ICYIZERE HANDBAG

From fruit waste to fashion

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Icyizere: Transforming Tree Tomato Biowaste into Handcrafted Fashion investigates how discarded tree tomato fruit can be converted into a pliable bioplastic, which—when combined with traditional crochet techniques—yields a lightweight, low-impact accessory using entirely living-derived materials.

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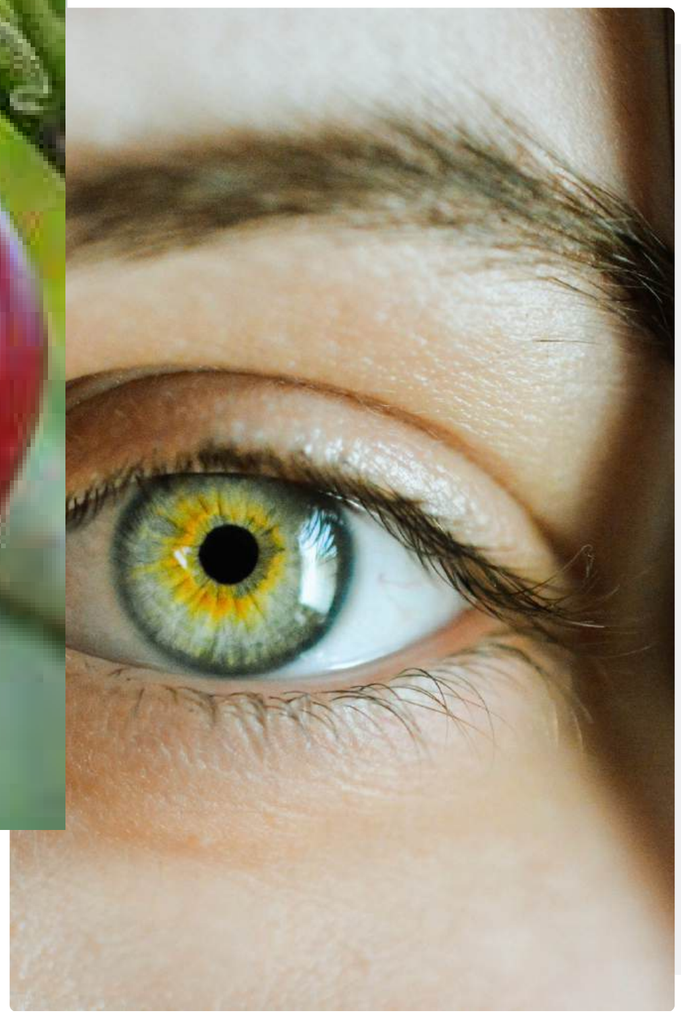
Abstract

The Icyizere Handbag Project explores the intersection of biomaterials, circular fashion, and traditional textile techniques to address both waste reduction and material innovation. Inspired by Rwanda's rich agricultural landscape, I utilized tree tomato waste (ibinyomoro)—a local and often discarded fruit byproduct—as the primary base to develop a bioplastic. One of the final handbag prototypes fuses this bioplastic with handmade crochet, bringing together organic chemistry and craft to form a biodegradable, expressive accessory.

This project merges scientific experimentation with cultural relevance. It reflects my belief in fashion that not only looks good but does good—for the earth, the community, and future design systems. Icyizere, meaning hope in Kinyarwanda, represents a hopeful future for sustainable fashion, rooted in local materials, regenerative thinking, and open-source innovation.

Keywords: Tree-Tomato Bioplastic, Bio-Crochet Fusion, Eco-Material Innovation, Low impact fashion, Additive crafting, Living-derived textiles.



Challenges and reflections

The main challenges I faced were:

- Material inconsistency during bioplastic formulation.
- Unavailability of lab equipment in local settings.
- One sample lost due to accidental lab damage.

These Hurdles taught me resillience and adaptability. The Icyizere handbag project became a space of learning, iteration, and making peace with imperfection- just like any true innovation process.

