

Abstract

Dominica is a beautiful island full of many cottage industries that are trying to grow and succeed. The current economy relies heavily on tourism, but the country is rich with agriculture. This group of four students worked with the Believers Multipurpose Cooperative where the process of producing virgin coconut oil was improved by 30%. The group also worked with the native Kalinagos at Mr. Daniels Cassava Bakery to restructure an oven and create advertisement tools to improve sales. All work completed in Dominica helped bring back more emphasis on agriculture to their economy.



Figure 1: ETHOS Dominica group members

Introduction

- Virgin coconut oil is an all-natural product since it utilizes no additives or heat sources
- Cassava bread is sweetened with coconut and very popular all over the island
- Most processes have sufficient equipment so focus was placed on process optimization

Project Description

Virgin Coconut Oil

- Bench-top experiments was performed to find ideal ratio of coconut milk to water

Table 1: Determination of optimal ratio of coconut milk to water

Trial #	1		2		3	
Ratio (Milk to Water)	1:1	2:1	1:1	2:1	1:1	2:1
Oil Extracted (L)	3.7	4.0	3.75	4.05	3.85	5.0
Oil Extracted (%)	37	40	37.5	40.5	38.5	41.7
Increase in Oil (%)	8.11		8.00		8.23	

- Analyzed if re-milking the copra would significantly increase the yield of oil

Table 2: Results of milking copra multiple times

Trial	Milking Number	Extraction time (min)	Coconut Milk Extracted (L)	% Milk Increase when milked twice
1	1st	140	116	22.0
	2nd	65	25.5	
2	1st	168	132	18.9
	2nd	70	25	
3	1st	145	100	23.0
	2nd	70	23	

- Researched and developed uses for coconut milk and dried copra byproduct waste
- Improve quality of filtration

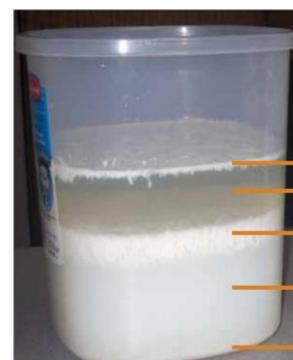


Figure 2: Natural Coconut Oil Separation



Figure 3: Coconut Oil Factory

Project Description

Cassava Bread

- Restructured the existing oven
- Produced and distributed advertisement brochures to generate more sales
- Created new oven designs



Figure 4: Making cement for the oven

Results & Discussion

- Found the optimal ratio of coconut milk to water to be 2:1 which increased daily yield of oil by 25%
- Implemented re-milking of the copra twice and led to a 21% daily increase in coconut milk produced
- Successfully made vinegar from coconut milk byproduct
- Cut down on water usage for virgin coconut oil process
- Restructured the cassava bread oven with local materials to increase cooking efficiency

Recommendations

- Find a way to turn dried copra into animal feed and sell it
- Implement a heating room for the natural separation to occur in
- Design a bottling machine for the oil
- Help move into a full-scale factory
- Design and construct a new, more efficient cassava bread oven
- Experience Dominican culture



Figure 5: Beautiful view of Roseau, Dominica

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