

MANGO^o MATERIALS

We create next generation sustainable materials.

The future is biodegradable.

The future is now.

Convergence approach to accelerating the
design of novel materials

May 15, 2023



Certified



Corporation



The Problem

The problem is growing, and current solutions are inadequate or incomplete

nature

Scientists raise alarm over 'dangerously fast' growth in atmospheric methane



The Guardian

Cutting methane emissions is quickest way to slow global heating - UN report

CR
Consumer Reports

According to the most recent data estimates available from the Environmental Protection Agency, just 8.7 percent of the plastic that was discarded in the U.S. in 2018 was recycled.



Societal cost of plastic produced just in 2019 revealed at US\$3.7 trillion: more than the GDP of India

The New York Times

This Fjord Shows Even Small Populations Create Giant Microfiber Pollution





It's time for a better way

What if those waste carbon emissions could help eliminate plastic pollution?

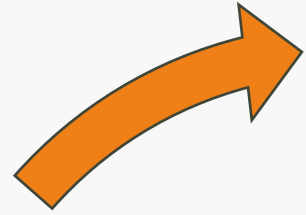
Mango Materials directly tackles the largest threats to our environment: methane and plastic pollution

The technology is already here

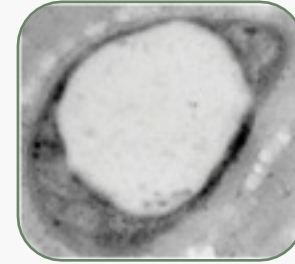
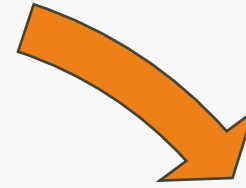
We have developed a gas fermentation process to transform waste methane into biopolymers, a plastic substitute.