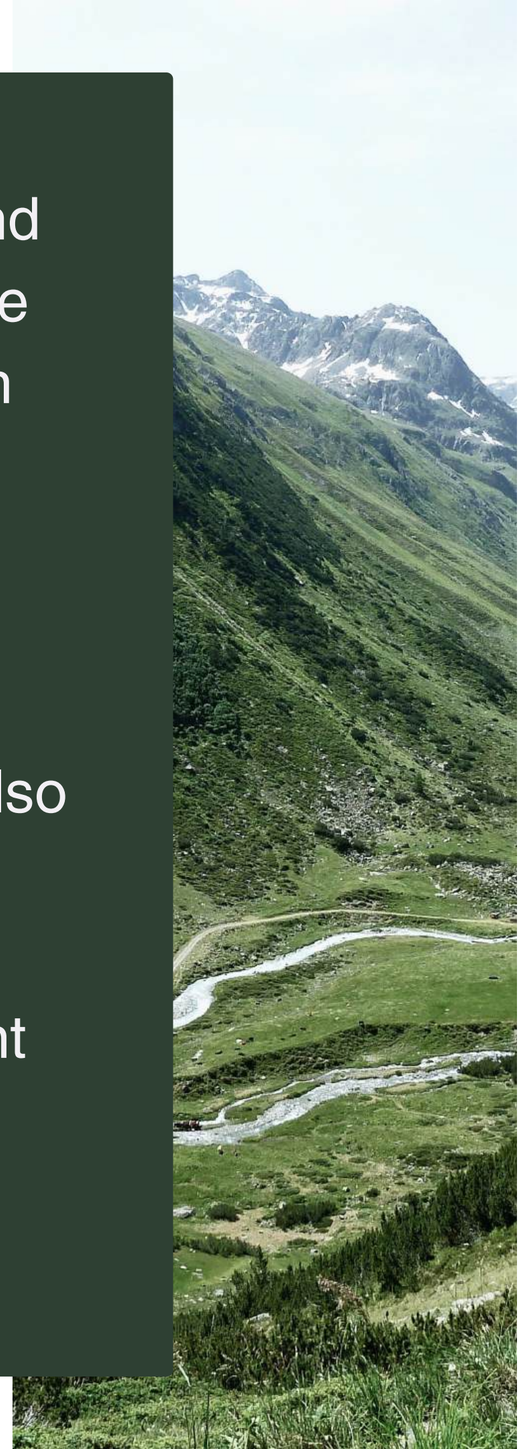
Acknowledgements

I am deeply grateful to my mentors—Nuria Robles, Kae Nagano, and Kawaida—whose expert guidance and unwavering support have been instrumental in shaping this project. I also want to thank my colleagues at Unique Crochet Ltd. for their valuable feedback during the experimental stages. Without the dedication and insight of this remarkable team, bringing the Icyizere Handbag Project to fruition would not have been possible.

Motivation

In Rwanda, agro-waste such as tree tomato peels and pulp are often underutilized or discarded. At the same time, the fashion industry continues to rely heavily on synthetic materials that contribute to pollution and microplastic waste. I saw this as an opportunity to reimagine what we consider waste—by turning local organic matter into functional biomaterials.

As an artisan and founder of Unique Crochet Ltd, I also wanted to highlight traditional textile techniques like crochet, which carry value, skill, and heritage. By combining these two worlds—bioplastic development and fiber arts—the Icyizere project aims to inspire a new kind of material storytelling.



Context

Celebrates local Rwandan heritage by integrating traditional crochet techniques with innovative biomaterial science.

Transforms discarded tree tomato waste into a functional bioplastic, embodying circular-economy principles.

