International Journal of Women in Technical Education and Employment
ISSN: 2811-1567. Volume 5 – Issue 1. July 2024
https://fpiwitedjournal.federalpolyilaro.edu.ng

Sensory of Standardized Cookie Recipe using Healthy Alternatives

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Abstract

This study examined the organoleptic attributes of standardized cookies using healthy alternative recipes. The composite flour was prepared and formulated in the ratio (A) 100% Oat, (B) 50% Oat – 50% Flour, (C) 75% Oat – 25% Flour and (D) the use of healthy alternatives was prepared as control. Functional properties of the composite flour were determined and the quality of cookies produced were evaluated for appearance, colour, softness, taste, Aroma, flavor, crispness and overall acceptability. Analysis of variances was employed in to determine the significant differences in treatment means and least significant analysis ($p < 0.05$) to separate means. The result of sensory evaluation shows that taste has the highest value of 2.33±1.02a in sample D, mouth feel has the highest value of 2.22±0.67a in sample C, umami has the highest value of 2.11±0.77a in sample A, while attractiveness has the highest value of 2.22±0.67a in sample B. The preference of the flour mixed cookies could be due to the product is new and give sweet taste to consumers than normal all-purpose flour cookies. Generally,the result is an indication that Sample D has better taste than other samples with the least sample being Sample C. The result also indicates that there is no significant difference between the samples when it comes to appearance, colour, softness, taste, Aroma, flavor, crispness and overall acceptability.

ARTICLE HISTORY
Received: April 23, 2024
Revised: May 5, 2024
Accepted: May 26, 2024

Keywords: Alternative recipes, gastronomy, food development, food trail, standardized cookies

Citation
Daniel E.O & Sokale A.I. (2024). Sensory of Standardized Cookie Recipe using Healthy Alternatives. *International Journal of Women in Technical Education and Employment*, 5(1), 1 – 8.

Introduction

A cookie is a small, flat, sweet snack or dessert that is baked or cooked. Typically, it has egg, flour, sugar, and some sort of fat, oil, or butter. Other ingredients like chocolate chips, almond, raisin, and oat might be included (Ettman, 2017). Due to their low production losses, increased convenience, long shelf life, and capacity to carry essential nutrients, biscuits have grown to be one of the most popular snacks among both young and old (Akubor, 2013; Honda & Jood, 2015). Among baked food products worldwide, cookies are the largest snack category (Pratima & Yadava, 2015).

Cookies have the following benefits: they are convenient, palatable, compact, and full of nutrients (Vijaykumar et al., 2013). Enhancing the nutritional value and, thus, health benefits of existing foods is a straightforward and useful way to use such additives. Standard foods, enriched or fortified foods, and dietary supplements are a few examples (Handa et al., 2012). A variety of ingredients, including sugars, spices, chocolate, butter, peanut butter, nuts, and dried fruit, are used to make cookies in different forms. The length of baking time can have an impact on how soft the cookies are. They are inexpensive, delicious, low in cholesterol, and simple to transport. Because they are ready to eat, widely consumed, have a relatively long shelf life, and

have good eating quality, cookies have been suggested as a better use of composite flour than bread (Okpala & Chinyelu, 2017).

A composition with a high sugar and fat content and a low water content is what defines biscuits. They have a low moisture content, which keeps them comparatively free from microbial deterioration and gives them a long shelf life, setting them apart from other baked goods like bread and cakes (Hanan, 2013).Biscuits' primary ingredients are water, sugar, wheat flour, and fat (margarine). Additional ingredients that may be added include milk, salt, emulsifiers, aerating agents, flavorings, and coloring. In order to satisfy the unique dietary or medicinal requirements of customers, they can also be enhanced or fortified with additional ingredients (Ajibola et al., 2015). However, the flours used in the production of many bakery products are bleached (or refined) flours, which some researchers call a "slow poison" (Erleen, 2013) due to their adverse health effects with long-term consumption. Some call them "gut glue" (Erleen, 2013) and discourage people from eating them or limit their intake of foods prepared from these flours because of the associated health risk (Erleen, 2013). But the flours used to make a lot of bakery goods are bleached (or refined) flours, which some researchers refer to as a "slow poison" (Erleen, 2013) because they have negative long-term health effects.

There is wide range of nourishing natural alternative recipes that provide exceptional substitutes for current ones; nevertheless, many of these recipes lack uniformity, especially in the context of baking cookies. It is necessary to standardize the recipe used because, when many cookies are made, the ingredients are frequently not combined in the exact amount needed for preparation. These cookie recipes can be prepared globally with consistent results if they are standardized. To substitute unwholesome ingredients for natural ones, standardize the finished product of the recipe, and lessen the quantity of unhealthy ingredients used, this study attempts to pair the ingredients used in cookies production with their healthier counterparts (stevia, olive oil, oatmeal, natural fruits, and cashews).

Materials and Method

The sample preparation was done in the kitchen of Hospitality Management Technology, the Federal Polytechnic, Ilaro. Data was gotten from a Twenty five-man panel consisting of staff of the Federal Polytechnic, Ilaro, who sampled the modified product and compared it with samples prepared using traditional recipe.

