

Consumer Acceptability of Kidney Beans Cookies

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Abstract: - Cookies are much-liked desserts and snacks. It is easy to make and cheap by standards. Its ingredients are easily available. Standard cookies are made from wheat flour, butter, sugar, and eggs. Variations to the cookies are influenced by the amount of the main ingredients, the temperature, duration of baking, and the type of additives. The purpose of this study is to find out the acceptability of kidney beans cookies when used as an additive to the wheat flour base of the cookie recipe. The study made use of the mix-method using the quasi-experimental and the taste test survey questionnaire to determine the acceptability of the kidney bean cookies. The participants of the study were the 60 senior Bachelor of Science in Hotel and Restaurant Management students of a University purposively chosen. Results showed that the kidney bean cookies were acceptable to the participants. Therefore it was concluded that kidney beans could be a very good add-on to the main ingredients of the common cookie recipe. Recommendations were directed on the sweetness, reduction of the chocolate additive and to conduct taste tests on a larger number of participants, and testing on the different amounts of the kidney beans to find out the best amount for the recipe.

Keywords:- Cookies, Kidney Beans, Main Ingredients, Acceptability, Taste Test.

I. INTRODUCTION

Cookies are different miniature sweet cakes, which can be flat or slightly raised. Its invention started with the discovery of sugar cane in Persia and was introduced in Britain and the New World – the United States. The term cookie is a Dutch word ‘koekje’ meaning cake, while in Scotland, the name cookie means ‘small, plain bun’ (Encyclopedia Britannica, 2021).

The main ingredients of cookies are flour, butter, sugar, milk, and eggs. Variations in the proportions of the ingredients, as well as the addition of other foodstuffs such as nuts, chocolates, raisins, oatmeal, and other things, result in many variations of the cookie. Usually, wheat flour is the base material for the cookie. It binds the other ingredients together and is responsible for the overall cake texture. Other types of flour could substitute for wheat flour which can again create variations of the original recipe.

Butter is the fat ingredient of the cookie. However, margarine can also be used. The fat content of the cookie is responsible for emulsifying all the ingredients together to produce crispiness. The amount of fat (either butter or margarine) gives the flavor, softness, and delicious aroma. Butter and margarine can be used separately or combined together to produce a distinct softness and durability (shelf life).

The role of the eggs in the mixture is to produce structure and robustness and also as natural emulsifiers. The yolk and the white of the egg have different functions: the yolk binds the dough, adds flavor, and is responsible for the crispiness. The egg white makes the cookie drier in texture and more of a cake. The number of eggs to be used sometimes is a trial and error thing because too many would make the cookie brittle and very soft.

The function of milk is for additional nutritional value, aroma, flavor, texture, and color. The milk to be used is the powder form. The milk powder can be either skimmed milk or full cream. This ingredient can be omitted for people who are lactose intolerant.

Sugar is the sweetener. This is the main function of the sugar; however, the sugar helps the dough to be tender and crumbly, it makes the dough expands and gives bulk, and adds color to the cookie –gold or amber as well as adds aroma. According to Cookie-elf (2021), there are four (4) types of sugar that are commonly used in baking cookies: granulated sugar, brown sugar, powdered sugar, and raw sugar. Granulated sugar is the table sugar, colored white, and most homes use them. Brown sugar is deeper in color because of the molasses content. It can be dark brown or light brown, depending on the molasses content. Regardless of the type of brown sugar, the function is the same. Powdered sugar, on the other hand, is well-known as the confectioner’s sugar. It is a granulated sugar made into a very fine powder and combined with 3% cornstarch which prevents adhesions of the crushed sugar. The higher the amount of cornstarch content of the powdered sugar changes the cookie texture and taste.

Raw sugar is the most recommended type of sugar for cookies because it produces the type of cookies that everyone knows and expects to be. Raw sugar has three types, depending on the desired type of cookie: Demerara sugar (coarse textured), Turbinado sugar (fine-textured), and Barbados sugar (steamed cleaned sugar).

In the making of cookies, the baking process is the most important because it influences the quality of the cookies. There are many recommended temperatures, but chefs agree that the oven must not be too hot or the cookie surface will not be smooth but causes cracking. The variations in the oven temperature are influenced by the duration of baking and the type of cookie outcomes desired. The higher the temperature of the oven and the longer the baking, it produces a cookie with soft to hard and chewy to crumbly. The baking temperatures range from 425 degrees Celsius to as low as 200 degrees Celsius (Sally's Baking Addiction, 2018). Regardless of all these, the quality of the cookies is highly dependent on the proportions of the main ingredients, the temperature of the oven, and the duration of baking (Kulkarni et al., 2018).

