



NORTHERN  
ARIZONA  
UNIVERSITY

# Memorandum

**To: Dr. Oman**

**From: Rural Food Processing Capstone Team**

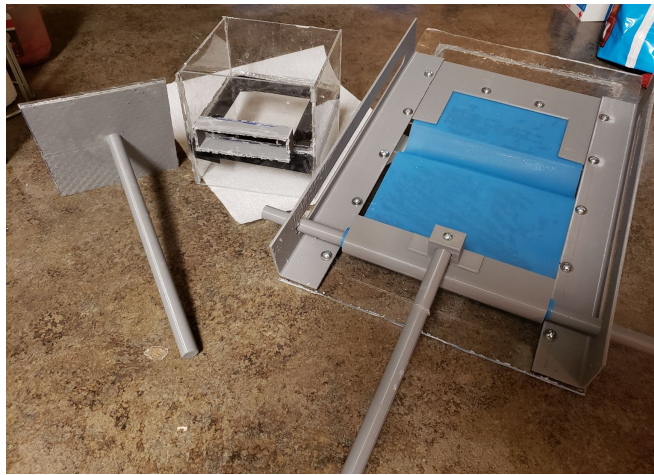
**Date: 6 December 2019**

**RE: Prototype Summary and Photos**

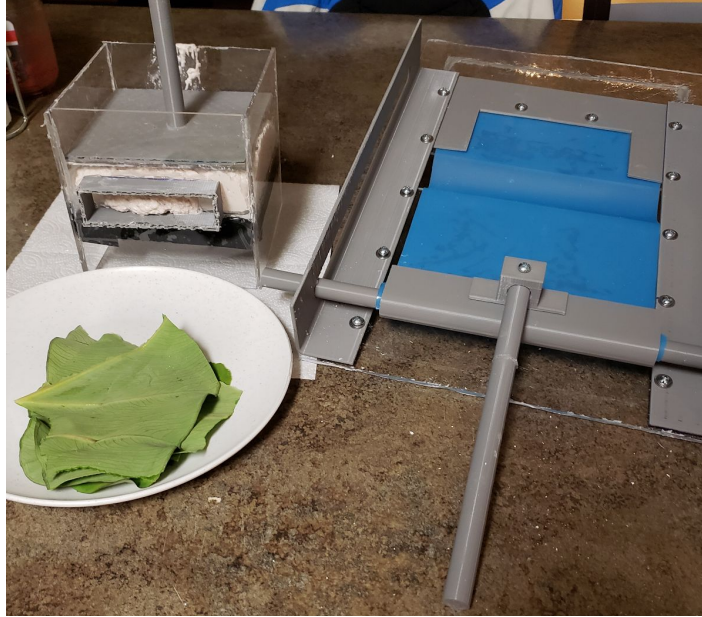
## Introduction

The purpose of this memo is to provide a summary and pictures of the prototype created by the Rural Food Processing team for the prototype demonstration held in class on December 4th, 2019.

