ALLISON
LABRATORIES
Wrapping the Future in Green

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SUSTAINABLE PACKAGING REVOLUTION
THE BIO-BASED TPU-FC1 PROJECT

PREPARED FOR:
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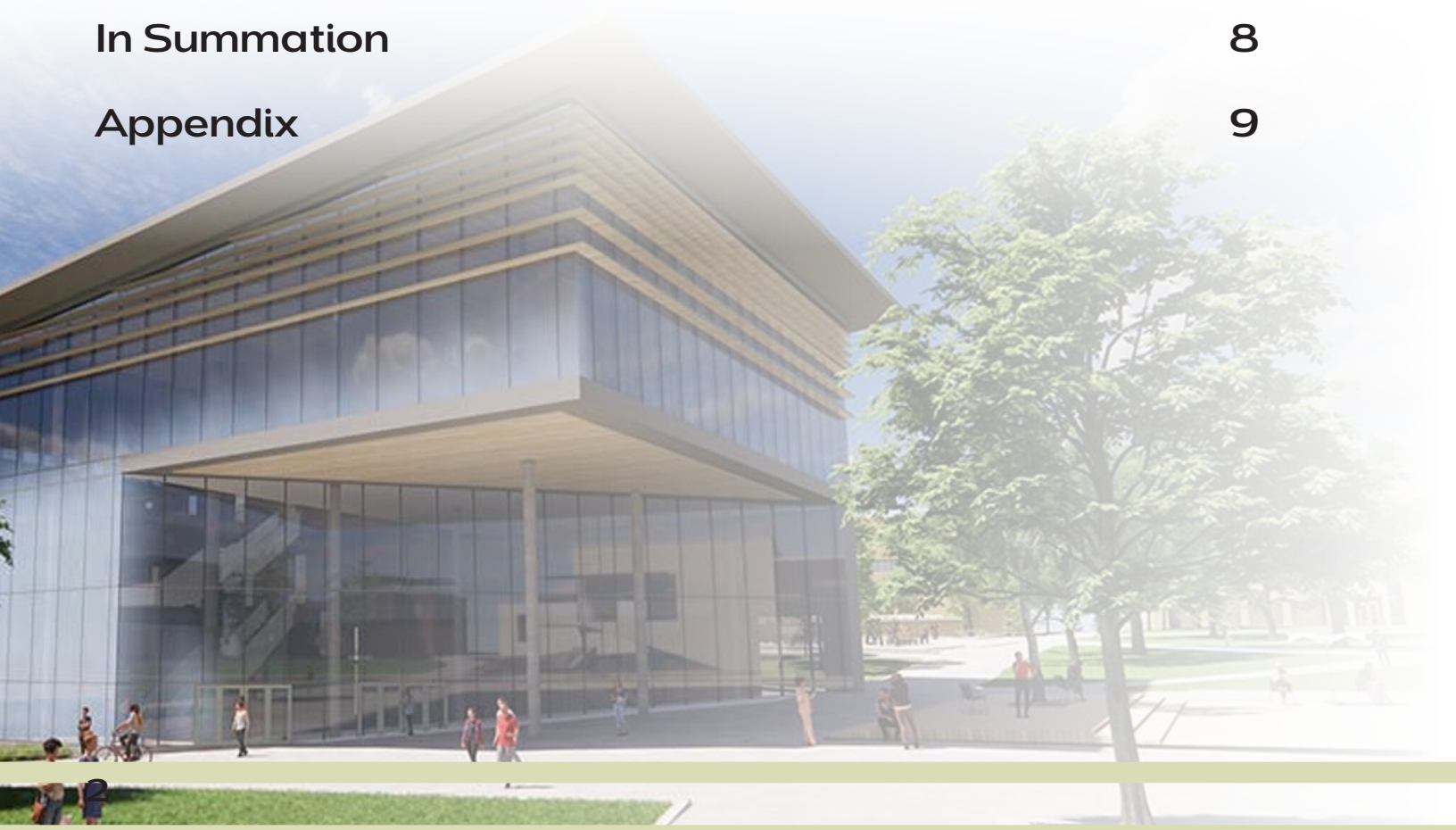


- Who We Are -

At Quinn Laboratory, we are dedicated to shaping a sustainable future by revolutionizing the packaging industry. Our mission is to combat plastic pollution through pioneering the development and commercialization of innovative, eco-friendly packaging solutions. With a focus on creating sustainable, biodegradable plastic wraps made from bio-based thermoplastic polyurethane (TPU-FC1), we are at the forefront of environmental stewardship.

