Sugar Production

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
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
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
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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 Chips



Coconut Honey



Coconut Milk



Coconut Cream



**Traditional foods
such as pickles**



Coconut Oil



Coconut-based sweets



Coconut Sap Sugar

Changing Consumer Preferences



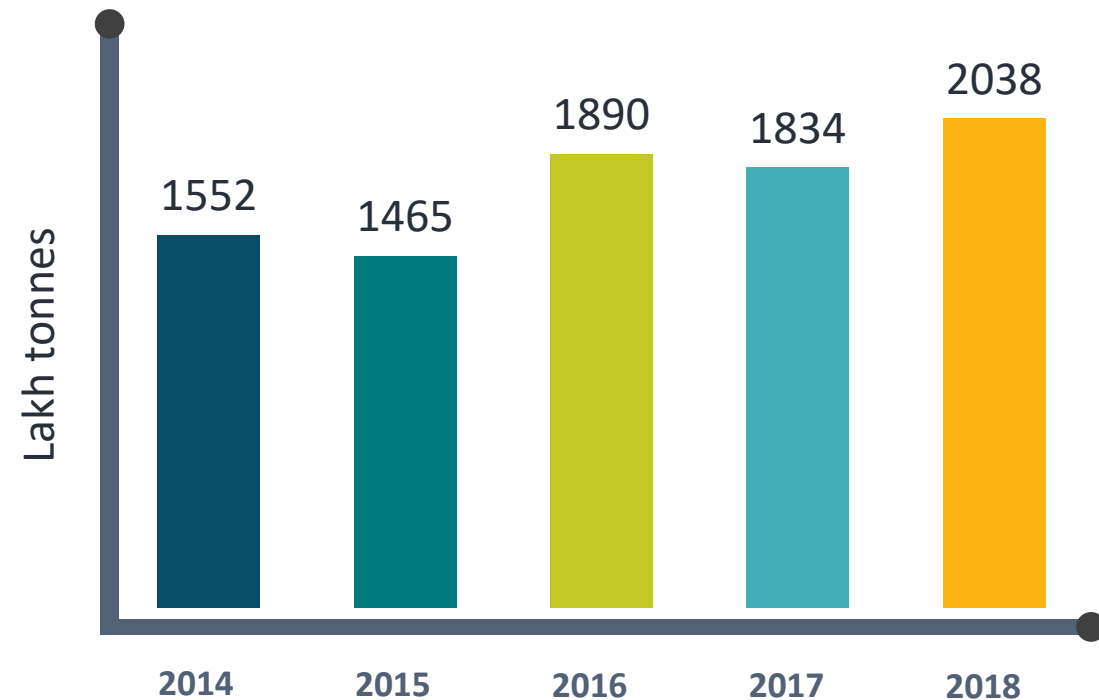
Coconut Sugar



- 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...



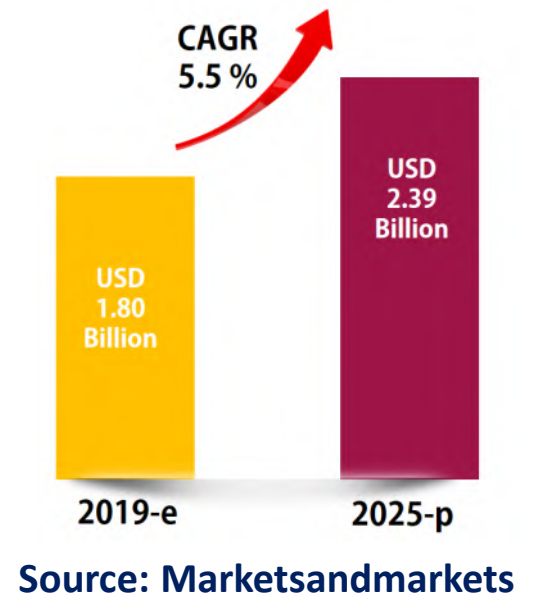
Coconut Sugar Import (volume) by European Union (2014 – 2018)

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.