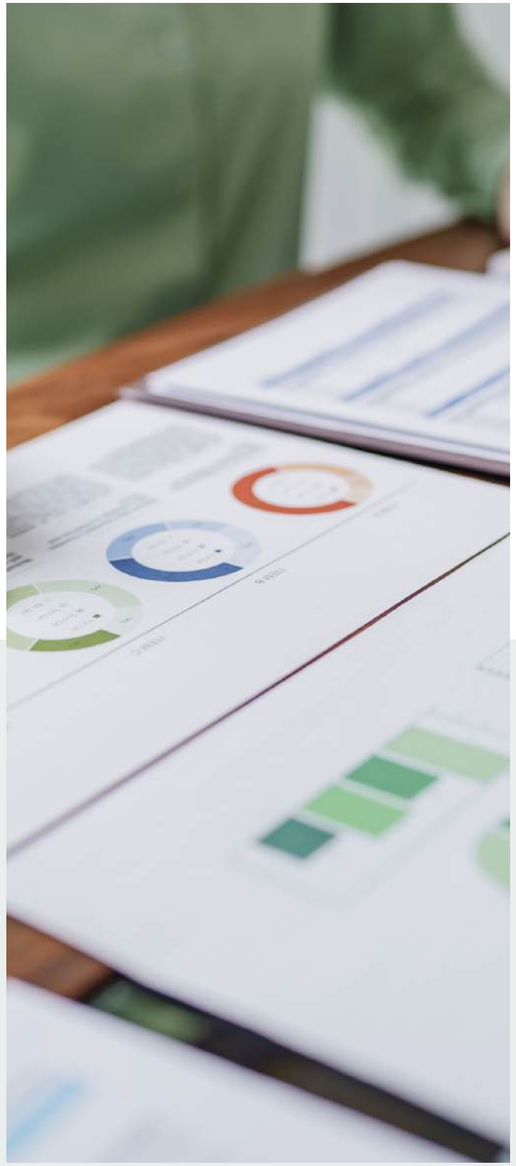
Reduces reliance on synthetic materials, offering a biodegradable and low-impact fashion alternative.

Material Research

Tree tomato bioplastic transforms waste from Solanum betaceum peels and pulp into a biodegradable film through green processing techniques. By leveraging the fruit's naturally high polysaccharide (cellulose, pectin) and cutin content, the bioplastic mimics plant cuticle properties—strength from the polysaccharides and water resistance from the lipid fraction (CORDIS). In practice, I experimented with mixing dried tree tomato residues with natural plasticizers (glycerol, cornstarch) and gentle heating to induce polymer formation and self-assembly, producing flexible sheets that can fully degrade in seawater within a month (World Bio Market Insights). Iterative trials varied pulp-to-plasticizer ratios and drying conditions to overcome issues like brittleness and uneven film thickness, ultimately yielding a stable, compostable material suitable for integration into crochet-fusion handbag panels (researchgate.net).

Material research& Development

The project began with several experiments to extract bioplastic from tree tomato pulp, blending it with natural additives such as glycerin, cornstarch, and vinegar to enhance flexibility, durability, and drying consistency. My goal was to achieve a semi-rigid, moldable sheet that could hold its form and be stitched, crocheted, or fused.



Over multiple iterations, I tested variables such as:

OBJECTIF 01

Pulp thickness

OBJECTIF 02

Drying time and
Ratios of plasticizer

OBJECTIF 03

Environmental effects
(humidity, temperature)

From Crop Science to Couture: A Rwandan Story

Academic Roots

Bachelor's degree in Crop Science sparked innovative ideas.

Agricultural Insight

Firsthand experience revealed untapped resource potential.

Inspired Innovation

Transforming Rwanda's crops into sustainable fashion products.

Designed for Impact: Empowering Rwandan Artisans

Local Collaboration

Working closely with community artisans for quality craft.

Sustaining Traditions

Preserves cultural skills while creating new livelihoods.

Fair Trade Focus

Ensures fair wages and safe work environments.

Beyond the Bag: A Commitment to the Environment

1

Fossil Fuel Alternative

Reduces dependency on petroleum plastics.

2

Biodegradable

Breaks down naturally, reducing landfill waste.

3

Reforestation Support

Contributes to tree planting projects in Rwanda.

The Tree Tomato's Secret: Unveiling the Bioplastic

Rich Biopolymers

Tree tomatoes provide natural biopolymer sources for bioplastic.

Waste to Resource

Turns agricultural waste into durable eco-friendly material.

Unique Material

Lightweight, water-resistant, and fully biodegradable.