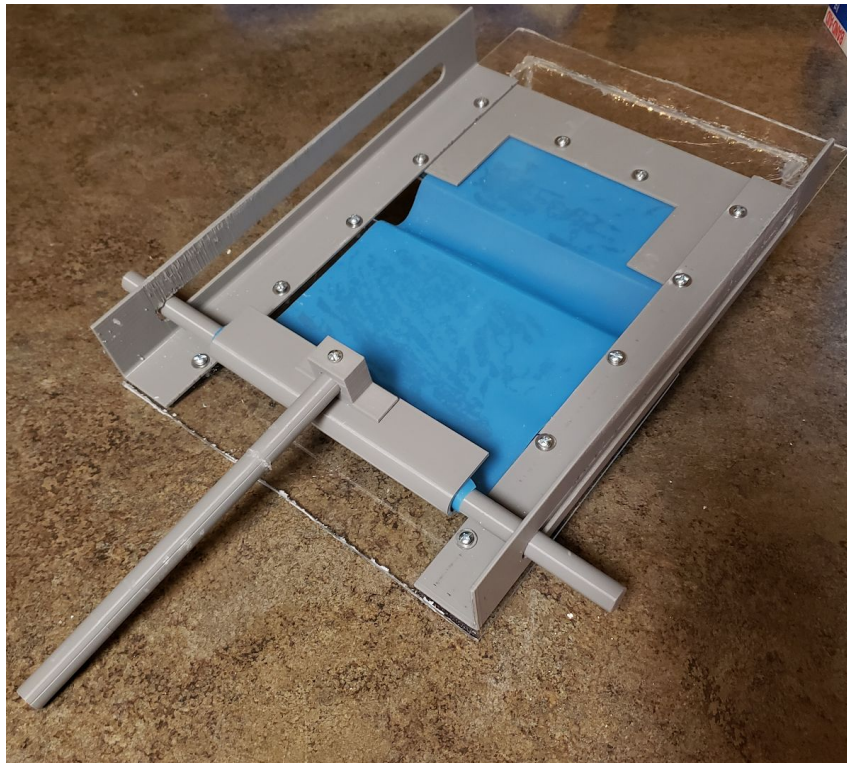
## Images



*Figure 1: Top Level Assembly*



*Figure 2: Top Level Assembly with cocoyam in dispenser*



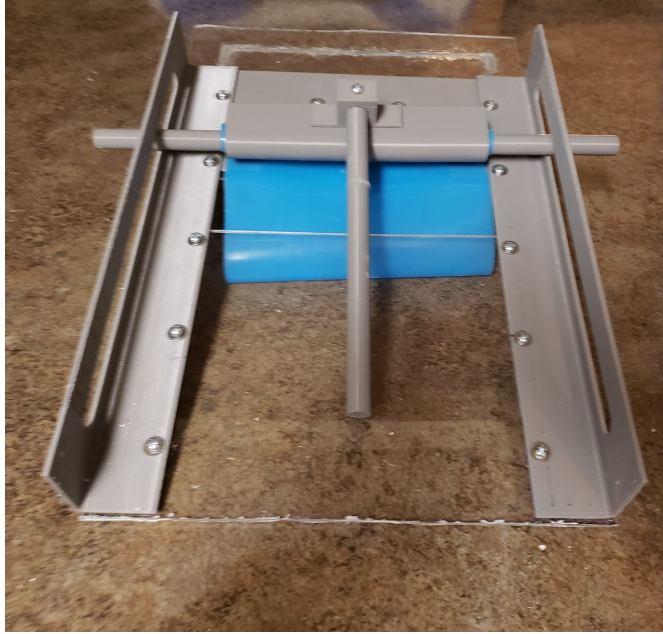
*Figure 3: Roller Isometric View*



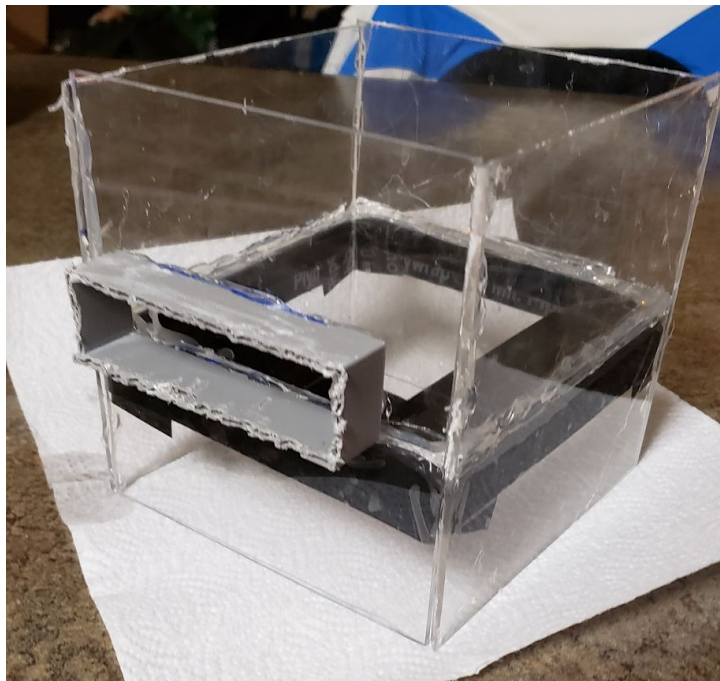
*Figure 4: Roller Top View*



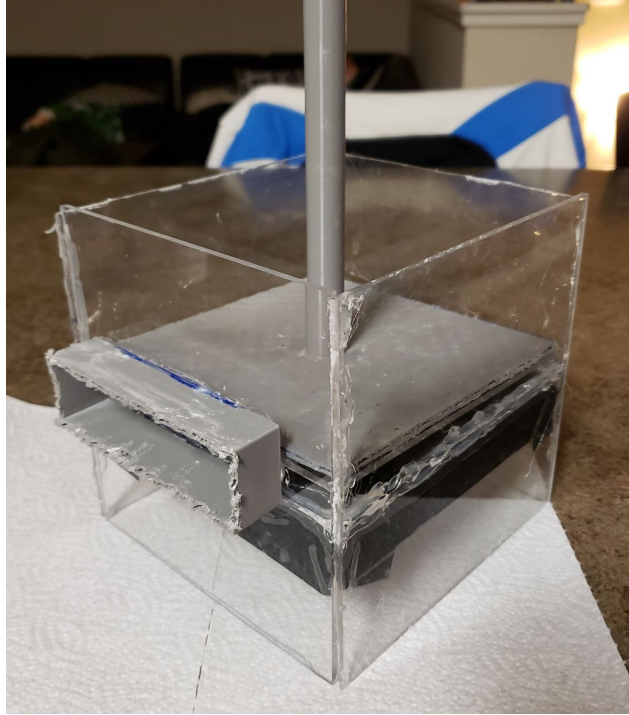
*Figure 5: Roller Side View*



*Figure 6: Roller in fully rolled position*



*Figure 7: Dispenser Reservoir*



*Figure 8: Dispenser Subassembly Isometric View*



*Figure 9: Dispenser Reservoir Top View*

## Summary

The prototype consists of two subassemblies that act as separate entities within the larger assembly. These consist of the dispenser and the roller. Both the dispenser and the roller are constructed primarily of plexiglass for rigidity in the reservoir of the dispenser and the base of the roller. The primary adhesive for construction was hot glue, with tape being used additionally in the reservoir to help to prevent leaking from gaps in the assembly.

For the dispenser, the team determined that the original dispenser design was excessively large for the amount of cocoyam that needed to be contained. As a result, the dimensions were scaled down significantly within the prototype. Additionally, the nozzle created more pressure and prevented the flow of the cocoyam through the dispenser. To counteract this effect, the nozzle was removed, instead leaving a small cutout to still aid in shaping the dispensed product. The plunger was 3D printed and plexiglass was added to the base to increase the rigidity of the thin, 3D printed plate. With the plunger handle being longer than needed to accommodate the previous reservoir, using it would cause an excessive moment on the plate causing failure. As a result, the user currently presses down on the base plate to dispense the cocoyam.

The roller subassembly was constructed of 3D printed parts along with plexiglass sheets. The side rails were 3D printed with predetermined size hole for the bolts. While gathering the materials to build the prototype the correct size bolts were not available at the store. Bolts the next size up were then chosen, the holes in the side rails and base were bored out to a larger diameter to fit the new bolts. Another sheet of plexiglass was cut and glued together to make the front stand of the base. To form the cut out for the finished roll to fall into, the two sheets of plexiglass that comprised the base were separated approximately two inches from each other. This was done instead of cutting out the square hole because of the lack of machinery available to the team at the time. This technique proved to be effective and more easily manufactured so it will be carried over into the final prototype.

## Conclusion

The prototype made for this demonstration closely resembles the team's previous designs and CAD packages. Small modifications made the design allowed for the device to operate more efficiently and effectively. Critical parts such as the nozzle highlighted some of the areas needing revision in future models. With further testing and research of materials, a final refined product is expected to be achieved based on the current prototype.