Sample size and technique

The Taro Yamani formula was used to calculate the sample size for this investigation. Thus, the following formula is provided:

n = N 1+N(e)2

Where

n = Sample size

N = final population

1 = constant

e = correction factor error

Therefore:

n = 25

1+25(0.05)2

n = 1+25 (0.0025)

n = 25

1+ 0.063

1.063

n = 23

Sourcing of Materials

Oat, egg, baking soda, coconut milk, stevia, cinnamon, olive oil, and natural dried fruits are among the ingredients used. These ingredients were sourced from JustRite supermarket.

Equipment

An oven, baking pan, mixing bowl, whisk, sieve, measuring cup, napkins, brush, measuring cup, cooling racks, cookie scoop and kitchen scale are the equipment used for the study.

Method of Preparation

The creaming method was used to make cookies in accordance with various recipes.

100% rolled oats

- 240 grams of oatmeal
- ½ teaspoon of stevia,
- 1/3 cup of olive oil
- one egg
- One tablespoon coconut milk
- one tsp cinnamon
- one tsp salt
- one tsp baking soda
- one tsp vanilla essence
- one tsp cashew nut
- dried raisins

50% flour and 50% oats

- 185 grams of flour
- 120 grams of oat flakes
- Stevia: ½ teaspoon
- 1/3 cup of olive oil
- One tablespoon of coconut milk
- One teaspoon baking soda
- ¼ tsp cinnamon
- One egg
- Dried raisin;
- ½ tspsalt;
- 1 tsp. vanilla essence
- cashew nut

25% flour - 75% oats

- 95 g of flour
- 180 g of oat flakes
- 1/3 cup olive oil
- ½ tsp stevia
- One tablespoon of coconut milk
- One teaspoon baking soda
- ¼ tsp cinnamon
- One egg
- 1 tsp of cashew nut
- ½ tsp of vanilla essence
- Salt
- Dried raisins

Cookies Control

- Grains: 370 g
- 120 grams of butter
- 300 grams of sugar
- One teaspoon baking soda and ¼ tsp cinnamon
- Two pieces of eggs
- 2 teaspoons of vanilla essence and ½ teaspoon salt
- Dried raisins

In the preparation process, baking powder was mixed with flour, followed by the addition of cinnamon to the flour mixture. Subsequently, olive oil and stevia were whisked together in a large bowl until they achieved a pale consistency. After beating the eggs, coconut milk, raisins, and the stevia mixture were sequentially added. The resulting liquid mixture was then combined with the flour mixture, resulting in sticky and wet dough.

The dough was rolled out and cut into the desired shape using a rolling pin. It was then placed on a rack positioned in the middle of a preheated oven set to 350°F and baked for 15 minutes. After cooling for two minutes on a wire rack with the cookie sheet, the cookies were transferred to another wire rack for sorting.

Research Tool

A sensory evaluation score sheet provided to the taste panel served as the research instrument for this project. A taste panel evaluated some of the sensory qualities of cookies made with a healthy recipe using a nine-point descending hedonic scale. Taste, appearance, flavor, color, crispness, softness, and general acceptability are examples of attributes.

Data analysis technique

With the use of the Statistical Package for Social Science (SPSS) version 20, one-way ANOVA was used to analyze the collected data. The least significant difference (LSD) analysis and analysis of variance will be used to identify any significant differences in treatment means.

To separate means, use ($P < 0.05$).

Results and Discussion

Table 1: Sensory analysis table

Sample	Taste	Mouth feel	Umami	Attractiveness
A	2.22±0.73a	1.97±1.03a	2.11±0.77a	1.93±0.58
B	2.02±0.69ab	1.91±0.73a	1.00±0.00b	2.22±0.67
C	1.84±1.84b	2.22±0.67a	2.00±0.37a	2.04±0.93
D	2.33±1.02a	1.57±0.54b	1.95±0.71a	2.11±0.71
Pr > F	<0.0235	<0.0014	< 0.0001	0.3031

Table 1 displays the findings of the proximate analysis, along with the participants' reactions to the taste. Sample A's average taste is 2.22±0.73, sample B's is 2.02±0.69, sample C's is 1.84±1.8, and sample D's is 2.33±1.02. The outcome indicates that sample D has a better taste than the other samples, with sample C having the smallest sample. Comparably, sample D recorded the lowest mean response of 1.57±0.54 in terms of mouthfeel, while sample C had the highest mean response of 2.22±0.67. In reference to Umami, sample A records the highest mean response, 2.11±0.77, while sample B records the lowest mean response, 1.00±0.00.Furthermore, in terms of sample attractiveness, sample B has the highest average response (2.22±0.67), while sample A has the lowest average response (1.93±0.58).

The outcome also showed that the samples' tastes differed significantly from one another. Sample C differs from the other samples, but samples A, B, and D do not significantly differ from one another. Furthermore, samples D differ significantly from samples A, B, and C in terms of mouthfeel, despite the fact that samples A, B, and C are similar to one another. The results regarding Umami indicate that only sample B differs significantly from samples A, C, and D.

