

## Introduction

- Known for their high level of antioxidants, cranberries ranked number one in antioxidant content with 9.584 mmol/100grams, when compared to nineteen other common fruits. For the past few years, consumer trends continue to go towards healthy, minimally processed items with clean labels.

## Objectives

- The goal of this project was to develop a cranberry chutney consisting of a variety of fruits, peppers, and spices that are minimally processed, contains a clean label, and shelf life similar to a shelf stable canned product.

## Materials & Methods

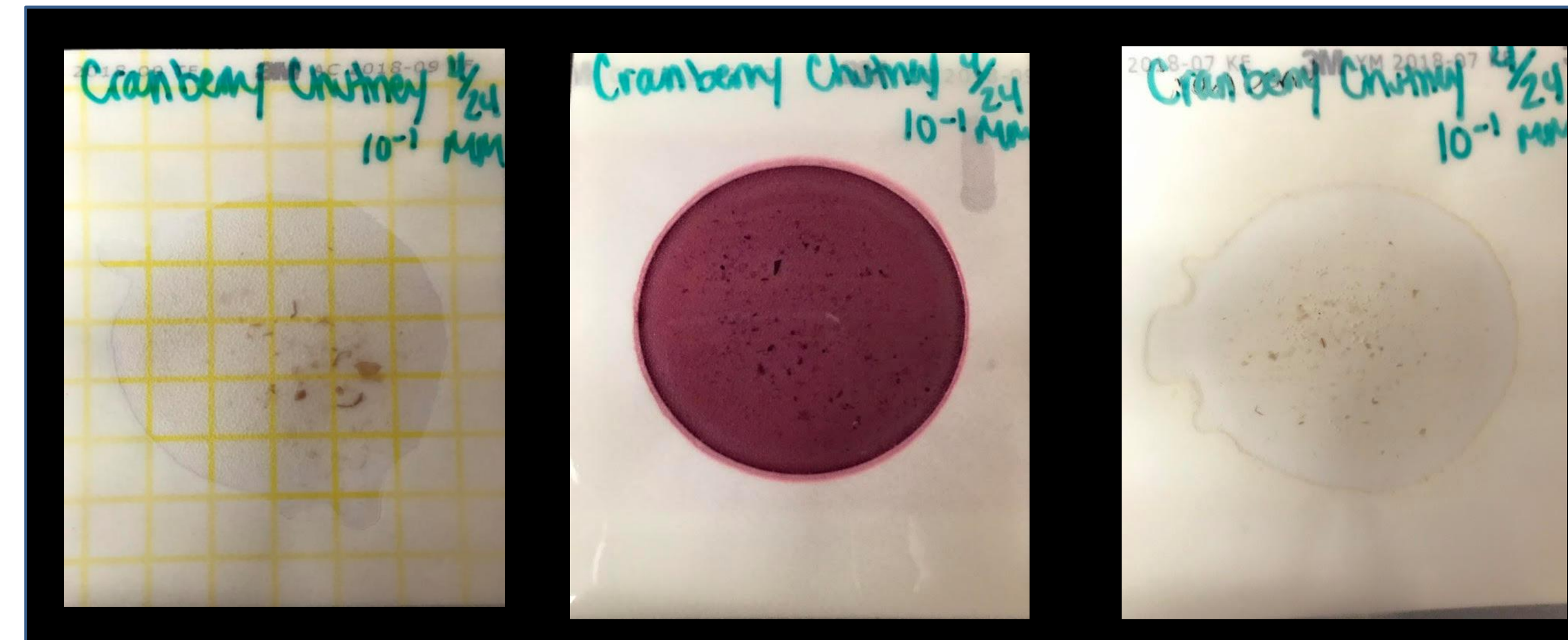
- A shelf stability study was conducted for the cranberry chutney. Product was minimally processed to an internal temperature of 71.1°C, held for 1 minute, filled above 65.5°C and inverted for 5 min. Once cooled, pH and water activity levels were measured.
- Two more samples were put into the accelerated shelf life incubator at 40.1°C. After 4 weeks, pH was evaluated. For the 8 week sample, microbial testing was done using 3M plates for aerobic plate count, *E. coli*/coliforms, and yeast/mold populations.
- The plates were incubated at 37°C and checked at day 3 and 5 for colony growth.
- The formulation with ingredient percentages is shown in Table 1.
- A nutrition facts panel was developed based on the formulations (Figure 3.)



Figure 1. Cranberry Chutney with a Biscotti. Photo by Konrad Cabus.

## Results

- During accelerated shelf stability testing, the pH levels for 0, 4, and 8 weeks were 2.98, 3.01, and 2.97 and water activity level was 0.976.



**Aerobic Plate Count:**  
<10CFU/ml

***E. coli*/Coliforms Counts:**  
<10CFU/ml

**Yeast/Mold Counts:**  
<10CFU/ml

Figure 2. Microbial Populations of Cranberry Chutney at 8 Weeks of Accelerated Shelf Life Testing at 41 °C.

Table 1. Cranberry Chutney Formulation

Cranberry Chutney	Percent Ingredient in Formulation	Grams in 1 serving
Ingredients		
Whole Cranberries	30%	21.00
Pears	26.3%	18.41
Green Apples	13.8%	9.66
Crushed Pineapple	12.1%	8.47
Cane Sugar	12.1%	8.47
Anaheim Peppers	2.85%	1.99
Cilantro	1.1%	0.77
Ginger	1.1%	0.77

## Support

Ocean Spray provided all of the cranberries for the project.

## Nutrition Facts

Serving size	1/4 Cup (70g)
Amount per serving	
<b>Calories</b>	<b>70</b>
	% Daily Value*
Total Fat 0g	0%
Saturated Fat 0g	0%
Trans Fat 0g	
Cholesterol 0mg	0%
Sodium 0mg	0%
Total Carbohydrate 17g	6%
Dietary Fiber 2g	7%
Total Sugars 13g	
Includes 8g Added Sugars	15%
Protein 0g	
Vitamin D 0mcg	0%
Calcium 4mg	0%
Iron 0mg	0%
Potassium 46mg	0%

\*The % Daily Value tells you how much a nutrient in a serving of food contributes to a daily diet. 2,000 calories a day is used for general nutrition advice.

Calories per gram:  
Fat 9 • Carbohydrate 4 • Protein 4

Figure 3. Nutrition Facts Panel for Cranberry Chutney

## Conclusions

- The chutney product was naturally acidic (pH 3.0) and applied a minimally processed heat treatment that was able to achieve an estimated shelf life of 1 year. Once opened, this product must be refrigerated and used within 4 weeks.



Figure 4. This concept was submitted in a video to Ocean Spray. Graphic by Conrad Kabus.