TIMELINE

Étapes	January	February	March
Phase 1	Description 1		
Phase 2	Experiment		
Phase 3	Prototype 1		Description 7
Phase 4	Prototype 2		
Phase 5	Description 5	Final product	

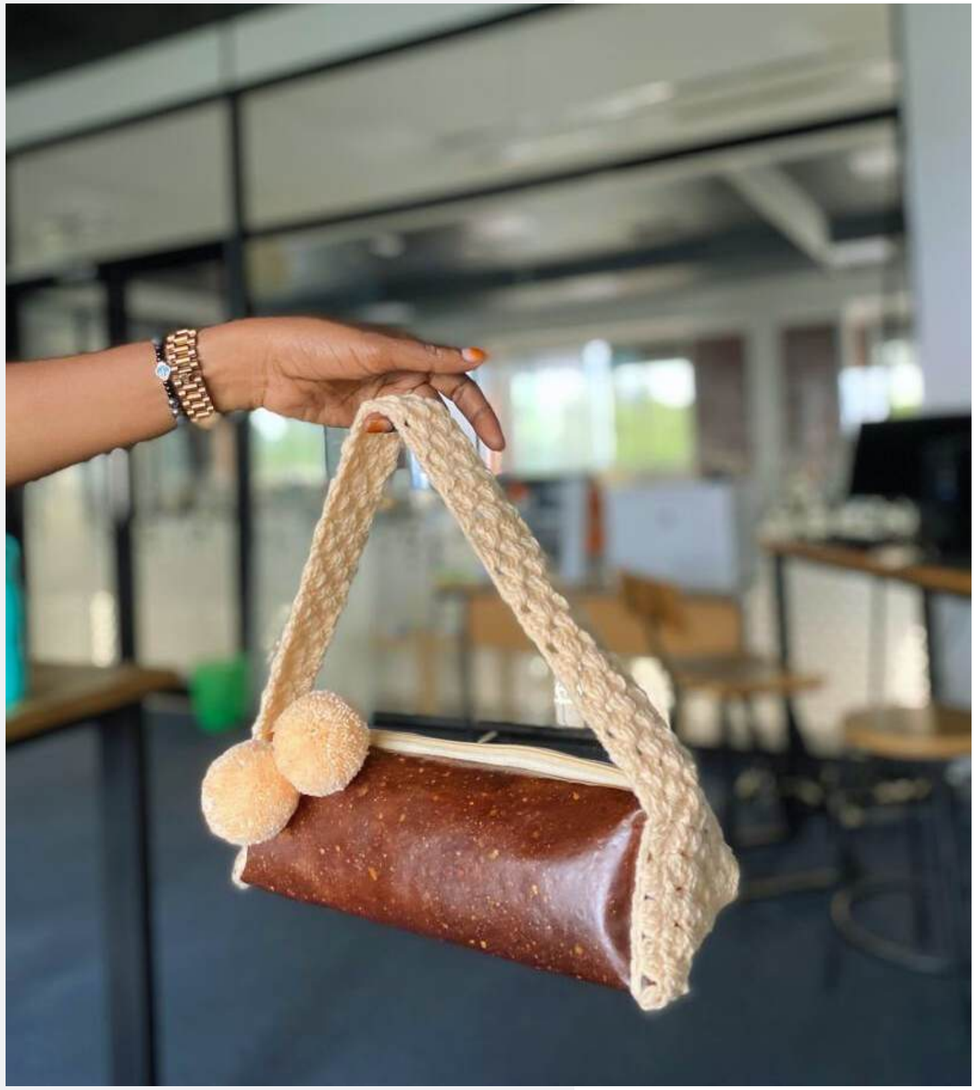
TIMELINE

Phases	January	February	March
Phase 1			
Phase 2			
Phase 3			
Phase 4			
Phase 5			