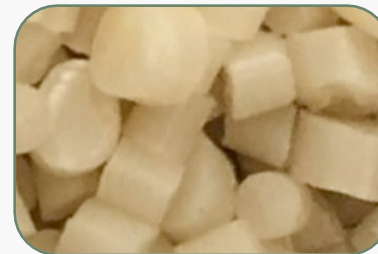
Waste facility



Methane emissions



Microbial process



PHA biopolymer

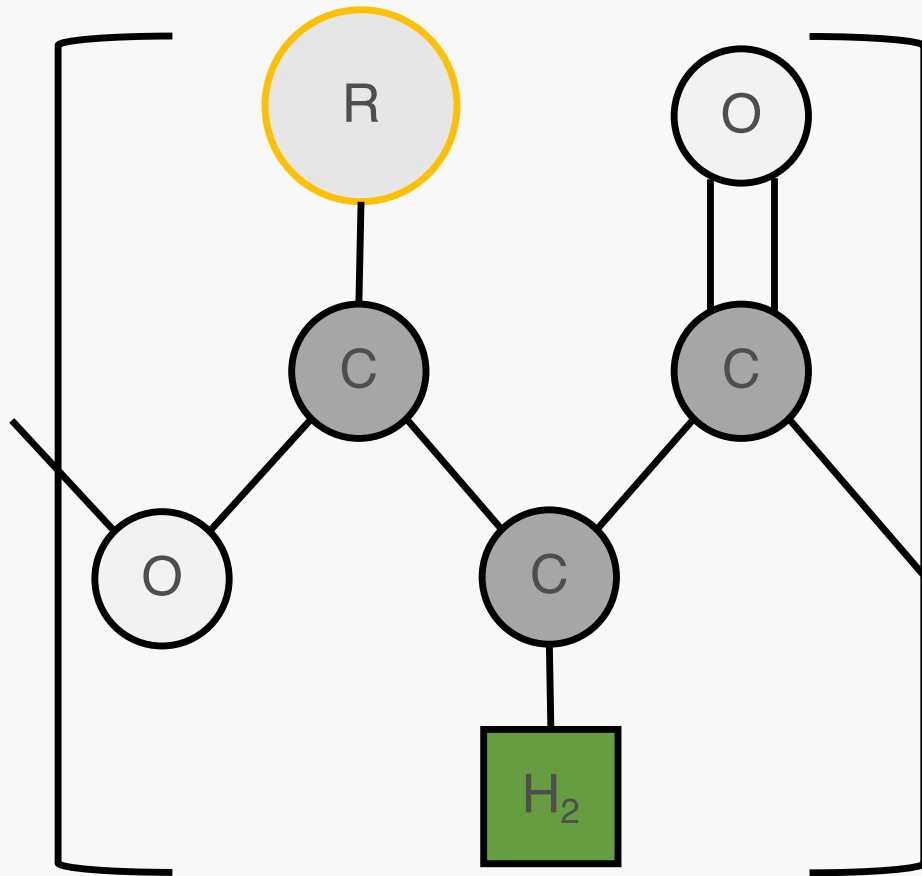


Biodegradable products

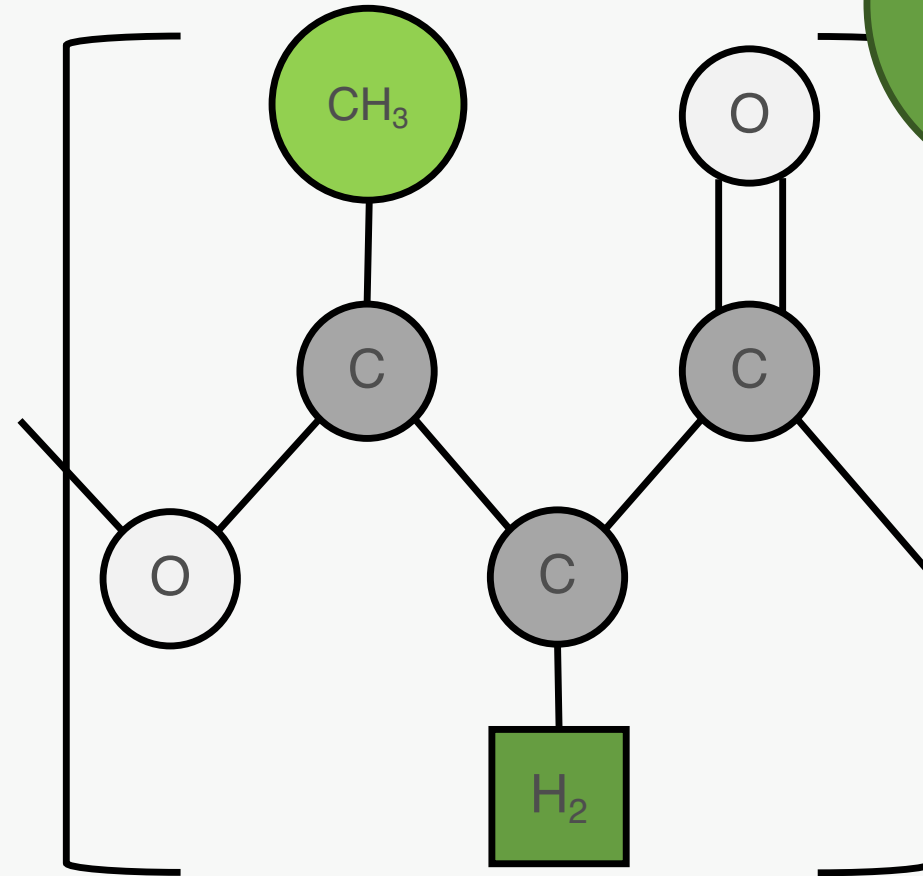


MANGOMATERIALS™

Polyhydroxyalkanoate (PHA)