Our commitment to sustainability goes beyond just product development. We aim to reduce environmental impact by promoting responsible consumption and offering products that align with the principles of a circular economy. By leading the market with contemporary, environmentally conscious products, we cater to the growing demand for sustainable packaging solutions that do not compromise on quality or functionality.

- Our Mission -

At Quinn Laboratory, our mission is to combat plastic pollution by pioneering the development and guide the commercialization of innovative, eco-friendly packaging solutions. We are committed to creating sustainable, biodegradable plastic wraps made from bio-based thermoplastic polyurethane (TPU-FC1). Our goal is to reduce environmental impact, promote responsible consumption, and lead the market with contemporary, environmentally conscious products. We strive to meet the growing demand for sustainable packaging and continuing the movement of a healthier planet.

- Prototype Action Plan -

To bring the bio-based TPU-FC1 plastic wrap from concept to reality, we will execute a phased plan of action. Our strategy focuses on key areas: research and development, prototype production, marketing, and regulatory compliance.

1. Research and Development (R&D): Our initial phase will concentrate on optimizing the TPU-FC1 formulation based on the completed biodegradability evaluations. This includes refining the material properties to ensure the bioplastic has outstanding characteristics including elasticity, temperature resistance, clarity, and durability. We will collaborate with plastics engineers and biomaterial engineers to ensure the product meets, if not exceeds, current plastics standards.

2. Prototype Development: Upon successful R&D completion, we will set up a small-scale production line with essential equipment for extruding and mixing the bio-based TPU. We will produce a limited batch of TPU-FC1 plastic wrap, focusing on quality control and iterative improvements based on testing feedback.

3. Licensing and Permits: To ensure compliance with regulatory requirements, we will secure the necessary licenses and permits for prototype production. This step involves working closely with legal experts to navigate the regulatory landscape and meet industry standards.

4. Marketing and Branding: Simultaneously, we will develop a marketing strategy to create awareness and generate interest in our product. This includes creating a strong product presence and identity, digital marketing campaigns, and outreach to potential early adopters and industry partners.

5. Distribution and Logistics: For prototype distribution, we will partner with logistics providers to ensure efficient delivery of samples to key stakeholders and potential customers. This phase also includes gathering feedback to refine the product before moving forward.

6. Operational Setup: Finally, we will establish the operational framework for ongoing production. This includes finalizing supplier agreements for raw materials, setting up production protocols, and training staff to maintain consistent quality and efficiency.

Through these steps, we aim to successfully develop and launch the TPU-FC1 prototype, setting the stage for future scalability and market penetration.

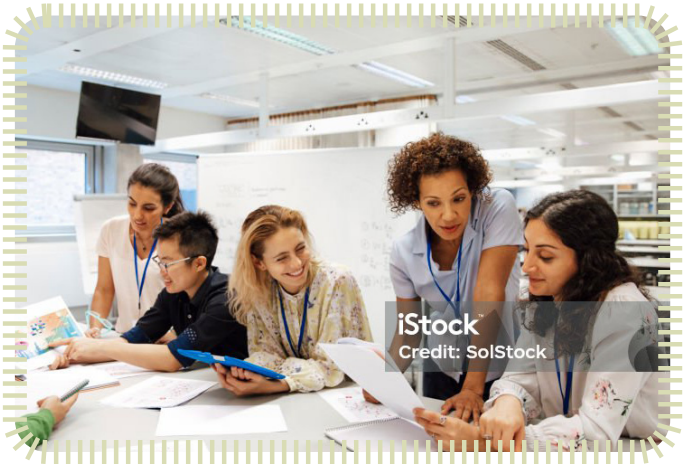
- Finacial Estimate -

DESCRIPTION	COST (USD)	TOTAL
Start-up Costs		
R&D	18,000	18,000
Prototype Development	20,000	38,000
Licencsing and Permits	5,0000	43,000
Marketing	5,0000	48,000
Operational Costs		
Production and Materials	25,000	25,000
Labor	18,000	43,000
Distribution and Logistics	5,000	48,000
Utilities and Overhead	5,000	53,000
TOTAL		101,000

