Circular Economy: Using Food Production By-Products

BIKI

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We’re on a mission to innovate in sustainable agriculture for the realization of food security and community welfare.

Inspired by nature methods of preservation, we made it our mission to build a barrier that could be applied to fruits and vegetables using edible materials that could slow down the rate of spoilage to help support SDG’s 2 (Zero Hunger), 12 (Responsible Consumption & Production) and 13 (Climate Action).
**PROBLEM**

Most food loss & food waste in the world comes from fruit and vegetable commodities (40%) - FAO 2015

* In developing countries, such as Indonesia, fruit and vegetables are wasted before reaching consumers (food loss)

National Development Planning Agency (2019):

- More than 63% of the supply total
- 20 million tons / year
- 221 trillion / year

The formation of methane and carbon dioxide which can cause global warming
**SOLUTION**

**Food Loss**
We make innovation **Chitasil Edible Coating** "nature (chitosan) based protection" for fruits and vegetables that can helps lasts longer.

**Food Waste**
We conducted a **campaign** for the **movement to reduce** fruit and vegetable **food waste** and started to **develop products for B2C market**.

**WHY US?**

You can’t see it, taste it, or smell it but this shield is powerful.

Chitasil adds a layer of tasteless, odorless, nature-based protection on the surface of fruits and vegetables. This helps keep moisture in, oxygen out, and improve antibacterial activity which means produce lasts longer.

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CIRCULAR ECONOMY SOLUTION

“Indonesia is the largest shrimp exporter in the world”

“More than 50% w/w of the frozen shrimp processing process produces shrimp shells that are not utilized”

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OUR PRODUCT

How CHITASIL works?

+ improve antibacterial activity

H₂O
Moisture stays inside

O₂
Oxygen stays outside

Light barrier

Barrier against moisture loss

Protection against gaseous escape

Protection against gaseous invasion

Protection against microbial attack

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SUSTAINABILITY IMPACT (Business Impact)

BIKI Early Startup (3 years)

Introduction of Company (Business)
We are PT. BIKI has a mission to innovate in sustainable agriculture for the realization of food security and community welfare. We have a dream to achieve better quality food products, more sustainable food systems and more durable production—creating value across the supply chain, and a more abundant future for all of us. Inspired by natural conservation methods, we made it our mission to build a barrier that can be applied to fruit and vegetables using ingredients that are edible and can slow the rate of spoilage to help support SDGs (Sustainable Development Goals) number 2 (No Hunger), 12 (Consumption & Responsible Production) and 13 (Climate Action).

Introduction of Product / Service
Inspired by nature methods of preservation, we made it our mission to build a barrier that could be applied to fruits and vegetables using edible materials that could slow down the rate of spoilage. We make innovation Chitasil edible coating “nature (chitosan) based protection” for fruits and vegetables that can help last longer and reduce plastic packaging. How Chitasil works? Enhanced barrier properties (reduce oxygen transmission, reduce water adsorption, and reduce ethylene production), Improved antibacterial activity (gram positive and negative bacteria, fungi, and yeast), and Improve antioxidant activity (preventing loss of chlorophyll, reducing oxidating species, preventing lipid peroxide & electrolyte leakage, and delaying browning. Since Chitasil nature-based protection helps fruits and veggies last longer, we’re able to see more food end up on our plates and less end up in landfills. In addition, we have succeeded in helping to improve the welfare of our target market (farmers, distributor, exporter, industry, and retail) by reducing 1.750 ton food loss and waste in 2020.

Target Market: B2B : Fruits and Vegetables Industry, Distributor, Exporter, Farmers Group, and Retail

Environmental Impact
- Reduce unused shrimp shell which is the raw material
- Reducing plastic packaging
- Reduce food loss and food waste of Fruits and Vegetables (the most wasted food commodity in Indonesia)
- Contribute in environmental movement to prevent climate change (we’re able to see more food end up on our plates and less end up in landfills)

Social Impact
- Improve community welfare especially farmers from food loss risk reduction by reducing 1.750 ton food loss and waste in 2020
- Help balance the supply and demand of our food system so that more people can be fed
- Educating the public not to throw away food carelessly because there are still many of our people who are hungry

Target SDG
- 12 Responsible Consumption and Production
- 2 Zero Hunger
# SUSTAINABILITY BUSINESS LIFE CYCLE

<table>
<thead>
<tr>
<th>Resource / Raw Materials</th>
<th>Production</th>
<th>Distribution</th>
<th>Use</th>
<th>Reuse / Recycle</th>
<th>Waste</th>
</tr>
</thead>
<tbody>
<tr>
<td>Extraction</td>
<td>Transport/Storage</td>
<td>Manufacturing</td>
<td>Transport/Storage</td>
<td>Storing, moving, selling and installing process</td>
<td>Lifetime usage and maintenance</td>
</tr>
<tr>
<td>Shrimp shells</td>
<td>Vehicles</td>
<td>Auxiliary materials for the processing and maintenance activities</td>
<td>Warehouse</td>
<td>Non-biodegradable plastics as packaging material</td>
<td>-</td>
</tr>
</tbody>
</table>

**Material, Energy, Toxicity (MET) Matrix**

- **Energy**
  - Type and source of energy used
  - Embedded emission
  - Direct/Indirect emission
  - Electric power for the extraction machines and for the processing of raw materials
  - Energy in the process of transporting materials before processing
  - Electric power for production process and machinery (Mixing and Homogenizing to 60-70 °C)
  - Electric stove for water heating
  - Electric power for lightning and warehouse
  - Energy used for the packaging process and transportation of the products to consumer
  - Energy for recycling, transportation, and waste management

- **Pollutant Emission**
  - Toxicity
  - Residual process chemicals which will then be neutralized in the waste management process
  - Gaseous pollutants in the material distribution process
  - Emission into the air
  - CO2 emission (indirect)
  - Emission into the air
  - Combustion gases and solid particles emitted by transport. Packaging waste
  - Waste material after recycling
THE CHALLENGES

1. Educate the customers
2. Government regulations
3. Supporting facilities
4. Technology
5. Better business model
“All by-products, especially in the Agricultural industry, have great potential to be reprocessed into biomaterials or high value-added products that have great potential both domestically and exported abroad with various innovations and technologies”
Food Security and Community Welfare for a Better Place

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