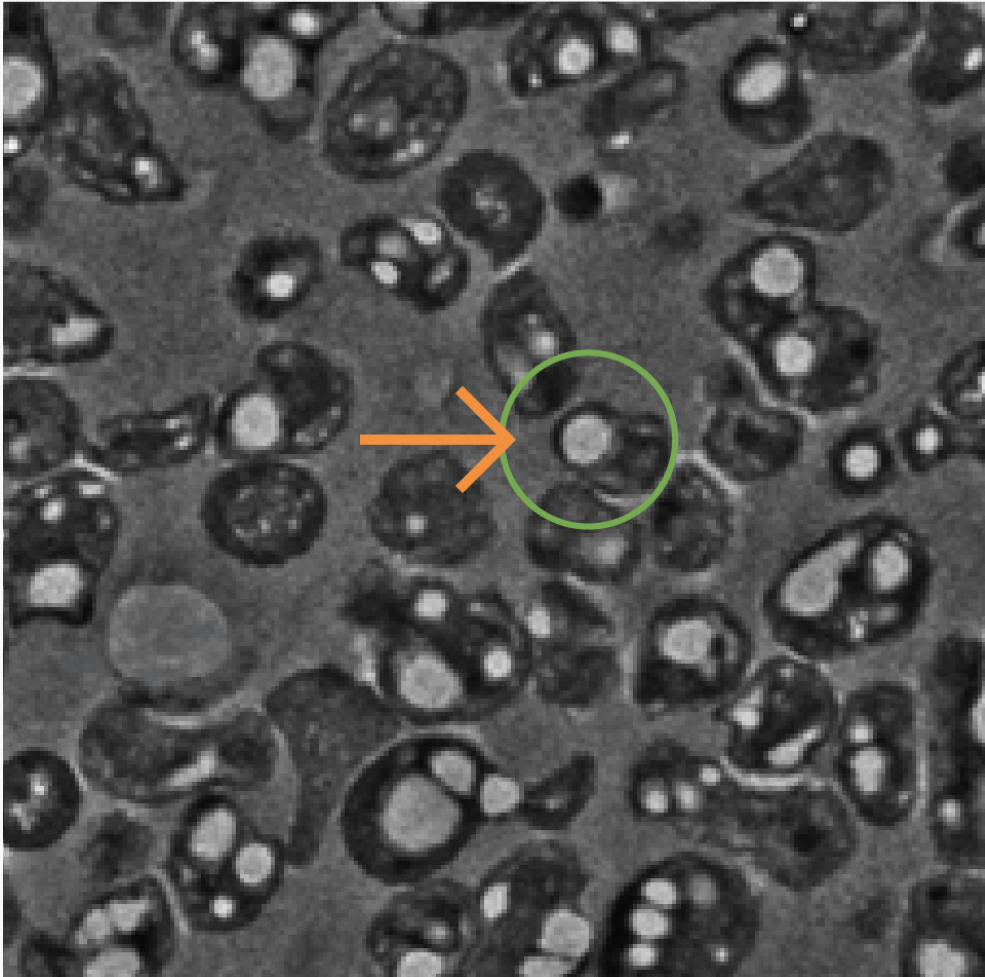
Polyhydroxyalkanoate (PHA)



Poly-3-hydroxybutyrate (P3HB)

P3HB is a preferred subtype

An Answer to Plastic Pollution



Polyhydroxyalkanoates (PHA)

- PHA is a family of naturally-occurring biopolyesters
- It is a viable substitute for most plastic applications
- Bacteria can produce PHA by growing on low-cost, sustainable feedstocks
- PHA is biodegradable by microorganisms
- It offers a wide range of customizable properties

Why Methane?

Methane is the low-cost, scalable feedstock of the future

- Abundant and widely available resource
- Positive environmental impact
- Superior Lifecycle Assessment (LCA)