- Our Team -

At Allison Laboratory, our success is driven by a passionate group of students from Missouri Science and Technology. We're a bunch of dedicated nerds who are committed to creating sustainable solutions for a better future. Each member brings a unique set of skills and expertise, contributing to our innovative approach to eco-friendly packaging.

Emily Chen, Chief Scientist: As a senior studying Biochemistry, Emily oversees our R&D efforts. Her work in biodegradable polymers ensures that our products are both innovative and eco-friendly. Michael Patel, Head of Production: Michael, a mechanical engineering student, applies his expertise in manufacturing and



quality control to ensure that our biodegradable wraps meet the highest standards of performance and sustainability.
Sarah Lopez, Marketing Director: Sarah, a junior majoring in Business Administration with a focus on Marketing, spearheads our marketing efforts with a keen eye for branding and a passion for environmental advocacy.
Lisa Martinez, Operations Manager: Lisa, a junior studying Industrial Engineering, brings organizational skills and operational expertise to ensure smooth day-to-day functioning, from logistics to supplier management, supporting our growth and efficiency.

- Our Founder -

Quinn Guffey, Founder and CEO: As a junior at Missouri Science and Technology, majoring in Technical Communications, she brings a unique blend of academic excellence and practical knowledge to the team. A member of The Theta Kappa Honors Society, she has been closely following TPU-FC1 developments for over a year. Their passion for sustainability and innovative packaging solutions drives Allison Laboratory's mission to create a greener future.

- The Sustainability Market -

Pharmaceutical and Healthcare: This sector is adopting sustainable packaging to reduce environmental impact and comply with regulations, making it essential for medical devices, drugs, and health supplements.

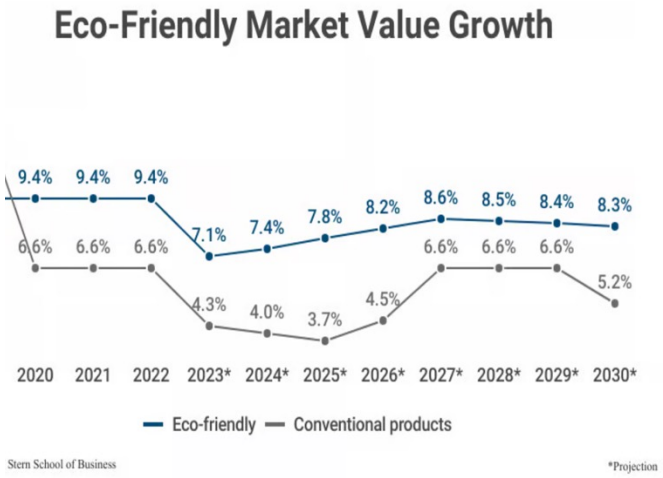
Cosmetics and Personal Care: Consumer demand for eco-friendly products is driving brands to use biodegradable and recyclable materials, enhancing market appeal and reducing plastic waste.

Food and Beverage: This industry generates significant packaging waste. Sustainable solutions like TPU-FC1 can reduce the environmental footprint and meet consumer demands for eco-friendly packaging for beverages and packaged foods.
Other Industries: Sectors such as retail, electronics, and household goods also seek sustainable packaging to improve environmental impact and meet consumer expectations.
By targeting these key industries, our biodegradable plastic wrap can promote sustainability across diverse markets.

North American Market Insights

Growth Projection: North America is expected to grow at a CAGR of 6.95% during the forecast period due to increasing consumer awareness and supportive government regulations.
Packaging Waste: The U.S. generates up to 80 million metric tons of packaging waste annually, with the food and beverage industry contributing about half. Companies like Nestle and Unilever are working to reduce their environmental impact.

