



Development and Sensory Analysis of Puerto Rican-Style Rum Cake

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Introduction

- The mango rum cake gets its inspiration from the rich flavors of Puerto Rican cuisine.
- The goal is to determine the optimal formulation that optimizes flavor and texture during a freeze-thaw cycle using monoglycerides and modified starch.
- The primary objective was to develop a microwavable Puerto Rican dessert for consumers that is both authentic and affordable.

Materials & Methods

Mango Rum Cake

INGREDIENTS: Sugar, All-purpose flour, Mangos, Eggs, Cream, Spiced Dark Rum, Butter, Buttermilk, Vegetable Shortening, Canola oil, Butter, Less Than 2% of the Following: Modified starch, Salt, Baking Powder, Vanilla extract and Monoglyceride

- C-PolarTex 12640 by Cargill is a modified corn starch used to improve emulsification and freeze-thaw capabilities of the cake.
- GMS 90 Monoglyceride by Cargill is an emulsifying aid to give the cake a finer crumb and more desirable texture.

Nutrition Facts	
1 serving per container	
Serving size 1 cake (168g)	
Amount per serving	
Calories	580
% Daily Value*	
Total Fat 31g	40%
Saturated Fat 14g	70%
Trans Fat 0g	
Cholesterol 140mg	47%
Sodium 260mg	11%
Total Carbohydrate 64g	23%
Dietary Fiber < 1g	4%
Total Sugars 45g	
Includes 41g Added Sugars	82%
Protein 6g	
Vitamin D 1mcg	4%
Calcium 64mg	4%
Iron 2mg	8%
Potassium 118mg	2%
Vitamin A 193mcg	20%
Vitamin C 8mg	8%
Vitamin E 2mg	15%
Folate 91mcg DFE	25%



Figure 1. Nutrition label, mango rum cake and principle display panel.

- Modified starch and a monoglyceride were added to the cake formulation to ensure stability throughout freeze-thaw cycles.
- Using C-Polar Tex 12640 modified corn starch (Cargill) and Monoglyceride GMS 90 (Cargill) a 3 x 3 factorial design was created resulting in 12 combinations for the development of the retail cake.
- The combinations included: GMS 90 baker's percentages at 0.8, 1.0, and 1.2%, and C-Polar Tex 1264 baker's percentages at 2, 3, and 4%.
- The concluding bakers percentages were found to be C-Polar Tex 12640 at 3% and GMS 90 at 0.8% for a reheatable quality comparable to a freshly baked cake.
- Each panelist (n=50) was given two (control and retail) microwaved cake samples and asked to complete a score sheet with questions regarding their likeness of aroma, appearance, texture, color, flavor, and overall acceptability with 1=extremely dislike and 9=extremely like.
- The control was a mango rum cake without the modified starch and monoglyceride.
- Analysis of variance was performed on SAS to determine if the functional ingredients had a significant effect on the attributes that were tested.

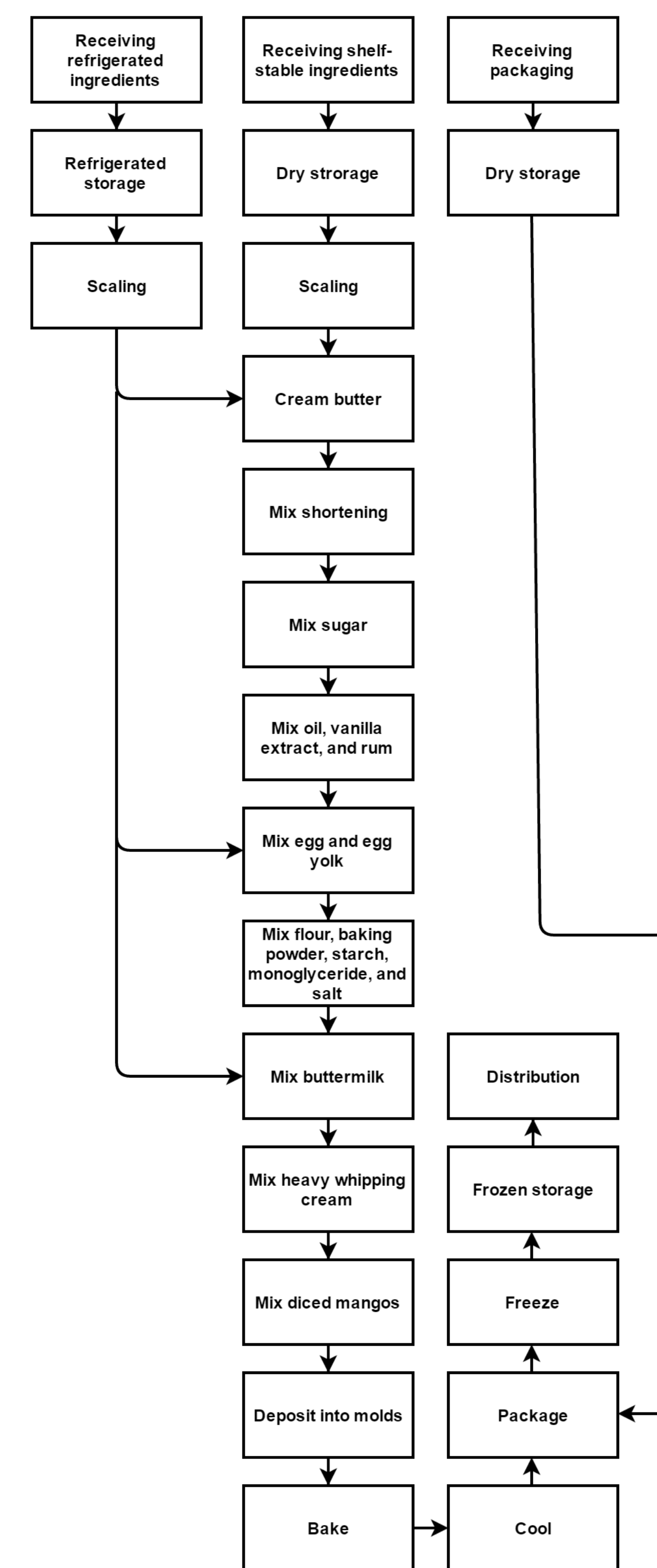


Figure 2. Processing flow diagram of mango rum cake.

