

Apr 11th, 8:30 AM - 11:30 AM

# The Overall Acceptability, the Nutrient Density, and Costs of Substituting All-Purpose Flour with Selected Vegetables of a Yeast-Free Pizza Crust

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## Recommended Citation

Fontenot, Catherine; Armstrong, Ashton; Stephens, Emily; and Cessna, Shannon, "The Overall Acceptability, the Nutrient Density, and Costs of Substituting All-Purpose Flour with Selected Vegetables of a Yeast-Free Pizza Crust" (2019). *ANS Research Symposium*. 51.

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## Evaluation of Selected Sensory Characteristics and Nutrient Composition of a Traditional Cornbread Recipe Prepared with Flour Alternatives

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Cornbread is a southern traditional side item that typically accompanies Louisiana iconic foods. Unfortunately cornbread can be low in dietary fiber and relatively high in fat. A traditional slice (2" X 2" square) yields approximately 170 kcalories, 4.5 grams fat, and 1 gram dietary fiber (USDA Food Database, 2019). When cornbread is eaten in combination with other southern foods such as fried chicken and dirty rice, the caloric intake from refined grains and added fat can influence the consumption of excess calories and reduce the opportunity for eating foods higher in fiber. Therefore, it is not surprising that the southern states have a large percentage of their adult population suffering from chronic diseases such as heart disease, diabetes, and obesity (CDC, 2019). Researchers implicate the overconsumption of calories from refined grains, total fat, especially saturated fat and minimal dietary fiber intake (Bareuther, 2009). Given cornbread's popularity among many southerners, it seems prudent to enhance the nutritional composition of this food. Therefore, the purpose of this study was threefold: 1). compare the overall taste panel overall acceptability of a traditional cornbread recipe to three recipes prepared with coconut flour, chickpea flour, and almond flour and 2). compare the nutritional content of each recipe variation to the nutrient composition of the traditional cornbread recipe. The researchers prepared the recipes following the muffin method used for mixing quick bread. Three laboratory experiences were conducted using a taste-test panel made up of fellow classmates. For each laboratory experiment, research members completed the same task for preparing the recipes to control for errors that would influence outcomes of the study. The panelists used a scorecard to assess selected sensory qualities that included color, texture, flavor and overall acceptability of the four samples presented for each lab and rated each sample from one to three using a scale (one representing very undesirable to three representing very desirable). Prior to each taste-testing, the researchers prepared a plate divided into four quadrants. A 1" X 1" sample was cut from the center of each recipe variation to ensure presentation consistency across samples and samples were identified by a random number that was indicative of a specific recipe variation. Following each experiment, the recipe was adjusted based on the ratings and any comments made by panelists. The final recipe of each variation was nutritionally analyzed using [www.happyforks.com](http://www.happyforks.com). Results indicated the cornbread recipe prepared with coconut flour received an overall acceptability of 92% whereas the recipe using chickpea flour was the least acceptable with a 66% overall acceptability. In terms of nutritional composition, the dietary fiber content was highest in the recipe using almond flour yielding 1.76 grams per serving compared to .97 grams dietary fiber in the control. This study is similar to a study that used maize flour, cassava flour, and millet flour to enhance the protein content of bread (Nwokonie et al, 2017). Overall acceptability for breads using these flours were similar to the findings of this study. The limitations of this study were the limited time frame available to conduct the study and the limited access to panelists who were unfamiliar with this study. On the other hand, the strength of the study were access to the tools necessary to execute the study and availability of sufficient quantities of the ingredients

needed to conduct each laboratory experiment. This study indicates that alternatives flours are viable options for replacing part of the all-purpose flour in a traditional cornbread recipe. Additional research is necessary to determine which flour alternative or flour combinations would yield the best results when compared to other flours available.