

# FRONT PORCH CHOCOLATE

Case Study | June – August 2023

Front Porch Chocolate is an innovative chocolate business located in Bozeman, Montana, operating under the food and beverage industry. The chocolate makers, Greg and T started in 2022 making and selling limited amounts of dark chocolate bars from the front porch of their house. They have created a niche for themselves producing dark chocolate packaged in reusable beeswax, demonstrating a strong commitment to environmental health and sustainability in Montana. The business is operated by only 2 co-owners.

*“Our chocolate is meant to be slow in every way, from the long process of making to the reusable packaging and finally to the experience of eating the chocolate itself.” ~ Greg & T*



## Project Background

Cocoa beans are used in making chocolate. Cocoa shells account for 10% to 20% of the overall cocoa bean and are considered a byproduct of chocolate production. According to Statista, the global annual cocoa production is estimated to be around 5,000,000 tons in 2022/2023, resulting in approximately 500,000 to 1,000,000 tons of cocoa shells being produced as byproducts.

In the process of making Front Porch Chocolate, once the cocoa beans are roasted and winnowed, only 70% of the cocoa nibs are obtained, resulting in a 30% loss as cocoa shell byproduct, which is 10% higher compared to the industry's average. Cocoa shells are a good source of antioxidants and flavonoids which have been shown to protect against oxidative stress. Prior to this project, the cocoa shells when milled to powder are similar to cocoa powder in color and flavor, are stored with no use in making a food product by front porch owners.

Reducing waste in the chocolate making process can be achieved by creatively upcycling byproducts through innovative food product development. The goal of this Montana Pollution Prevention (MTP2) internship is to help Front Porch Chocolate improve efficient resource use and reduce waste, contributing to the overall well-being of the planet.

## Intern



**Chidimma Ifeh**

Sustainable Food Systems  
Montana State University

## Production Photos



**Sorting cocoa beans**



**Refining cocoa nibs**

## Product Development Trials

The cocoa shell was milled into a powder form and used as a food ingredient in carrying out different food development trials. The development of some food products, such as hemp drink, granola bar and a steak rub using cocoa shells was produced. The steak rub was the most preferred by Front Porch business owners. The recipe was modified following preliminary sensory by two Chefs, Intern and the two business co-owners.

## Solutions

**Upcycling the cocoa shell:** By upcycling the cocoa shells and creating a steak rub for sale to consumers, we can both minimize waste and generate additional income.

**Upgrading the winnowing machine:** Upgrading the winnowing machine by incorporating screening mechanisms and optimizing parameters like airflow and speed will enable us to achieve our target of yielding less than 20% cocoa shells from the cocoa beans. An engineer can be hired to work on the winnowing machine to improve its efficiency.

**Product sales:** For sales distribution, we will employ wholesale distribution, instore sales, and/or adopt compressed natural gas or biodiesel vehicles, effectively conserving energy and significantly reducing carbon dioxide emissions.

This project raises awareness about the environmental impact of cocoa shell waste encouraging consumers to make choices that align with pollution prevention and sustainability principles.

## Photos



**Granola bar**



**Cocoa shells**



**Steak rub**

**Table 1: Pollution Prevention Outcomes**

Recommended P2 Actions	If Implemented:				If Not Implemented:	
	\$		Annual Waste (lbs.)	MTCO <sub>2</sub> e emissions (tons)	Annual Reductions	
	One-time Cost to Implement (\$)	Annual Savings from P2 Action (\$)			Barrier to Implement	Plans to Implement within 5 years? (Pick Y/N)
Winnowing machine	500	1,108	-	-	-	Y
Upcycling cocoa shells	-	3,324	740	-	-	Y
Product sales (Natural gas vehicle)	10,000	-	-	0.198	Funding	Y