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# Acceptability of Coffee Bean (*Coffea Arabica*) Cookies among Consumers

**Lea Queen M. Tamayao[1], Lizalee T. Flores[2]**

[1,2]Kalinga National High School

**ABSTRACT:** This study examined the acceptability of coffee bean (coffea Arabica) cookies among consumers at Kalinga National High School, focusing on the texture, taste, aroma and appearance. The research aimed to profile consumers by age and sex, assess the level of acceptability among three coffea Arabica treatments (3 tbsps., 5 tbsps., 7 tbsps.), and determine any significant differences between treatments. Additionally, the study investigated whether there was a significant difference in acceptability based on consumer profiles. Through a descriptive-comparative design and quota sampling method, data was collected from 50 consumers, specifically coffee enthusiasts including teachers and students at Kalinga National High School. Sensory evaluation forms were used to father consumer's ratings for the three coffea Arabica treatments. Statistical tools such as frequency count, F-test, and weighted mean were employed for data analysis. The findings revealed a preference for treatment 1 and 2 since both treatments received the same average of ratings, while treatment 3 has been also liked across their sensory characteristics. Despite variation in ratings, the ANOVA. Results suggested no significant difference between the coffea Arabica treatments.

**KEYWORDS:** acceptability, coffea Arabica, consumers, treatment, significance.

## I. INTRODUCTION

Coffee bean is an agricultural product highly valued in international markets (Lelyana & Cahyono, 2015). A coffee bean is roasted seed of the coffee plant that is used to make coffee beverages (Norihisa & Yukihiro, 2024). Coffea Arabica is one of the most widely grown plant in the world with a perennial shrub that grows up to6 meters tall and produces yellow berries when ripe, the fruit contains around 10 seeds which contains an oily seed inside called a coffee bean (Meharchandani, 2023).

Coffee is one of the most consumed drinks worldwide, and one of the most consumed beverages in the world (Cantele, 20222). In a recent study by Brown & Adams (2020), it was revealed that the global coffee market is experiencing a steady growth rate of 2.5% annually. Furthermore, Garcia et, al. (2019) reported that the consumption of coffee-based products has surged by 15% in the past years, indicating a clear trend towards coffee-infused culinary innovations. These culinary alternations and renovations have become increasingly popular as chefs and food enthusiasts explore new ways to incorporate the rich and complex flavors and coffee into variety of dishes and beverages. For example, coffee rubs, offee-spikes sauces, coffee infused cocktails, coffee infused oils and vinegars and so on which made a unique element being creatively incorporated into culinary creations to enhance flavors and come up to new products.

Research on identifying aromatic-active Compounds in Coffee-Flavored Dairy Beverages conducted by Mahmud et. al, (2022) aimed to evaluate the effects of the fat to coffee ratio on liking nine formulated coffee-flavored dairy beverages and found out that too low coffee concentration is not desirable as too much fat affects aroma release and/or alters the characteristics coffee flavor which negatively affects consumers acceptance.

The acceptance and popularity of coffee bean (Coffea Arabica) products have been rapidly increasing in the culinary world, the acceptability of these unique baked goods among consumers, it is essential to address its sensory experience ad product innovation and variation.

A study on Functional and Technological Potential of Arabica Coffee Oil, evaluated that the use of arabica coffee oil mixture as a natural preservative in food can be considered a promising alternative for the partial replacement of chemical additive in food matrices and in cosmetic formulations allowing the development of innovative products (Lima et, al., 2023). Another study by Gocmen et, al. (2019) found out that Coffee Silver Skins (CSS) supplemented cookie had a strongly positive effects on extractable, hydrosylable, and total phenolic compound. Moreover, CSS is an excellent by product from the coffee processing industry and it could be utilized for the preparation of healthier, more nutritious and more functional cookies and other bakery products as a source of phenolic compounds, antioxidants and a natural coloring agent.