Source: Marketsandmarkets

Leading Players in the Market

- The majority of the manufacturers are from the Philippines and Indonesia.
- **Key players in the industry:**



Bigtreefarms

Treelife

The Coconut Company Ltd

Franklin Baker

Coconut Secret Adon Exports

Coco Sugar Indonesia

Holos Integra

Ecobuddy

Saudi Food Ingredients Factory

Celebes Coconut Corporation

Los Ricos Compania Corporation

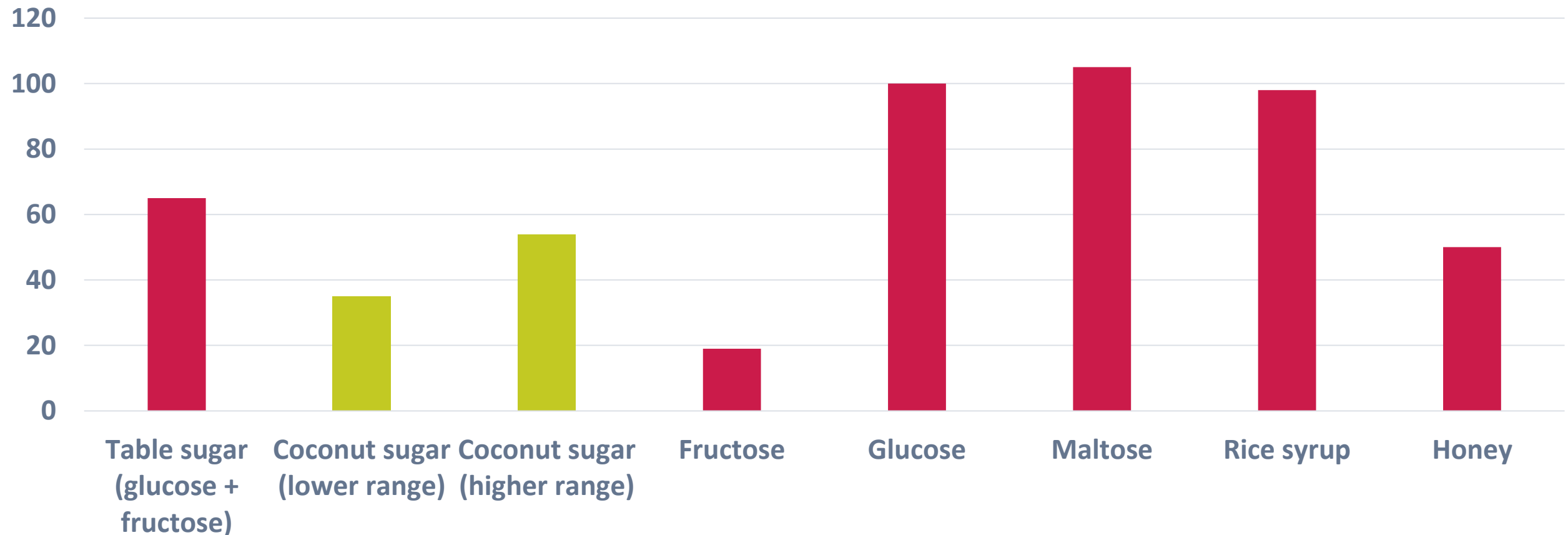
Madhava Sweeteners

Earth Circle Organics

Urmatt and SunOpta, Inc.

TARDO Filipinas Inc.