A recent analysis titled Sustainability and Changing Consumer Behavior, published by Capgemini, showed that 79% of customers alter their purchasing habits in response to social responsibility, inclusivity, or environmental impact.



UK Market Insights (Comparative)

Innovative Solutions: Companies like CuanTec are developing compostable materials to reduce plastic dependency and extend the shelf life of produce, particularly seafood. These initiatives also aim to decrease food waste, which the US currently produces at a rate of around 2 million metric tons yearly (Staits Research, 2023).

- In Summation -

Mission and Vision

Allison Laboratory aims to revolutionize the packaging industry by developing and commercializing eco-friendly, biodegradable plastic wraps made from bio-based thermoplastic polyurethane (TPU-FC1). Our mission is to combat plastic pollution and promote responsible consumption, aligning with the principles of a circular economy. Commitment to Sustainability Beyond product development, we focus on reducing environmental impact through sustainable practices and offering high-quality, contemporary products that cater to the growing demand for eco-friendly packaging solutions.

Phased Plan of Action

1. R&D: Optimize TPU-FC1 formulation, ensuring high material standards.
2. Prototype Development: Establish production line, produce and test TPU-FC1 wraps.
3. Licensing and Permits: Secure necessary regulatory approvals.
4. Marketing and Branding: Develop strategy to create product awareness and identity.
5. Distribution and Logistics: Partner with providers for efficient prototype delivery.
6. Operational Setup: Finalize supplier agreements, set up production protocols, and train staff.

Target Industries

» Pharmaceutical and Healthcare: Sustainable packaging for medical devices and drugs.
» Cosmetics and Personal Care: Meeting consumer demand for eco-friendly products.
» Food and Beverage: Reducing packaging waste with sustainable solutions.
» Other Industries: Retail, electronics, and household goods seeking sustainable packaging.

Market Insights

North American Market: Expected growth at 6.95% CAGR due to consumer awareness and supportive regulations. Major companies are reducing packaging waste, influenced by consumer behavior.
UK Market: Innovations in compostable materials to reduce plastic dependency and food waste.

Budget Overview

» Start-up costs
» R&D: $18,000
» Prototype Development: $20,000
» Licensing and Permits: $5,000
» Marketing: $5,000
» Operational Costs
» Production and Materials: $25,000
» Labor: $18,000
» Distribution and Logistics $5,000
» Utilities and Overhead: $5,000
» Total Annual Budget: $101,000

- Appendix -

Allemann, M. N., Tessman, M., Reindel, J., Scofield, G. B., Evans, P., Pomeroy, R. S., Burkart, M. D., Mayfield, S. P., & Simkovsky, R. (2024). Rapid biodegradation of microplastics generated from bio-based thermoplastic polyurethane. Scientific Reports, 14(1). https://doi.org/10.1038/s41598-024-56492-6

Beadle, A. (2024, April 2). Researchers develop biodegradable plastic that won't leave microplastics behind. Applied Sciences From Technology Networks. https://www.technologynetworks.com/applied-sciences/news/researchers-develop-biodegradable-plastic-than-wont-leave-microplastics-behind-385057

Fishman, D. (2024, June 27). How biodegradable polyurethane could solve the microplastic pollution problem. Energy.gov. https://www.energy.gov/eere/bioenergy/articles/how-biodegradable-polyurethane-could-solve-microplastic-pollution-problem

Franklin, M. (2024, March 21). Say hello to biodegradable microplastics. UC San Diego Today. https://today.ucsd.edu/story/biodegradable-microplastics

McClure, P. (2024, March 22). "First plastic demonstrated to not create microplastics" has been tested. New Atlas. https://newatlas.com/environment/algae-microplastic-biodegradable/
Research, S. (2023, March 17). Sustainable Packaging Market Size, share, and Forecast to 2031. https://straitsresearch.com/report/sustainable-packaging-market

Of Note

» All persons except recipient (Dr. Allison) and author (Quinn Guffey) are fictional for the purpose of composing a complete proposal project.
» TPU-FC1 is a real product, and the developers are currently partnered with RhinoShield to make biodegradable phone cases (McClure, 2024).