Harnessing DNA & Blockchain Technology for First-Mile Palm Oil Traceability

Erik Malmstrom, CEO

November 4, 2019
Summary

• Company Background
• First-Mile Palm Oil Traceability
SafeTraces Mission Statement

We are propelling food tech into the future, using nature’s own DNA to make food production safer, more transparent, and less wasteful.
Company Snapshot

- Founded in 2013
- Based in Pleasanton, CA
- Expert team of scientists, engineers, manufacturers, FSQ practitioners, and commercial leaders
- Customers include major food producers, processors, and brands
- Partnered with world-class research institutions and venture capital firms
Core Technology

• Patented method uses edible DNA barcodes drawn from seaweed
• Applied directly to food and agricultural materials
• No effect on shelf life, flavor, or odor
• FDA Generally Recognized As Safe (GRAS)
• Web-based app integrates easily with other systems
miniDART™: World’s First DNA Printer

Applies barcode directly on fresh produce, dry, and liquid bulk commodities at item-level, enabling rapid trace to source
miniDART™: How It Works

01 Create safeTracers™ with unique DNA barcode on-site

02 Apply safeTracers™ during regular processing to tag each item or lot with source data

03 Verify authenticity, origin, and purity – anywhere, in 15 minutes
Summary

- Company Background
- First-Mile Palm Oil Traceability
First-Mile Traceability is Defining Problem of Palm Oil Supply Chain

Business

Most Palm Oil Companies Can’t Fully Trace Supplies, Survey Shows

By Agnieszka de Sousa
October 29, 2019, 3:00 AM PDT

- Only 19 of 83 companies can trace from mill to plantation: ZSL
- Palm output boom is linked to hurting forests and wildlife

Stakeholders have failed to identify effective, practical, reliable, and cost-effective solution
Use Case: First-Mile Palm Oil Traceability

Problem Statement
Common ingredient in consumer food products
History of environmental & labor abuse in supply chain
Existing traceability solutions are flawed:
• Limited scope
• Vulnerable to fraud
• Impractical
• Costly
• Exclude smallholders

SafeTraces Solution
Physical item-level tagging of palm FFB's with geo-tag and time-stamp
Satellite monitoring of sourcing origins
Digital data record secured via blockchain
Certification of suppliers & process by third parties
How SafeTracers Work in First-Mile Palm Oil Supply Chain

<table>
<thead>
<tr>
<th>Plantation</th>
<th>Mill</th>
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<tbody>
<tr>
<td>Harvest crew applies unique DNA barcode to palm FFB via injector or sprayer linked to smartphone</td>
<td>Quality assurance manager conducts detection test of palm FFB’s to confirm positive identification of DNA barcodes</td>
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<tr>
<td>Each DNA barcode application creates data event that is recorded, timestamped, and notarized in blockchain</td>
<td>Detection test results recorded, timestamped, and notarized in blockchain and verified against other critical tracking data</td>
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Highly Accurate Detection During First-Mile Transit From Plantation to Mill

Local workers performed SafeTracers FFB tagging after five minutes of training.

SafeTracers applied to hundreds of FFB’s

100% accuracy identifying origin of tested FFB’s

100% accuracy identifying non-conforming FFB’s
SafeTracers Are Stable in Palm Oil For Over One Year

Stability is significantly longer than normally required for origin to destination transit
SafeTraces Will Extend Beyond First-Mile for True End-to-End Product Traceability

Product is verified at each key node in the supply chain from plantation to consumer
Next Steps: Strategic Partners and Integrations

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<tr>
<th>Traders / Processors</th>
<th>Software / Blockchain Providers</th>
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<td>![Diagram of a factory]</td>
<td>![Diagram of a computer network]</td>
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<th>Brands / Retailers</th>
<th>Standards &amp; Certifications</th>
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<td>![Diagram of a package]</td>
<td>![Diagram of a certification]</td>
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Customer ROI

Revenue Creation:
Gain first-mover advantage with ability to premium price and defend margins

Cost Savings:
Mitigate significant cost and risk exposure associated with fraud / adulteration

Brand Equity:
Strengthen transparency and sustainability story with consumers
Call to Action

• Partner with SafeTraces

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Trace the product, not the package

www.safetraces.com