According to the study of Johnson (2018) on the Impacts of Coffea Arabica on Culinary Creation aimed to explore the various ways in which coffea arabica influences culinary creation and the overall gastronomic experience and identified that the unique

flavor profiles and aromatic properties of Coffea Arabica enhances the taste and appeal of dishes. In the study conducted by Lee (2019) on Sensory Evaluation of Coffee-Infused Baked Goods intended to assess the sensory attributes of coffee-infused baked goods and their impacts on consumer preference and revealed that coffee-infused baked goods were well- received y the consumers, with the aroma and flavor of coffee being key factor in their enjoyment. Study on Consumers Preferences for Novel-Coffee Based Products aims to understand consumer's preference and acceptance of innovative coffee-based products in the market revealed consumer interest in novel coffee product offerings and the factors driving their purchasing decision (Wang, 2017)

Research conducted on Health Benefits of Incorporating Coffea Arabica into Snacks aimed to investigate the potential health benefits associated with incorporating coffea arabica into snack products and found out that coffee arabica may offer antioxidant properties and certain health-promoting compounds when used in snacks (Robinson, 2020). A study by Hernandez (2018) on Market Trends in Coffee-Flavored Desserts aimed to analyze the market trends and consumer demand for coffee-flavored desserts wherein it identified popular coffee dessert variations, consumer demand patterns, and emerging trends shaping the coffee dessert market. Research on the Role of Coffea Arabica in the Food Industry conducted by Gomez (2016) explored the diverse application of coffea arabica in various food products and its contribution to flavor profiles. Consumer interest in novel coffee-based snacks has been steadily increasing, showcasing a potential market demand for coffee bean cookies (Nguyen, 2020).

Aromas and flavor of coffea arabica have been shown to create emotional connections and enhance the overall experience of coffee-based desserts (Perez, 2018). However, despite the wealth of literature on coffee-based products and consumers preferences, there remains an aperture in the specific exploration of the acceptability of coffea arabica cookies. The existing research has primarily focussed on beverages and traditional coffee deserts, leaving a significant void in understanding the potential of coffee bean cookies as a culinary innovation.

This study aimed to evaluate the acceptability of coffee bean cookies among consumers and assessed consumer perception and preference regarding coffee-infused baked goods.

Coffee culture and nostalgia play a significant role in consumer acceptance and enjoyment of coffee-infused treats (Kim, 2016). The significance of this study lies in its contribution to the understanding of consumer preferences towards coffee bean cookies and the culinary application of coffea arabica in snack formulation by focusing on the acceptability of coffea arabica cookies, this study seeked to provide valuable insights for product development, and industry in the realm of coffee- based culinary creations.

Generally, this study aimed to use coffee bean specially coffea arabica in making cookies and to evaluate its sensory acceptability among consumers. Specifically, it aimed to answer the following questions:

1) What is the profile of consumers in term of age and sex?
2) What is the level of acceptability of the coffee bean cookies on the following treatments? As to taste, texture, aroma and appearance.
   a) 3 tbsps. of coffea Arabica mixture in cookies
   b) 5 tbsps. of coffea Arabica mixture in cookies
   c) 7 tbsps. of coffea Arabica mixture in cookies
3) Is there a significant difference on the level of acceptability as to taste, texture, aroma, and appearance among the coffee bean cookies with 3 tbsps., 5 tbsps., and 7 tbsps., of coffea arabica mixture?
4) Is there a significance difference on the level of acceptability of the coffee bean (coffea Arabica) cookies among the respondents who grouped according to their profile?

## II. METHODOLOGY

This chapter of this study present the research methodologies that were employed in the conduct of the study. It includes the research design, local and population of the study, data gathering instrument, data gathering procedure, treatment of data and data analysis in order to rearrange the gathered data.

***Research Design***

This study utilized descriptive-comparative research design. A comparative descriptive design is used to evaluate any differences between and among the variables being studied (Cantrell, 2011).The descriptive comparative design is chosen for this study as it allows a detailed analysis of sensory attributes and preferences. This design enables researchers to compare the different characteristics, such as texture, taste, aroma and appearance between 3 treatments used in making coffee bean cookies. The respondents were coffee enthusiasts. There were 50 consumers, specifically coffee enthusiasts who tasted and evaluated the coffee bean cookies at the same time.

***Locale and Population of the Study***

This study was conducted at Kalinga National High School using the quota sampling method. Quota sampling is the method of selecting a sample, in which the sample is selected based on specific characteristics with equal chance of being consumers who will taste and evaluate the coffee bean cookies at the same time (Hassan, 2024)

***Data Gathering Instrument***

The researchers gathered data and information through the use of a sensory evaluation form/questionnaire for the participants to evaluate their experience on the sensory characteristics such as taste, aroma, Texture, and appearance. These are the following materials and ingredients needed in making the Coffee Bean Cookies.

***Data Gathering Procedure***

In gathering the data, the researchers first baked the sample product for the consumers at Kalinga National High School. The researchers baked 3 bunches of cookies with 3 different amounts (3 tbsps., 5 tbsps., 7 tbsps.) Of coffee bean (coffea arabica) incorporated to the cookies to test which among the coffee bean addition is best and acceptable for the final product. After baking, the researchers let at least 50 participants to taste the 3 different treatments of coffee bean (coffea arabica) cookies and let them choose which is better and acceptable according to taste, aroma, texture, and appearance.