End of Life



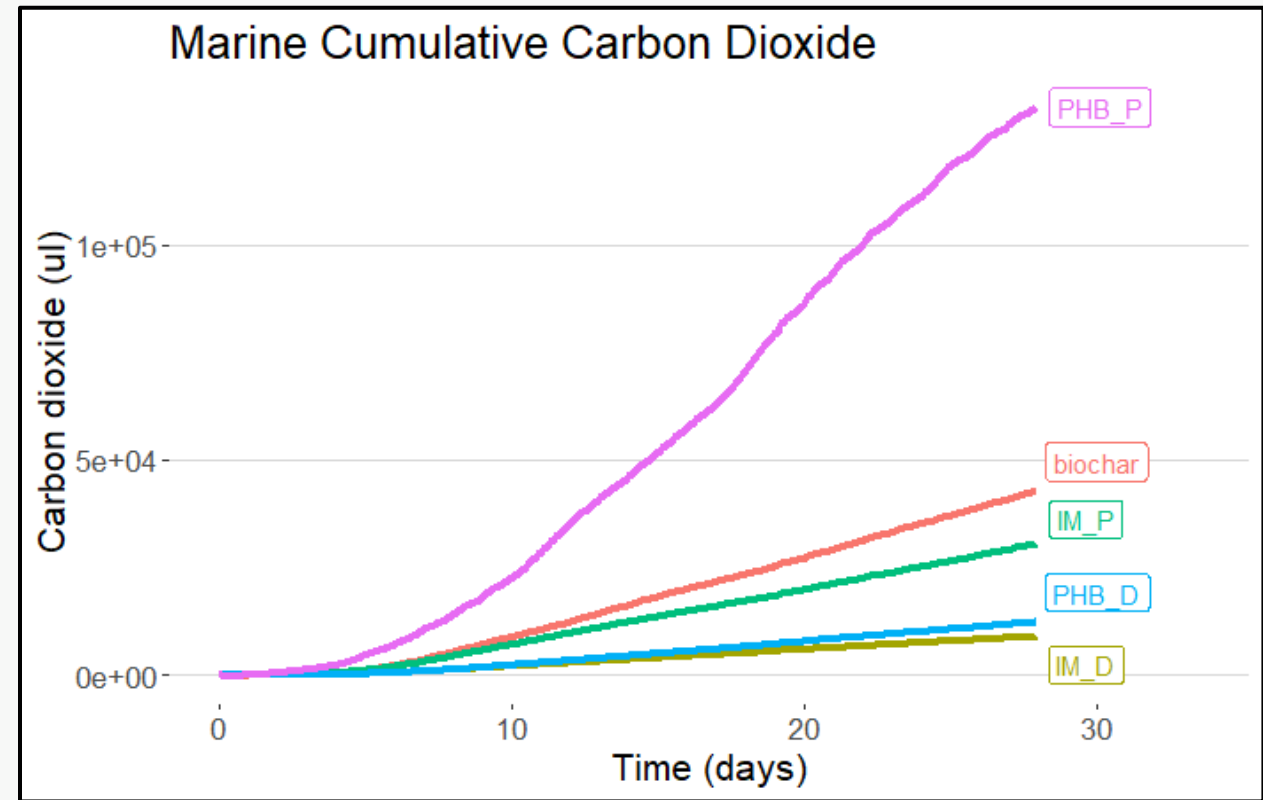
Design for the naturally occurring carbon cycle!