A. Background of the Study

Flour is the main ingredient in the baking of cookies. Commonly used flour for cookie making is the all-purpose wheat flour known for its nutritional value and health benefits. Flour is responsible for the overall structure of the cookie or baked product. Since wheat flour is rich in gluten, other sources/types of flour can be used as a substitute for gluten-free cookies such as rice, potato, peas, tapioca, or xanthan gum (Gray, 2017). Most wheat flour substitutes for vegan recipes make use of chickpea flour and soybeans (Camilla, 2018). There are many other non-wheat flours available in the market for gluten-free recipes (Duyff, 2012).

This study explored kidney beans as a source of flour to be the base ingredient of cookies. Kidney beans have higher protein content than wheat flour and are gluten-free. Comparing it to wheat flour which contains 70% carbohydrates, kidney beans contain only 22.8 grams per 100grams of boiled kidney beans (Purohit, 2014). In this regard, the researcher would like to find out the acceptability of the cookies made from kidney bean flour. Specifically, would like to answer the following questions:

- *What is the level of acceptability of the kidney beans cookies among the participants who tasted the cookies in terms of:*
 - Color and appearance
 - Texture
 - Taste
 - Aroma
- *What are the comments and suggestions of the participants to improve the kidney beans cookies?*

II. METHODOLOGY

A. Research Design.

The researcher made use of a mixed design using the taste testing method, a common method used by the food industry. It makes use of a survey to compare the food understudy to the original one. This method is quantitative in nature and aims to establish if a new recipe or variant recipe is good, bad, comparable, or better than the original (Ghose & Lowengart, 2001). The cookie preparation is quasi-experimental in nature because of the addition of the kidney bean powder to the original recipe of the common cookie.

B. Study Site and Participants.

The study was conducted in a University in the northern Philippines among its senior BSHRM students using total purposive enumeration. There were 60 senior student participants. The profile is shown in the table below:

Characteristics	Category	Frequency (n=60)	Percent
Age	17-20	35	58.33
	21-24	25	41.66
Gender	Male	28	46.66
	Female	32	53.33
Civil status	Single	53	88.33
	Married	7	11.66

Table 1. Demographic Profile of the Participants

C. Materials and Procedures.

There are two stages of the study. The first stage is the preparation of the kidney beans cookies, and the second stage is the taste test. The first stage was conducted in the following:

➤ *Baking of the cookies using the following ingredients:*

- 1 ¾ kidney beans, ground
- 2 eggs
- ½ cup granulated sugar
- ½ cup brown sugar
- 1 teaspoon vanilla
- ½ cup butter, very soft or melted
- ¾ all-purpose flour
- 1 teaspoon salt
- 1 teaspoon baking soda
- 1 cup dark chocolate

➤ *Baking process:*

Preheating the oven at 350 degrees Celsius. In a food processor, mix the grounded beans and eggs and puree until with even consistency, then add the brown and granulated sugars and mix well. Transferred the mixture to a stand-up mixer, then add butter and mix for 2 minutes. Let stand. In a separate bowl, mix the all-purpose flour, salt, baking soda, and the mixture of kidney beans until fully combined. Using a small scoop, cover the baking pan with cookie-covered butter before putting a small dollop of the batter in cookies and bake for 15 minutes.

The second stage is the taste test survey for the acceptability of the cookie variant. Tasting of the kidney beans cookies will be done by the 60 senior BSHRM students and answering the survey questionnaire. The survey questionnaire is composed of 5 areas: appearance, color, texture, taste, and aroma. The acceptability of the kidney beans cookies through the survey was analyzed using a 4-point scale below:

Scale	Numerical Range	Interpretation
4	3.25-4.00	Acceptable
3	2.50-3.24	Somewhat acceptable
2	1.75-2.49	Somewhat unacceptable
1	1.00-1.74	Unacceptable

Table 2

D. Ethical Consideration.

The study was conducted upon the approval of the University administration. Respondents were informed of the procedures of the conduct of the study, and voluntary participation was sought prior to the taste tests and survey questionnaire. The confidentiality of the responses was strictly observed.