After the making of cookies, the researchers distributed the sensory evaluation form to be answered by the consumers after they taste the coffee bean cookies. The researchers collected and tallied the results of the study.

***Treatment of Data***

To determine which amount (3 tbsps., 5tbsps., 7tbsps.) Of coffee bean is suitable in making coffee bean cookies, the evaluation form below was used:

| Treatment 1 | Treatment 2 | Treatment 3 |
|---|---|---|
| -3 tbsps. Coffee Bean | - 5 tbsps. coffee bean | -7 tbsps. coffee bean |
| - 3 tbsps. hot water | -5 tbsps. hot water | - 7 tbsps. Hot water |
| - 1 cup flour. | - 1 cup flour | -1 cup flour |
| - 1/3 cup butter. | - 1/3 cup butter | - 1/3 cup butter |
| - 1/4 cup sugar | - 1/4 cup sugar | - 1/4 cup sugar |
| - 1 tbsp baking powder | - 1 tbsp baking powder | - 1 tbsp baking powder |

***Data Analysis***

To get a valid and reliable results in this study, the researchers used the following statistical tools:

1. Frequency Count was used to gather the numbers of ratings of which of the following three test were more preferred by the consumers.
2. Weighted mean was used to identify which among the 3 tests are most prefer by the consumers using the rating scale.
3. F- test was used to compute the significant difference on the level of acceptability between 3 tbsps., 5 tbsps., 7 tbsps. of coffea arabica mixture in making coffee bean cookies in terms taste, texture, aroma and appearance

## III.RESULTS AND DISCUSSION

This chapter presents the results, discussion, and the personal insight that the researchers have gathered of a study on the acceptability of coffee bean (cofffea arabica) cookies.

**Table I: Age and Sex**

| ***AGE*** | ***FREQUENCY*** | ***PERCENTAGE*** |
|---|---|---|
| 12 yrs. old below | 2 | 4% |
| 13-17 yrs. old | 24 | 44% |
| 18-22 yrs. old | 14 | 28% |
| 23-27 yrs. old | 1 | 2% |
| 28 yrs. old above | 11 | 22% |
| **Total** | **50** | **100%** |
| **SEX** | | |
| Male | 30 | 60% |
| Female | 20 | 40% |
| **Total** | **50** | **100%** |

Profile of the respondents when they are grouped according to age and sex. The survey shows that there are more males (60%) than females (40%) who responded. Most of the people who answered are between 13 and 17 years old (44%).

**Table II: Level of Acceptability**

| *LEVEL OF ACCEPTABILITY* | *MEAN* | *DESCRIPTION* |
|---|---|---|
| Treatment I<br>(3 tbsps. of coffea arabica mixture) | 3.25 | LIKED |
| Treatment II<br>(5 tbsps. of coffea arabica mixture) | 3.25 | LIKED |
| Treatment III<br>(7 tbsps. of coffea arabica mixture) | 2.98 | LIKED |

Based on the data provided, it appears that Treatment I and II, which involves the use of 3 tbsps. and 5 tbsps. of coffea arabica mixture, both received the highest mean acceptability score of 3.25, indicating that it was generally liked by the respondents. Treatment III, which involves the use of 7 tbsps. of coffea arabica mixture, received a slightly lower mean score of 2.98, suggesting that it was also liked, but to a slightly lesser extent.

**Table III: Treatment 1 (3 tbsps.)**

| *CHARACTERISTIC* | *4* | *3* | *2* | *1* | *MEAN* | *DESCRIPTION* |
|---|---|---|---|---|---|---|
| Texture | 19 | 21 | 10 | 0 | 3.20 | Like |
| Taste | 21 | 23 | 5 | 1 | 3.28 | Extremely Like |
| Aroma | 27 | 16 | 6 | 1 | 3.28 | Extremely Like |
| Appearance | 20 | 24 | 4 | 2 | 3.24 | Like |
| **Average Weighted Mean** | | | | | **3.25** | **Like** |

Table 2.1. The table shows that the 3 tablespoon coffea arabica mixture treatment received a good score for all sensory aspects. The texture got 3.20, taste and aroma got 3.28, and appearance is 3.24. Overall, the Treatment I (3 tbsps. Coffea arabica mixture) was generally LIKED by the consumers.