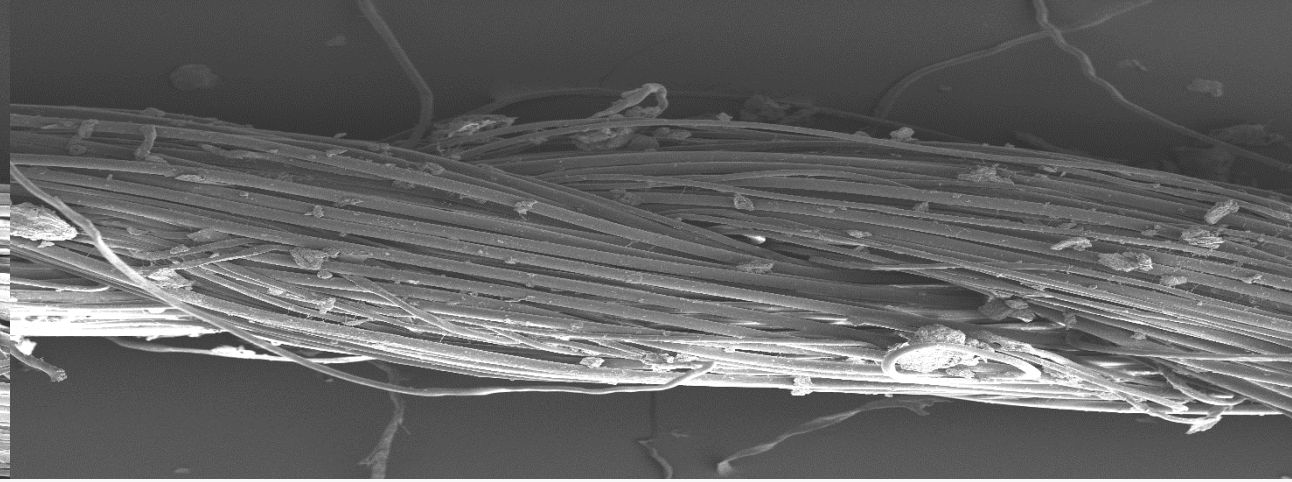
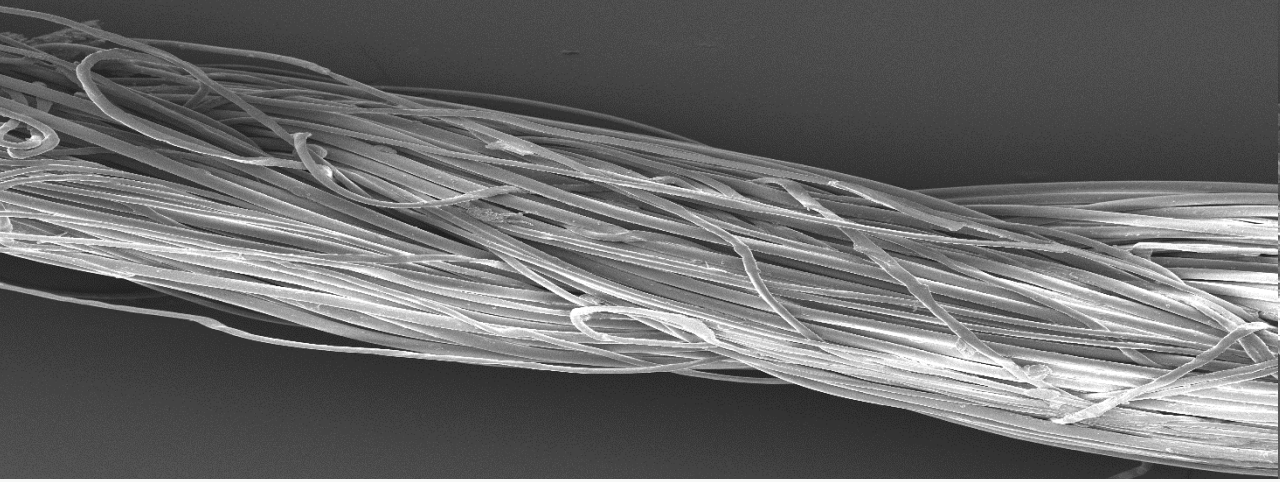
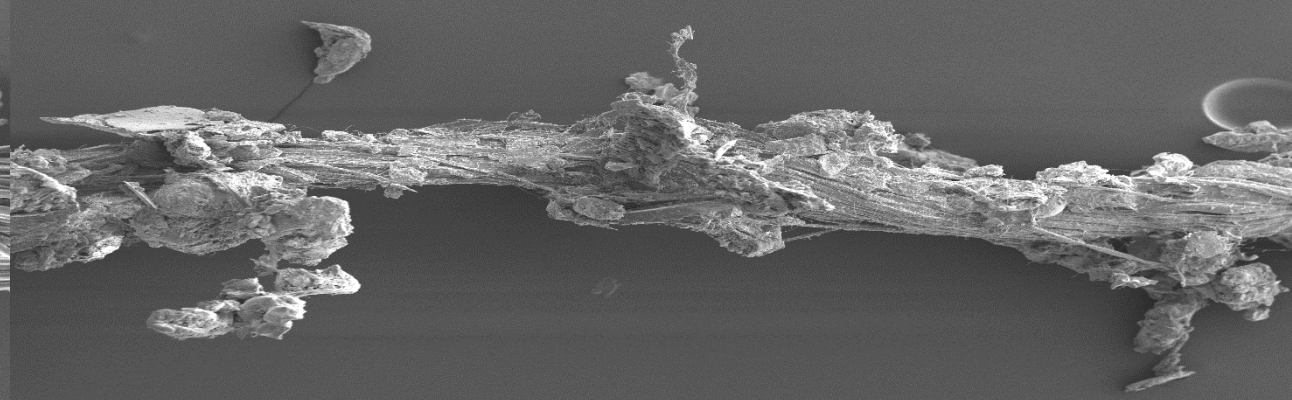