The GI of Different Sweeteners



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



Cost



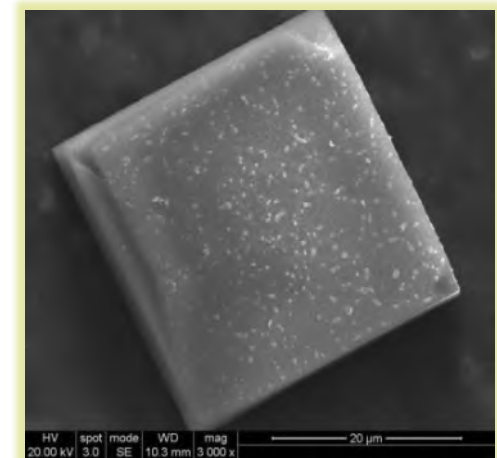
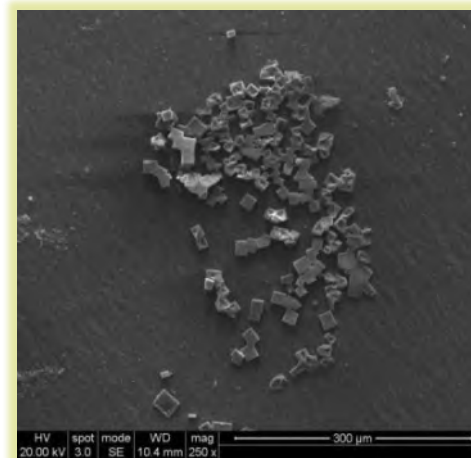
Calories



Consumer

Acceptance

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



Business Standard

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FOR INVESTING.

FSSAI asks food companies to voluntarily cut salt, sugar, fat in packaged products

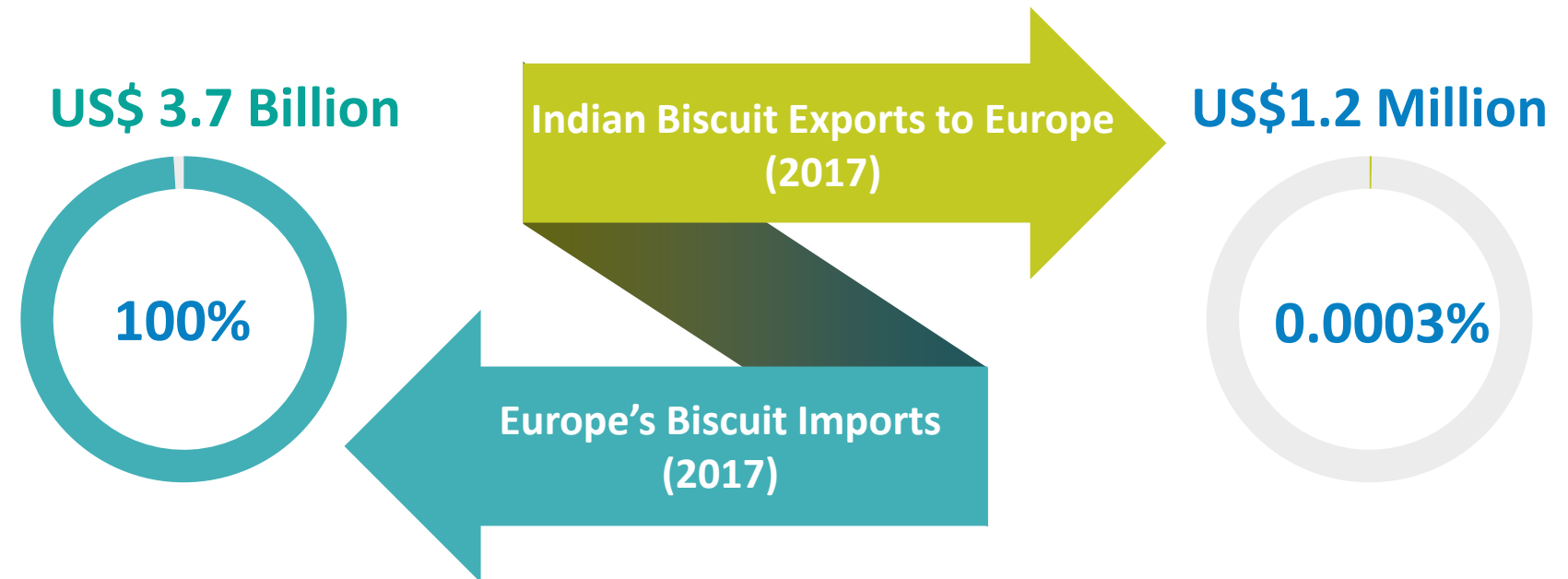
Press Trust of India | New Delhi
Last Updated at July 10, 2018 19:45 IST