Design proposal

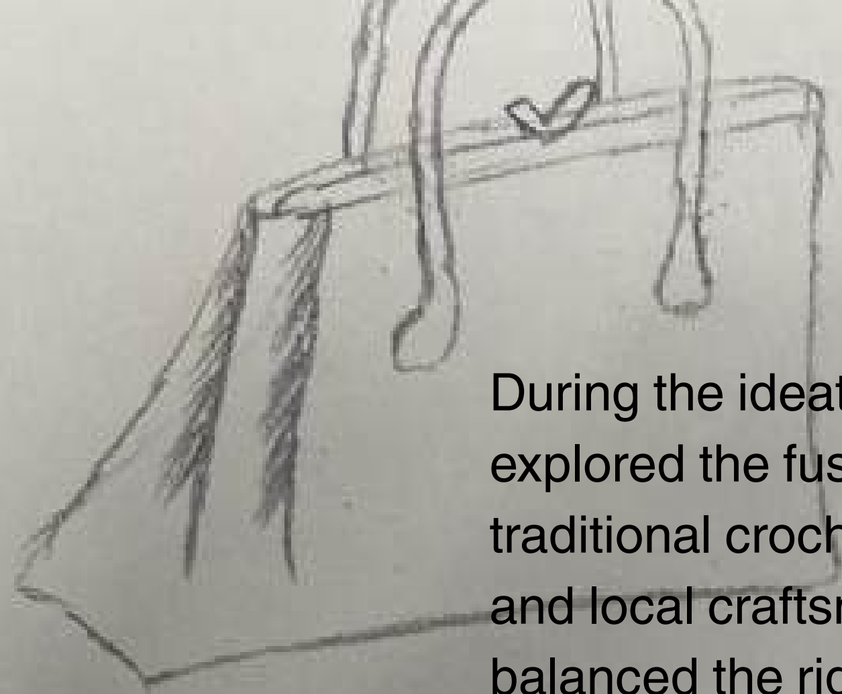
The goal of the Icyizere Handbag Project is to create a fully biodegradable, locally produced accessory by marrying tree tomato–based bioplastic with traditional crochet techniques. This hybrid design leverages the structural integrity and water resistance of the bioplastic for the bag’s panels, while the crochet body provides flexibility, repairability, and a distinctly handcrafted aesthetic.