III. RESULTS

The following are the findings of the study:

Items	M	SD	Interpretation
Glossy in appearance from butter	3.08	0.59	Somewhat acceptable
Fits in the size of the palm of the hand	3.27	0.52	Acceptable
Variation in shape and modulation of the surface of the cookie	3.38	0.52	Acceptable
Work of art – excellent proportions, distributions, and color	3.07	0.48	Somewhat acceptable
Overall Mean	3.2		Somewhat acceptable

Table 2. Acceptability of the Kidney Beans Cookies in Terms of Color and Appearance

The color and appearance of the cookies were somewhat acceptable to the participants who tasted the kidney bean cookies but were acceptable in size and shape variations.

Items	M	SD	Interpretation
Crunchy exterior surface	3.17	0.62	Somewhat acceptable
Chewy on the inside	3.34	0.56	Acceptable
Crumbly and brittle	3.07	0.48	Somewhat acceptable
Overall Mean	3.19		Somewhat acceptable

Table 3. Acceptability of the Kidney Beans Cookies in Terms of Texture

The texture of the cookies was also somewhat acceptable to the participants. The chewy inside was acceptable to the participants.

Items	M	SD	Interpretation
Taste similar to the original recipe	3.53	0.57	Acceptable
Rich creamy flavor	3.08	0.50	Somewhat acceptable
Chocolate flavor	3.43	0.56	Acceptable
Overall Mean	3.35		Acceptable

Table 4. Acceptability of the Kidney Beans Cookies in Terms of Taste

The taste of the kidney bean cookies was acceptable to the participants; the rich creamy flavor was somewhat acceptable to the taste of the senior BSHRM students.

Item	M	SD	Interpretation
1. Enticing aroma	3.53	0.57	Acceptable
2. Vanilla scent	3.27	0.52	Acceptable
3. Delicious smell	3.38	0.52	Acceptable
Overall Mean	3.39		Acceptable

Table 5. Acceptability of the Kidney Beans Cookies in Terms of Aroma

The aroma of the kidney beans cookies was acceptable because it is enticing, vanilla-scented, and delicious.

Items	M	Interpretation
Appearance and color	3.2	Somewhat acceptable
2. Texture	3.19	Somewhat acceptable
3. Taste	3.35	Acceptable
4. Aroma	3.39	Acceptable
Overall	3.28	Acceptable

Table 6. Summary Table of Acceptability of Kidney Beans Cookies

The kidney beans cookies were acceptable to the participants in terms of taste and texture while somewhat acceptable in color and appearance, and texture. However, there is an overall acceptance of kidney beans cookies.

Comments to improve the kidney beans cookies; participants gave more than two comments:

- The majority of the participants said that the cookies were too sweet (48 participants);
- Most of the tasters said that the chocolate overpowered the taste of the cookies (39 participants);
- The appearance is not so much glossy as the original recipe (29 participants).

IV. DISCUSSION

The original cookie recipe produces a small crumbly sweet confection that is served as dessert (Roth, 2014). There were many variants of the traditional cookies depending on the added ingredients by the person who baked the goodies (BakerPedia, 2018). Expected outcomes are almost always different from the others, even with similar ingredients as influenced by the baking time, the amount of the ingredients, and the additives. Variants produced were either different in size; some are larger than others, some are smaller to tiny bits or bite-size. Variants also differ in sweetness depending on the preferences of consumers. Acceptability of the cookie variety is commonly a result of individual preferences and idiosyncrasies (Simons & Hall, 2017). Overall, the kidney beans cookies were acceptable to the participants in terms of appearance, texture, taste, and aroma.

V. CONCLUSIONS

In view of the findings of the taste tests and survey, the following conclusion was drawn:

- Kidneys beans can be used as flour substitute or extender to the flour base of the cookie recipe without resulting in a different appearance, texture, taste, and aroma;
- Adjustments can be made to suit the preferences of the participants/ or consumers in the future.

RECOMMENDATIONS

The following recommendations were given based on the conclusions drawn:

- Experimenting on the possibility of using kidney beans flour as the cookie base to determine its suitability as structure base of the cookie;
- Proportions of the different main ingredients are determined for a standard kidney beans cookie recipe;
- A larger number of participants for taste tests to be able to generalize the results of acceptability.

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