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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

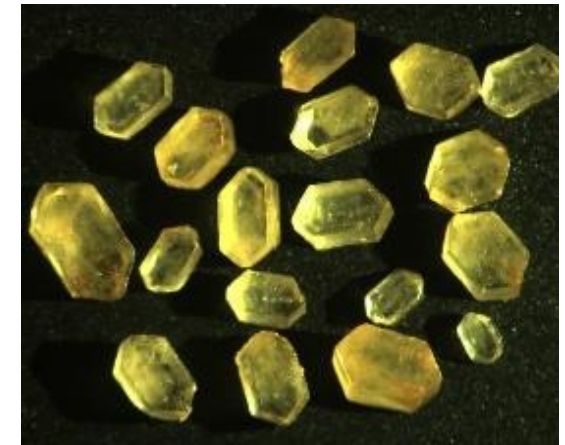
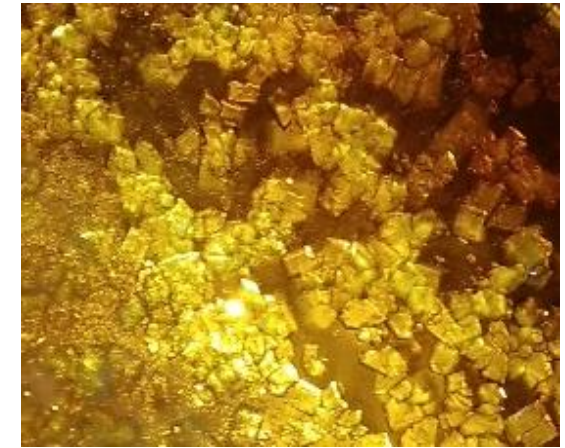
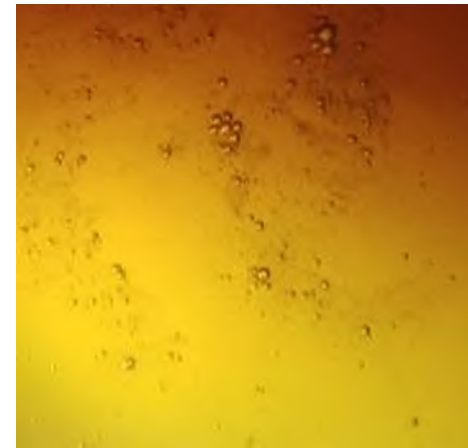
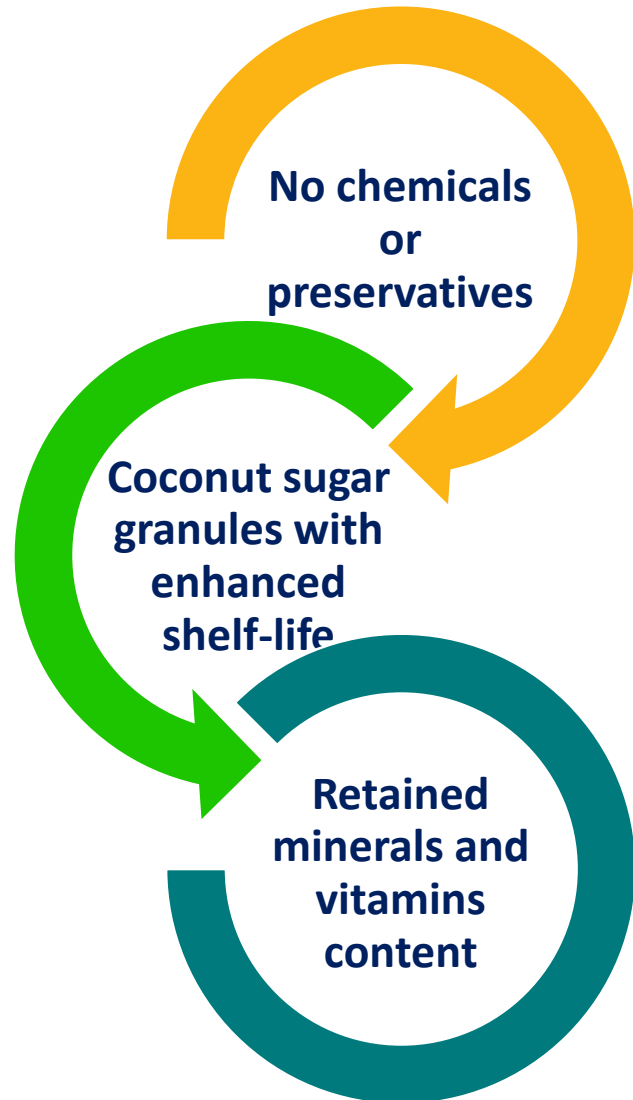
Neera (coconut sap) Tapping Machine