**Table IV: Treatment 2 (5 tbsps.)**

| *CHARACTERISTIC* | *4* | *3* | *2* | *1* | *MEAN* | *DESCRIPTION* |
|---|---|---|---|---|---|---|
| Texture | 17 | 22 | 10 | 1 | 3.10 | Like |
| Taste | 21 | 24 | 5 | 0 | 3.30 | Extremely Like |
| Aroma | 23 | 21 | 5 | 1 | 3.32 | Extremely Like |
| Appearance | 21 | 24 | 3 | 1 | 3.28 | Extremely Like |
| **Average Weighted Mean** | | | | | **3.25** | **Like** |

Table 2.2. The table shows that consumers also like the addition of 5 tbsps. of *coffea arabica* mixture in cookies in terms of texture, taste, aroma, appearance. Texture got a rating of 3.10, Taste got 3.30, Aroma got 3.32, and Appearance got 3.28. Generally, the Treatment II was also liked by the consumers.

**Table V: Treatment 3 (7 tbsps.)**

| *CHARACTERISTIC* | *4* | *3* | *2* | *1* | *MEAN* | *DESCRIPTION* |
|---|---|---|---|---|---|---|
| Texture | 15 | 19 | 14 | 2 | 2.29 | Dislike |
| Taste | 20 | 21 | 7 | 2 | 3.18 | Like |
| Aroma | 21 | 20 | 8 | 1 | 3.22 | Like |
| Appearance | 23 | 19 | 6 | 2 | 3.26 | Extremely Like |
| **Average Weighted Mean** | | | | | **2.98** | **Like** |

Table 2.3. In this table, the texture received a rating of 2.29, taste got 3.38, aroma got 3.22, and appearance 3.26. Overall, the cookies with 7 tbsps. of coffea arabica mixture was liked by the consumers in terms of texture, taste aroma and appearance, however, the texture was slightly lower.

***Table VI: ANOVA TABLE on the LEVEL of ACCEPTABILITY***

ANOVA Table on the significant difference on the level of acceptability between 3 tbsps., 5 tbsps., 7 tbsps. Of coffee bean in making coffee bean cookies in terms taste, texture, aroma and appearance.

| *Source of Variation* | *SS* | *df* | *MS* | *F.cal* | *P-value* |
|---|---|---|---|---|---|
| Between Groups | 0.23 | 4 | 0.06 | 0.15 | 0.96 |
| Within Groups | 17.27476 | 45 | 0.39 | | |

| | | | | | |
|---|---|---|---|---|---|
| Total | 17.5 | 49 | | | |

***Table VII: ANOVA TABLE on the DIFFERENCE BETWEEN GROUPS***

*`The ANOVA results that there is no significant difference between the groups.*

| ***Source of Variation*** | ***SS*** | ***df*** | ***MS*** | ***F.cal*** | ***P-value*** |
|---|---|---|---|---|---|
| Between Groups | 2.55 | 4 | 0.63 | 1.60 | 0.21 |
| Within Groups | 8.36 | 21 | 0.40 | | |
| Total | 10.90615385 | 25 | | | |

## IV. CONCLUSION AND RECOMMENDATIONS

***Conclusion***

1. The majority of respondents were males aged 13-17 years old. This demographic information provides insight into the 1preferences of the target population.
2. Treatment I (3 tbsps.) and Treatment II (5 tbsps.) was both generally liked by the consumers
3. Treatment III (7 tbsps.) was also liked by the consumers in terms of texture, taste aroma and appearance, however, the texture was slightly lower.
4. The ANOVA results indicated that there was no significant difference on the level of acceptability between 3 tbsps., 5 tbsps., 7 tbsps. Of coffee bean in making coffee bean cookies in terms taste, texture, aroma and appearance. Suggesting that all three treatments was acceptable by the consumers.

***Recommendations***

Taking into consideration of the findings of the study and the positive feedbacks from consumers:

1. With the favorable reception of coffee bean (coffea Arabica) cookies among consumers, there's potential to market it as a snack for coffee enthusiasts, particularly for those who ages 13-17 years old .
2. Given the positive feedback from consumers, it is recommended to further develop the coffee bean (coffea Arabica) cookies using the preferred treatment methods, particularly those using 3 tbsps. and 5 tbsps. of coffee bean (coffea Arabica) mixture in making coffee bean cookies overall acceptability.
3. Treatment III (7 tbsps.) ingredients can be adjusted to attain the desired texture of the coffee bean (coffea Arabica) cookies.
4. Promote the coffee bean (coffea Arabica) cookies or any coffea Arabica products by learning and exploring its culinary potentials.

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