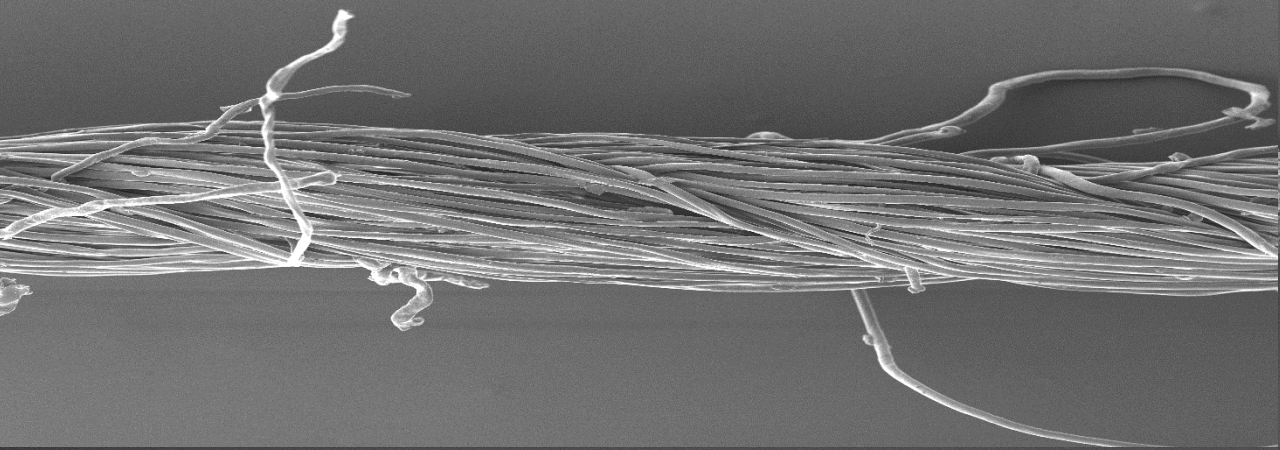
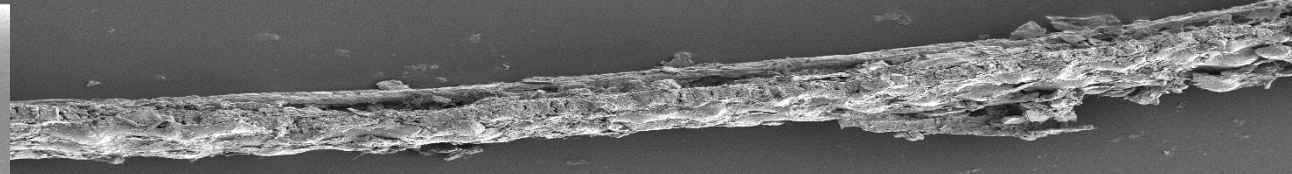
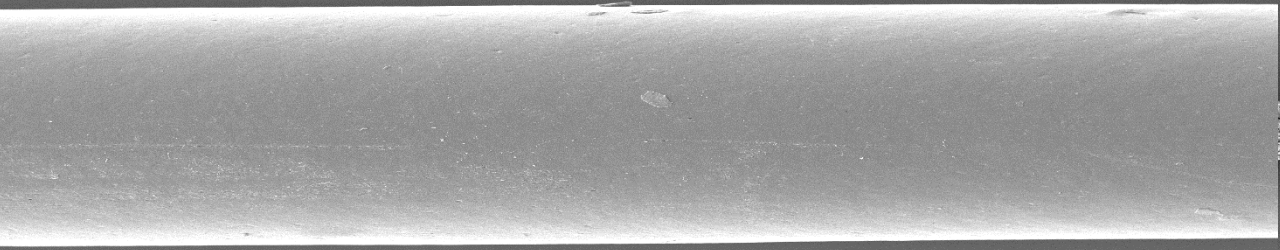
Marine Biodegradation

