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Organization Background

FINNOVATION LAB is based in Minneapolis and was founded in 2018 as a platform dedicated to supporting and accelerating the growth of social entrepreneurs. Their Circle Up Initiative is designed for upcycling companies to network and establish a thriving ecosystem for food waste in Minnesota. Food waste is a significant global issue as approximately 40% of all food produced never reaches consumers. Upcycling converts food waste into shelf-stable ingredients that can be packed and reused in other food or beverages sold to consumers. Dehydration and fermentation are two common processes used in upcycling.



"I enjoyed learning about the processes behind food production and the challenges associated with upcycling. I was able to apply my skills by reducing food waste at an industrial scale and develop future opportunities for products using upcycled ingredients. Overall, this internship has prepared me to create meaningful and impactful change in my future endeavors." ~ JBD

Project Background

Upcycling has been gaining traction as a solution to reduce food waste and was introduced to the U.S. Environmental Protection Agency's Wasted Food Scale in 2023. This project was designed to address that tier of the food scale for Minnesota food clients. The project included outreach to various food manufacturers with byproduct waste streams and upcycling outlets, including a fermentation company and a dehydration client, with the goal of testing and matching current waste streams with compatible upcycling pathways. After creating an initial list of 25 to 30 opportunities, eight were selected for testing to see if they could produce viable byproducts by themselves or as ingredients for future products.

Incentives to Change

Upcycling has a variety of benefits including conserving valuable natural resources by reducing demand for raw materials; reducing costs associated with waste disposal, such as ending up in landfills; and promoting the development of new product lines, including those that appeal to environmentally conscious consumers. Raw materials can be costly or sensitive to price volatility whereas upcycled ingredients have more stable input costs. Sometimes byproducts can be processed into high-value ingredients, such as dietary fibers or protein powders, that can enhance existing products and lead to them being sold at higher price points.

Currently, the market availability of upcycled products is low due to lack of upcycled goods manufacturers. Projects like this demonstrate how improving relationships between food manufacturers and upcycled food manufacturers could streamline byproduct sourcing and encourage more businesses to consider incorporating upcycled ingredients into their products.

SOLUTIONS

This project identified more recommendations than could be covered in this executive summary. Please see the table for the full list of recommendations.

Upcycle Coffee Grounds into Edible Human Food Products

A local organic coffee producer generates roughly 40,000 pounds of spent coffee grounds per day. These grounds are of premium quality, and the manufacturer wanted to identify new opportunities to upcycle their coffee grounds to new products instead of their current practice of composting the grounds. Part of this test is dewatering the grounds, and successful batch tests showed dehydration worked well. MnTAP continues to work with this client closely on their dewatering needs so that the entirety of their grounds can be successfully upcycled into new human food products. If this recommendation was implemented, this could divert 10,400,000 pounds of spent coffee grounds into upcycled products per year.

Solutions

Upcycle Brewers Spent Grain into Pizza Dough

A byproduct of the brewing industry is Brewers Spent Grain (BSG), which consists primarily of barley grain husks that are leftover after extracting sugars for beer production. BSGs can become new ingredients for nutritious snacks and baking mixes, including creating specialty pizza dough. For this project, two breweries agreed to upcycle their BSG, which could be incorporated into pizza dough at the rate of four times per month. This could divert 36,000 pounds of BSG to upcycled products per year.

Ferment Fruit Juice Liquid Byproduct Monthly

Juicing companies regularly import 200-hundred-pound drums of juice, and around 20% to 60% of each drum can spoil before the company uses it. Over a year, this could add up to 156,000 pounds being discarded down the drain. This project identified an opportunity to connect this waste stream with a fermentation client with potential to produce fermented beverages, such as kombucha, cider, or fruit wines, by adding sugar and/or removing water.

Currently, this process is being implemented in a pilot phase. If successful, this recommendation could upcycle up to

600 pounds of juice into fermented products per year. This opportunity has also led to continued technical assistance, including an additional site visit to recycle or reuse the waste byproducts in the production process onsite.

"The program provided a strong set of solutions to the issue of food waste in Minnesota. The innovative advancements provided by MnTAP and the intern will be put to excellent use in the coming years as we work to reduce food waste in Minnesota. This is a difficult problem, and we wouldn't have made this much progress in a short period of time without the strong focus of this intern program. I look forward to supporting it in the future."

~ Jennifer Barta, FINNOVATION Lab CEO

Recommendation	Annual Reduction	Annual Savings	Status
Upcycle Coffee Grounds into Edible Human Food Products	10,400,000 lbs. waste	TBD	Testing
Upcycle Brewers Spent Grain (BSG) into Pizza Dough	36,000 lbs. waste	TBD	Testing
Ferment Fruit Juice Liquid Byproduct Monthly	600 lbs. waste	TBD	Recommended
Pilot Test Garbanzo Beans via Dehydration	750 lbs. waste for the pilot 93,000 lbs. waste at full scale	TBD	Recommended
Pilot Test 15 Different Feedstocks via Dehydration	11,250 lbs. waste	TBD	Recommended
Divert Oat Mash from Client to Community Kitchen for Baked Goods	9,000 lbs. waste	TBD	Testing
Find End Market for Dehydrated Distilled Spent Grains (DSG) from Client	9,000 lbs. waste	TBD	Find End Markets
Divert Eggshells to Toothpaste	1,000 lbs. waste	TBD	Testing
Continue Testing Vanilla Pods and Lavender via Fermentation	120 lbs. waste	TBD	Testing

MnTAP Advisor: Jon Schroeder, Waste Specialist