Results

Consumer Testing

- An untrained sensory panel (n=50) control and retail cakes for appearance, color, aroma, flavor, texture, and overall acceptability. These attributes were tested for overall likeness, using a scale of 1 (dislike extremely) to 9 (like extremely).

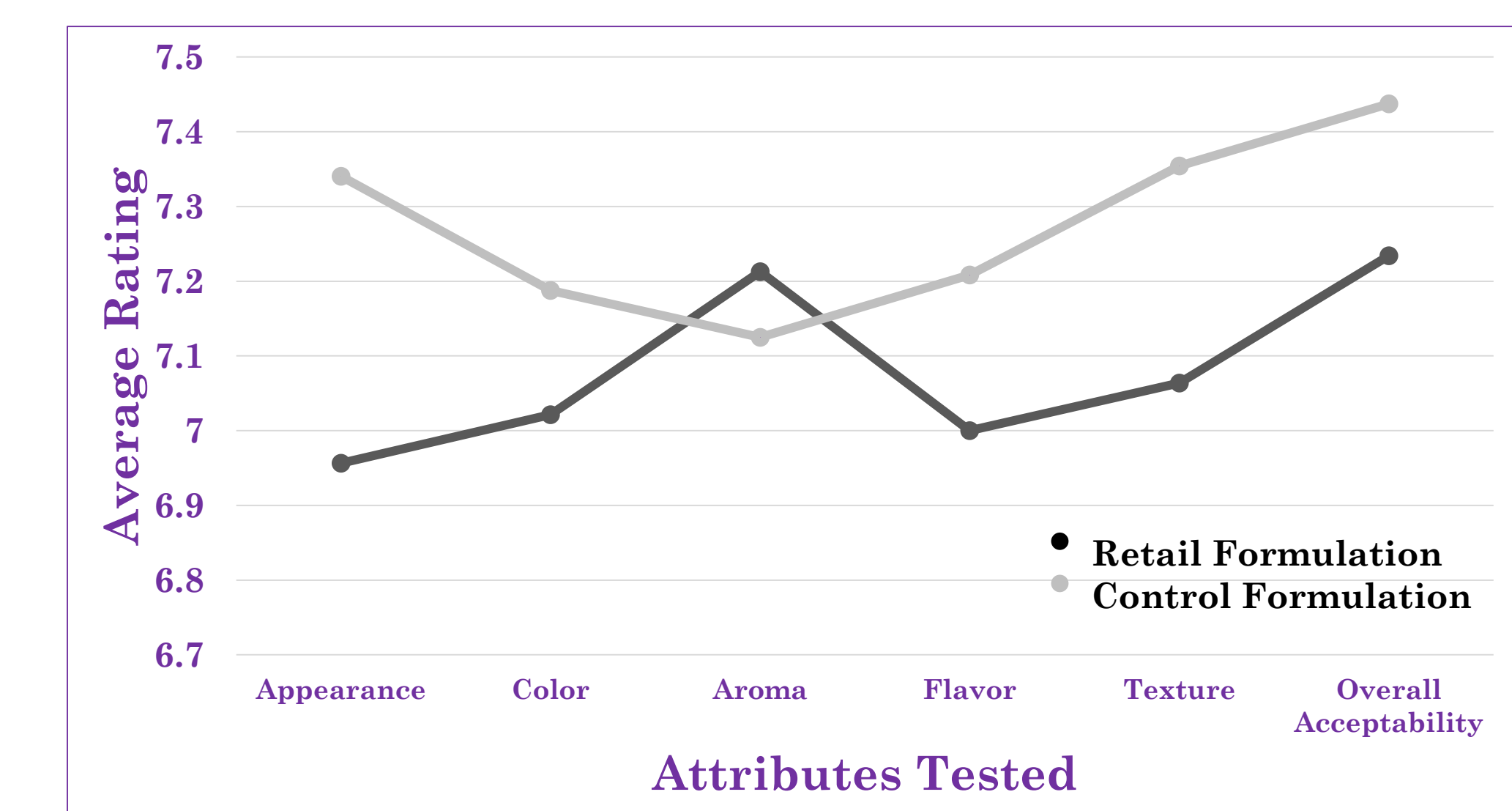


Figure 2. Average acceptability of control and retail formulations

Table 1. SAS ANOVA p-values. This is testing the variance between the attributes of the cakes with monoglyceride and modified starch to the cakes without.

Attribute	SAS P-Values	
	P-Value	Significance
Appearance	0.0993	Insignificant
Color	0.5171	Insignificant
Aroma	0.7853	Insignificant
Flavor	0.5069	Insignificant
Texture	0.3417	Insignificant
Acceptability	0.4280	Insignificant

Conclusion

- Based on the p-values it can be statistically proven that there were no significant differences between the two cakes based solely on the results of the sensory analysis.
- The results also indicate that the mango rum cake would be acceptable for the retail market.
- The sensory analysis provided a specific baseline for further testing on the modifications to improve sensory results.