Week 0



Week 6





The Mango Materials Solution

Traditional plastics and polyesters are destroying our planet, so we make alternatives that will not pollute the environment

YOPP

YOPP+

- Plant-based PHA
- Made from rapidly renewable plant resources
- Fully biodegradable and compostable
- Low carbon footprint

- Methane-based PHA
- Made from waste greenhouse gases
- Fully biodegradable and compostable
- Carbon negative

A blend of YOPP/YOPP+ is currently available, with the future goal of 100% YOPP+

Targeted Application Development

Molded Goods

- Rigid, shelf stable, does not deteriorate in use
- Commercially available soap dish by Natura
- Formulated for various molding techniques, including single point injection

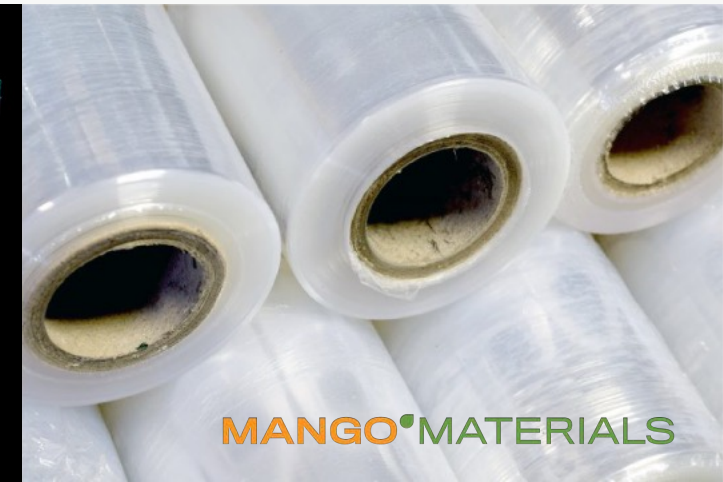
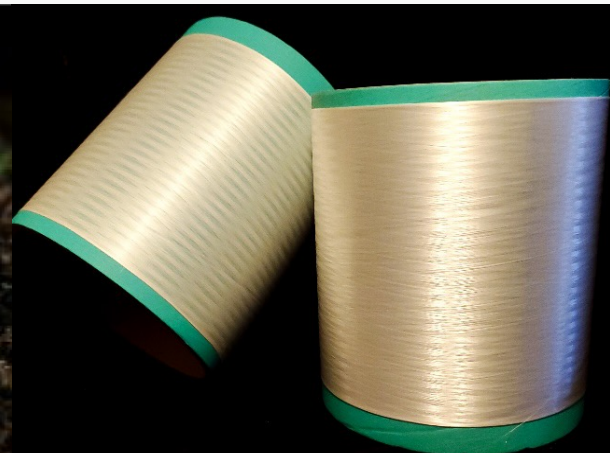
Fibers & Fabrics

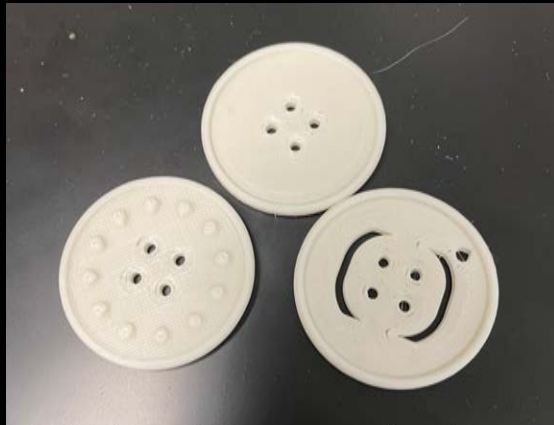
- High strength, flexibility, and durability
- Proprietary method to be commercialized by 2024
- Formulated for preliminary weaving into fabrics for fashion and other textiles