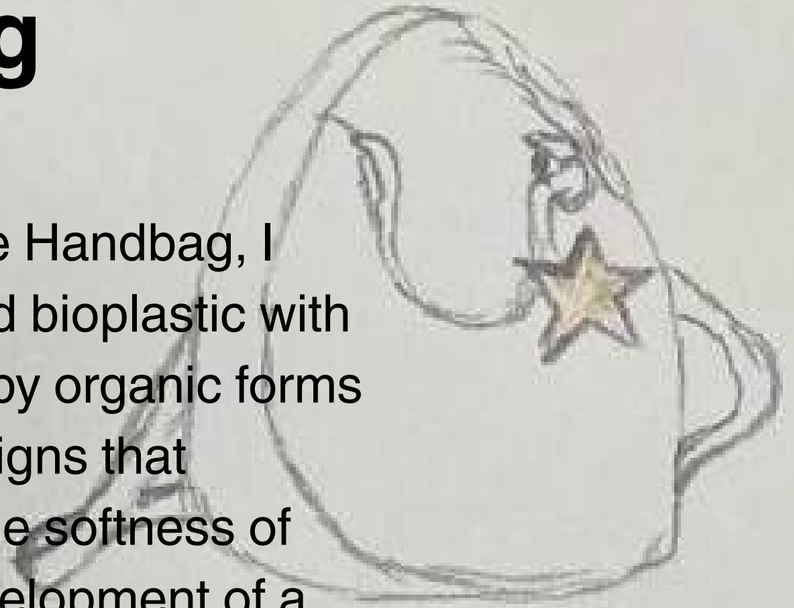
Innovation Impact

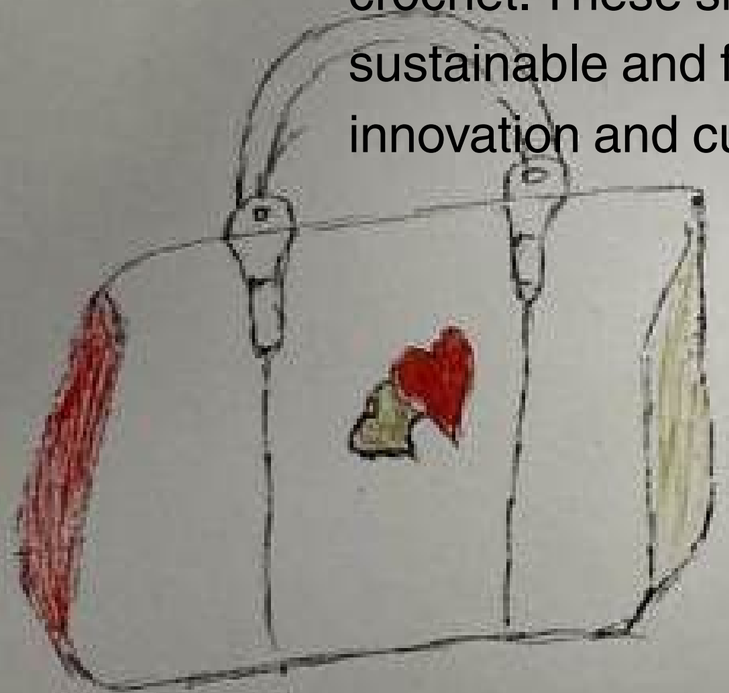


Sketching

During the ideation phase of the Icyizere Handbag, I explored the fusion of tree tomato-based bioplastic with traditional crochet techniques. Inspired by organic forms and local craftsmanship, I sketched designs that balanced the rigidity of bioplastic with the softness of crochet. These sketches guided the development of a sustainable and functional accessory that embodies innovation and cultural heritage.







Bioplastic experiment

In developing the Icyizere Handbag, I focused on formulating a tree tomato-based bioplastic that balances elasticity, tensile strength, and durability, ensuring it complements the structural integrity of crochet elements. By experimenting with various natural additives, I aimed to enhance the bioplastic's flexibility and resilience, creating a sustainable accessory that merges innovation with traditional craftsmanship.

Ingredients used

INGREDIENT	QUANTITY	FUNCTION
Tree tomato	100 grams	Natural polymer source, base material for bioplastic.
Glycerol	1 to 2 teaspoons	Adds flexibility and retains moisture.
Gelatin	10 grams	Provides gel formation and structural support.
Water	100 ml	Helps dissolve and blend ingredients.
Vinegar	1 teaspoon	Adjusts pH and increases durability
Cornstarch	10 grams	Enhances film strength and elasticity.
Egg white	5 to 10 ml	Improves elasticity and acts as a binding agent.
Gelatin & Glycerine mix	5 to 10 grams	Increases flexibility and water solubility.
BeeWax	2 to 5grams	Adds structural support and stability.
Sodium Alginate	5 grams	Enhances water resistance and improves texture.

Step by step tree tomato bioplastic

Blending tree tomato wastes

1

Heating the mixture

2

Pour to the surface and wait 4 days

3

Bioplastic formation

4

This hybrid method combines tree tomato bioplastic and crochet, blending strength and softness for a stylish, functional handbag.

Bioplastic Crochet fusion implementation

Bioplastic gives structure, while crochet adds flexibility and beauty. Carefully joined by stitching, the design is durable, adaptable, and showcases eco-friendly fashion innovation.

Initial design

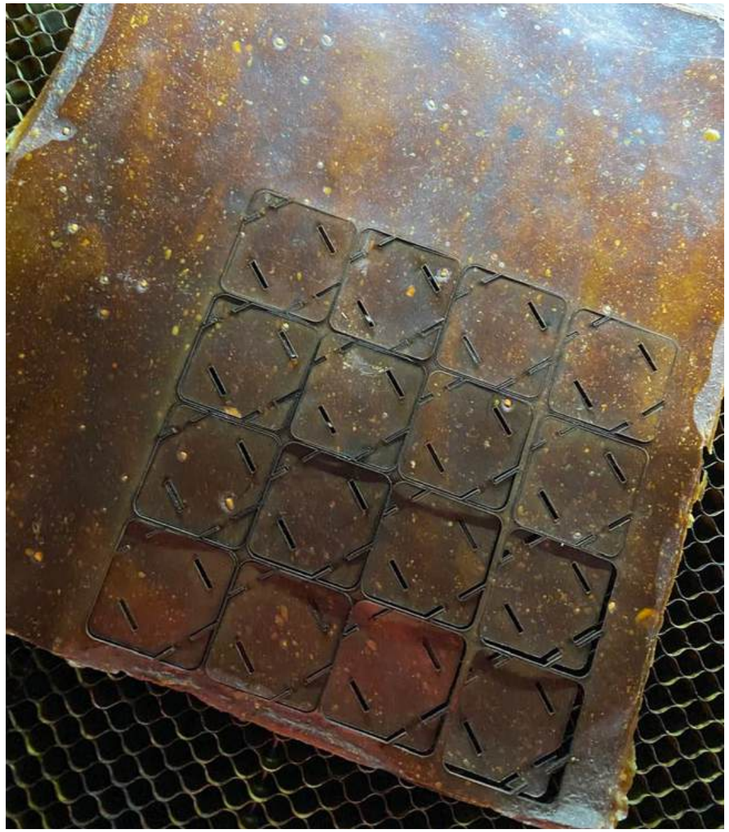
The first Icyizere design marries rigid bioplastic panels made from tree-tomato waste with a soft, hand-crocheted shell to create a truly hybrid accessory. I cast thin, translucent sheets of tomato-based bioplastic in custom molds, then cut them into front and back panels. Around each panel, I crocheted a snug frame in natural cotton yarn—using tighter stitches for strength at the edges and looser stitches for flexibility elsewhere.The result is a lightweight yet sturdy bag body where the bioplastic gives shape and water resistance, while the crochet provides a forgiving structure that can flex, stretch, and be easily repaired.