The Approach



Collection gadgets *under design and development* for collection of the sap from the tree

Neera (coconut sap) Crystals Technology



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



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

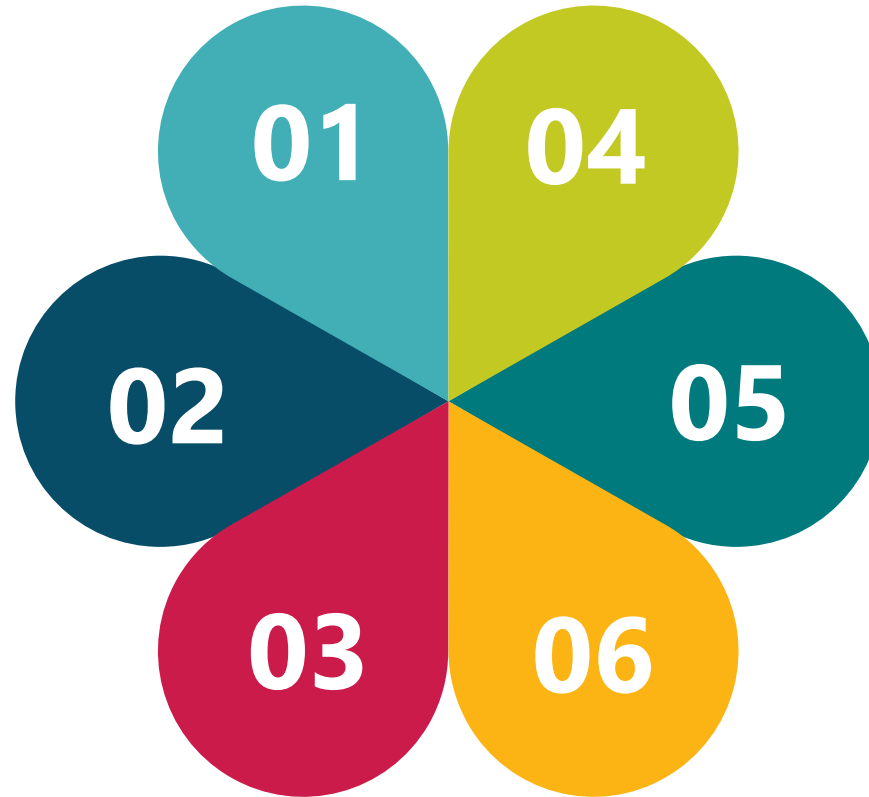
**Market
Driven
Food Products**

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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