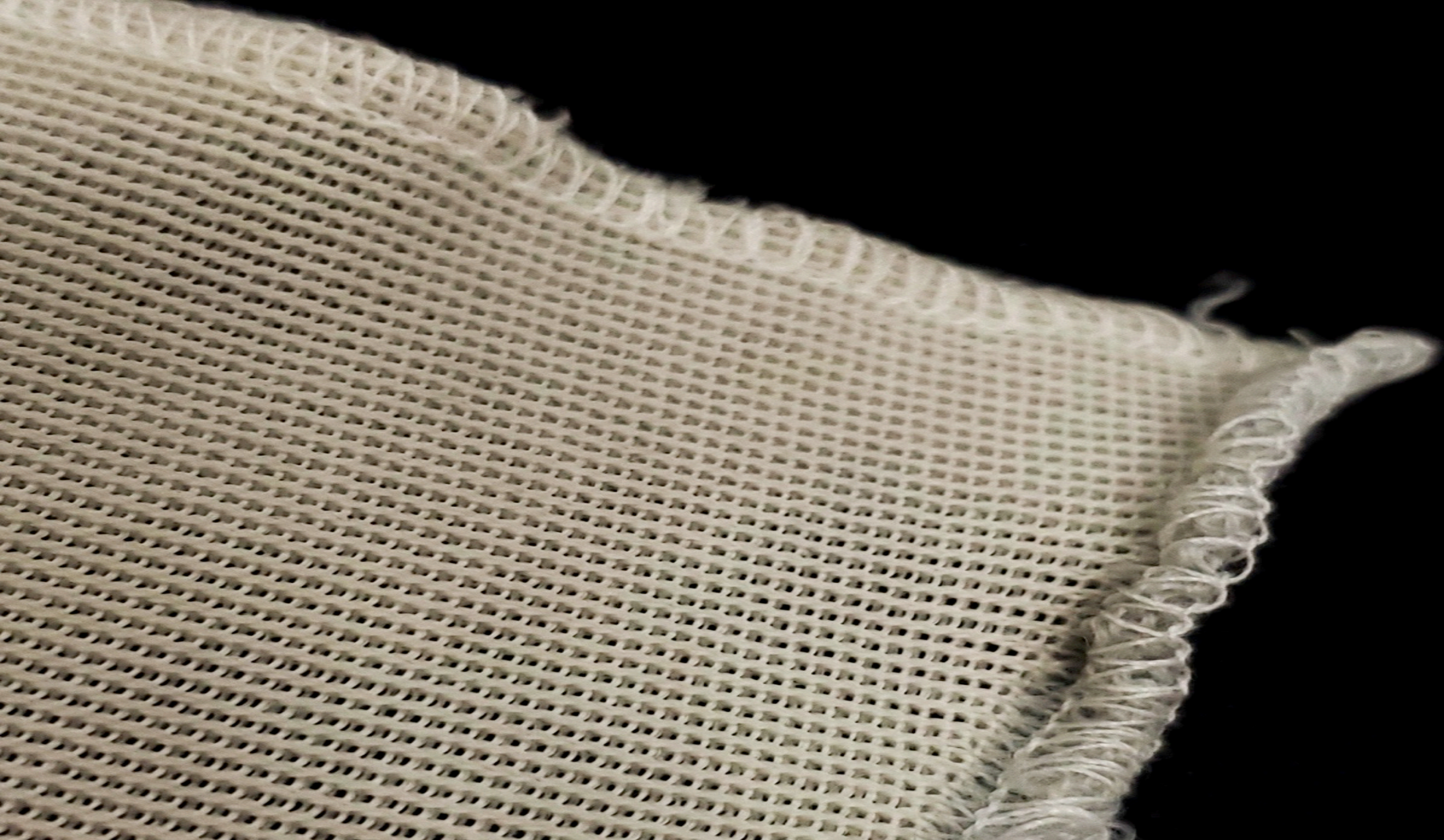
Films

- Successfully demonstrated low peel, low shrinkage, good adherence to layers

PHA is stable while in use, but biodegradable when exposed to significant enzymatic attack







Nereid Relationship

Mango Materials provides PHA and biodegradability collaboration

- Production of sensors and other items via 3D printing
- Biodegradability testing in house for marine conditions
- Collaboration on biodegradability of PHA in the field



Successful Scale-up Program

Mango Materials has steadily scaled up its technology to the Launch Facility

**Scientific
Validation**



**Lab
Bioreactors**



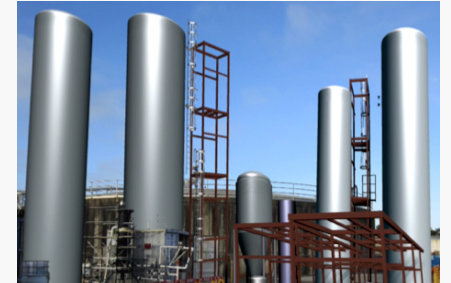
**Pilot
Plant**



**Launch
Facility**



**Flagship
Plant**



Launch Facility





A. Pieja

M. Morse

A. Schauer-Gimenez

Thank
You

For further information

Anne Schauer-Gimenez, COO
anne@mangomaterials.com

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