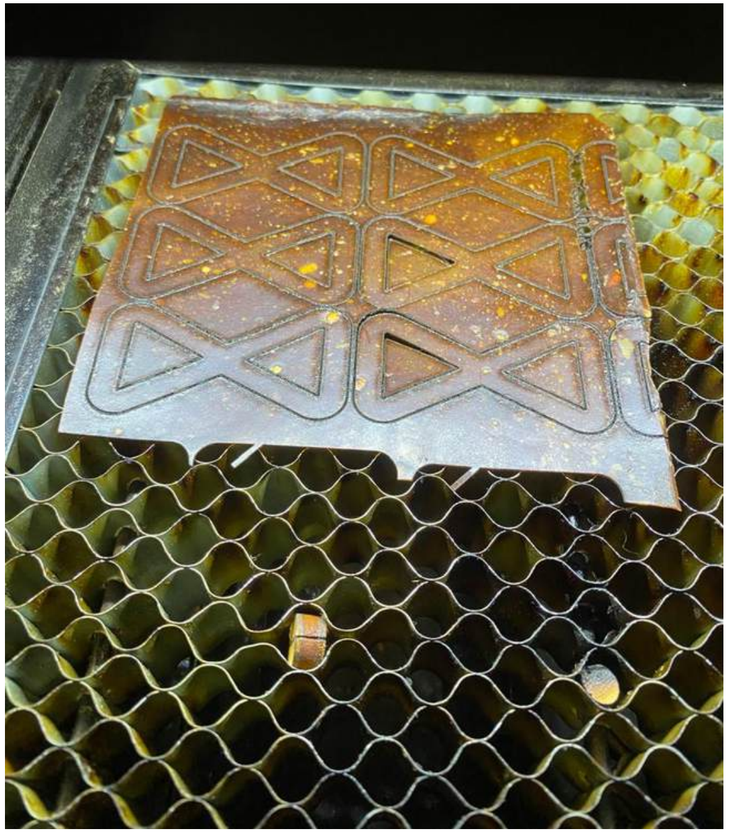
This was my first Icyizere handbag, with the main part made from bioplastic. The crocheted elements were added to enhance its beauty. As you can see, the pompom attached to the zipper also serves a relaxing, soothing purpose.

