

INTRODUCTION

The American diet is high in saturated fat and dietary cholesterol (Cheng, Graziani, and Diamond, 2005). These components can lead to high blood cholesterol, which is a factor in cardiovascular disease. This disease is the leading cause of death among Americans (Cheng et al., 2005). For this reason, it is important to explore ways to lower the saturated fat and cholesterol content in the typical American diet (Bandini et al., 1999). It is anticipated people around the world will choose snacks that are made with all natural ingredients and low in sugar, salt, fat and calories (Manzel et al., 2014). Therefore, it seems reasonable to develop products that people enjoy, substituting ingredients that are healthier but also maintain similar taste, texture, appearance, and flavor as the traditional version.

PURPOSE

The purpose of this study is to decrease the saturated fat content of a tea cookie substituting butter using almond, avocado, and olive oil butters while maintaining similar sensory quality characteristics and costs when compared to the control tea cookie prepared with butter.

RESEARCH OBJECTIVES

- Decrease the saturated fat content of a traditional tea cookies prepared with butter by replacing it with healthy fat alternatives (almond, avocado, & olive oil butters).
- Assess the acceptability for selected sensory qualities of the recipes prepared with the fat alternatives.
- Compare the cost per serving and the cost per recipe of the recipes prepared with healthier fats.

METHODS

A sensory panel made up of fellow classmates ranging in age of 18-22 were used to assess selected sensory qualities that included appearance, texture, flavor and overall acceptability of the four samples presented for each lab. For four-weeks, the panelists rated each sample using a scale that ranged from one to five with one representing very undesirable to five representing very desirable. Panelists were seated in a room free from distractions and were presented a plate divided into four quadrants with one 2" X 2" cookie representing each recipe variation. Panelists were given verbal instruction on how to proceed with taste-testing and how to use the scorecard to record their assessment of each recipe variation. The panelist also had an opportunity to provide written comments. Recipes were adjusted following each lab experiment to address challenges and issues with the tea cookies as reflected by the panelists scores and comments. The scorecard data was calculated using means. The nutritional content of each final recipe was determined using Esha Food Processor software and cost per recipe and per serving were calculated using sales receipts and the ingredient.



RESULTS

Table 1

Average Sensory Analysis Scorecard Results

Variation	Appearance	Texture	Flavor	Overall Acceptability
Control	4.16	4.03	3.93	3.88
Olive Oil	3.79	3.67	3.75	3.33
Avocado	4.08	3.67	4.13	3.75
Almond Oil	3.75	3.75	4.33	4.25

Note: Appearance 1=dull; 2= flat; 3=crumbly; 4=crisp; 5=golden; Texture 1=pasty; 2=brittle; 3=dry; 4=crispy/dense; 5=tender; Flavor 1=undercooked; 2=bland; 3=salty; 4=fatty; 5=savory/sweet; Acceptability 1=dislike very much; 2=dislike/slightly; 3=n/a; 4=like slightly; 5=like very much

Table #2

Cost Analysis of Control Recipe, Almond Oil Butter, Olive Oil Butter, Avocado Oil Butter

Variation	Cost Per Serving	Cost Per Recipe
Salted Butter	\$0.75	\$2.49
Almond Oil Butter	\$0.75	\$2.49
Olive Oil Butter	\$0.75	\$2.49
Avocado Oil Butter	\$0.75	\$2.49

Cost analysis was calculated using Super One Grocery. Recipe yields 18.

Table #3

Nutrient Analysis of Cookies Prepared with Butter, Almond Oil Butter, Olive Oil Butter, and Avocado Butter

Variation	Calories (kcal)	Total Fat (g)	Saturated Fat (g)	Cholesterol (mg)	Sodium (mg)	Calcium (mg)
Salted Butter	139.7	6.5	3.9	26.7	198	50
Almond Oil Butter	139.5	6.3	2.2	10.8	206	40
Olive Oil Butter	139.5	6.3	2.2	10.8	206	40
Avocado Oil Butter	139.5	6.3	2.8	10.8	208.7	40

Nutrition analysis was calculated using Cronometer. Analysis yields 1 serving - 33 g.



RESULTS

The tea cookie prepared with almond oil butter had the highest overall acceptability score of 4.25 followed by the control with a score of 3.88, avocado of 3.75 and the olive oil butter of 3.33. The saturated fat content of the tea cookies were successfully reduced, as the olive, avocado, and almond variations had less saturated fat than the control (2.2 g, 2.8 g, 2.2 g, and 3.9 g, respectively). In addition, the cholesterol content of the tea cookies was also reduced from 26.7 mg (control) of cholesterol to 10.8 mg for all variations. There was no difference in cost across the recipes (\$0.75/serving; \$2.49/recipe).

CONCLUSION

The data from this study brought to the light that altering the lipid profile of tea cookies by using four different butters makes little to no difference in texture, appearance, flavor, and overall acceptability. There was no difference in cost across the four different variations, as the plant butters were the same cost as butter. As for nutrient composition, the olive oil butter had less calories, saturated fat, and sodium than the other three butters. The three plant butters had less saturated fat than the regular butter as well. However, given the small sample size, additional taste-testing is warranted as well as assessing shelf-life stability.