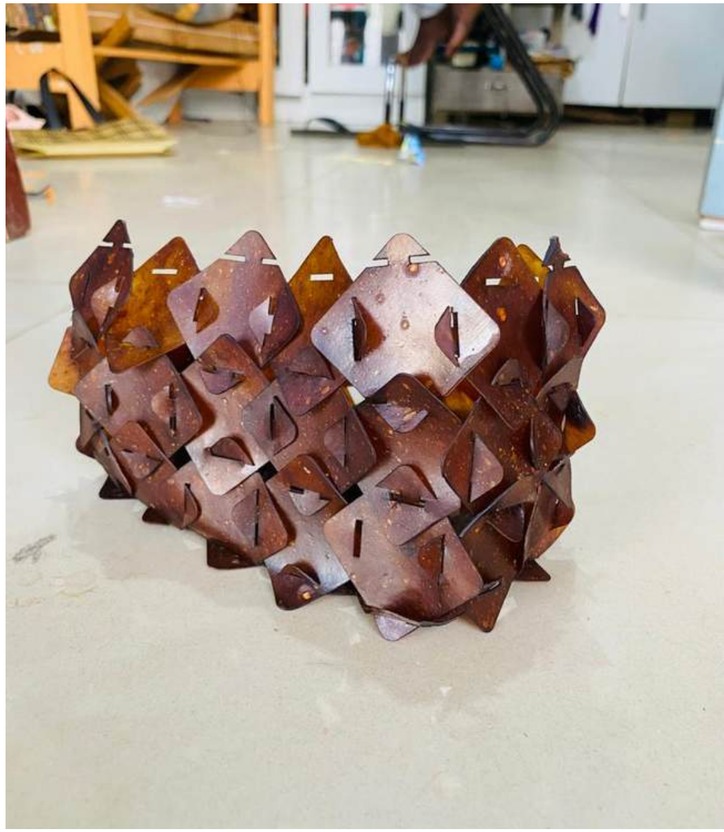
Bioplastic crochet fusion prototype

Second design

By using laser cutter







Final design

I created a modular bag using tree tomato bioplastic and a circular fashion approach. I designed interlocking pieces and cut them with a laser cutter. The bioplastic showed good flexibility, though I faced challenges with thickness and fitting. The result is a unique, adaptable, and eco-friendly fashion piece.

Style Meets Sustainability: The Icyizere Design

Fashion Forward

Designed for function and modern style.

Variety

Available in multiple colors and styles to suit tastes.

Personalization

Customization options to reflect your unique personality.

The Icyizere Experience: More Than Just a Handbag

Conscious Choice

Wear a statement of sustainable consumerism.

Community

Join a global network of environmentally aware buyers.

Feel Good

Own a bag that supports planet and people.

BILL OF MATERIALS REQUIRED

Price List			
Product	**Quantity**	**Unit Price**	**Total Price**
Tree tomato	10 kgs	$2	$20
Yarn	5 pcs	$1	$5
Egg	20 pcs	$0.2	$4
Gelatin	200 grams	$0.04	$8
Water	2 jericans	$3.5	$7
Cornstarch	300 grams	$0.03	$9
BeeWax	150 grams	$0.04	$6
Vinegar	1 bottle	$0.06	$0.6

Conclusion

OUR RECOMMENDATIONS

Circular Design: Transforms tree tomato waste into biodegradable bioplastic, promoting sustainability and reducing environmental impact.

Cultural Fusion: Integrates traditional Rwandan crochet techniques with innovative biomaterials, celebrating local craftsmanship.

Empowering Communities: Provides artisans with new skills and income opportunities, fostering community development.

Sustainable Fashion: Offers a compostable, repairable accessory that embodies ethical and eco-friendly fashion principles.

- **Recommandation 01**
- **Recommandation 02**
- **Recommandation 03**
- **Recommandation 04**

Icyizere is a story of hope, heritage, and hands-on innovation, showing how materials of the future might just begin in the soil, the kitchen, and the community.

Embarking on the Icyizere Handbag Project has been a transformative journey, blending sustainable innovation with cultural heritage. I am profoundly grateful to my mentors—Nuria Robles, Kae Nagano, and Kawaida—whose guidance and support were instrumental in navigating the complexities of biofabrication and design.

I extend my sincere thanks to the Fabricademy community for providing a platform that fosters creativity and interdisciplinary collaboration. Their resources and encouragement have been invaluable throughout this process.

To the local artisans and farmers in Rwanda, your traditional knowledge and sustainable practices inspired and informed every aspect of this project. Your contributions were pivotal in integrating cultural heritage with modern design.

Lastly, I am deeply appreciative of my family and friends for their unwavering support and belief in my vision. Their encouragement sustained me through every phase of this journey.

Thank you all for being part of this endeavor to create a sustainable and culturally resonant product.