Lastly, sample B is the most attractive sample compared to the other samples, followed by sample D, but there is no discernible difference between the samples in terms of attractiveness.

Sensory Analysis

Table 4.2: Sensory Analysis Table

Samples	Appearance	Colour	Softness	Taste	Aroma	Flavor	Crispness	Overall acceptability
A	2.17±1.07	2.08±0.97	2.26±1.01	1.95±1.07	2.42±0.84	2.22±0.79	2.06±0.86	1.82±1.13
B	2.13±1.05	2.20±0.89	2.06±0.96	2.06±0.91	2.28±0.92	2.02±0.89	2.17±1.03	1.91±1.06
C	2.04±0.09	2.00±1.08	2.26±0.96	2.02±1.16	2.28±0.96	2.11±0.91	2.17±1.05	1.77±1.18
D	1.95±0.10	1.77±0.90	1.95±0.93	2.00±0.93	2.02±0.89	1.84±1.02	1.93±0.91	1.71±1.03
Pr > F	0.7580	0.2053	0.3310	0.9642	0.2211	0.2474	0.5847	0.8549

The analysis of appearance results indicate that sample A had the highest mean response (2.17±1.07), sample B had the second-highest mean response (2.13±1.05), and sample D had the lowest mean response (1, 95. ±0.10). Furthermore, sample D shows the average color response with a value of 2.20±0.89, while sample A follows with an sample D has the lowest response, with an average of 1.77±0.90, while sample D has the highest average response, 2.08±0.97.

With an average response of 2.26±0.96 regarding sample softness, sample C has the highest average response, followed by sample A with an average response of 2.06±0.96. On the other hand, sample D exhibits the lowest value, with an average response of 1.95±0.93. Likewise, concerning taste, sample B exhibits the highest mean response, measuring 2.06±0.91, while sample A displays the lowest value, measuring 1.95±1.07. With reference to Aroma, sample A exhibits the highest mean response, measuring 2.42±0.84, while sample D displays the lowest mean response, measuring 2.02±0.89.

Furthermore, concerning taste, sample A has the highest mean response (2.22±0.79), sample C is next (2.11±0.91), and sample D has the lowest value (1.84± 1.02). In reference to brittleness, sample B exhibits the highest average response, measuring 2.17±1.03, followed by sample C at 2.17±1.05, and sample D at 1.93±0. 91, which shows the lowest average response. With an average value of 1.91±1.06, sample B has the highest overall acceptability out of all the samples, sample A comes in second with a value of 1.82±1.13, and sample D has the lowest average value at 1.71±1.03.

In conclusion, the results indicate that there are no appreciable differences between the samples in terms of their overall acceptability, appearance, color, softness, taste, crispness, and aroma.

Discussion of Findings

The average taste for sample A is 2.22±0.73, sample B is 2.02±0.69, sample C is 1.84±1.8, and sample D is 2.33±1.02, according to the results of the proximate analysis. The outcome suggests that sample D tastes better than the other samples, with sample C having the smallest taste. In the same way, sample D has the lowest mouthfeel value of 1.57±0.54, while sample C has the highest mean response of 2.22±0.67. Sample A demonstrates that Umami has the highest response, with a mean of 2.11±0.77, while sample B has the lowest value, at 1.00±0.00. Sample A has the lowest mean response (1.93±0.58) and sample B has the highest mean response (2.22±0.67) in terms of attractiveness. The

outcome also showed that the samples' tastes differed significantly from one another. Sample C differs from the other samples, but samples A, B, and D do not significantly differ from one another. Furthermore, samples D have a mouthfeel that is noticeably different from samples A, B, and C, even though samples A, B, and C are similar to one another.

The results indicate that only sample B differs significantly from samples A, C, and D in terms of Umami. The samples are not significantly different in terms of attractiveness, however sample B is the most attractive out of the group, followed by sample D.The analysis of appearance results indicate that sample A had the highest mean response (2.17±1.07), sample B had the second-highest mean response (2.13±1.05), and sample D had the lowest mean response (1, 95. ±0.10). Furthermore, concerning color, sample D records the lowest response with an average of 1.77±0.90, while sample A records the highest average of 2.08±0.97. Sample D also records the lowest average of 2.20±0.89.

With an average response of 2.26±0.96 regarding sample softness, sample C has the highest average response, followed by sample A with an average response of 2.06±0.96. On the other hand, sample D exhibits the lowest value, with an average response of 1.95±0.93. Likewise, concerning taste, sample B exhibits the highest mean response, measuring 2.06±0.91, while sample A displays the lowest value, measuring 1.95±1.07. With reference to Aroma, sample A exhibits the highest mean response, measuring 2.42±0.84, while sample D displays the lowest mean response, measuring 2.02±0.89.In terms of flavor, sample A has the highest mean (2.22±0.79), sample C is next (2.11±0.91), and sample D has the lowest value (1.84±1.02). Regarding brittleness, sample B exhibits the highest average response (2.17±1.03), sample C exhibits the second-highest value (2.17±1.05), and sample D exhibits the lowest value (1.93±0.91). With an average value of 1.91±1.06, sample B has the highest overall acceptability out of all the samples, sample A comes in second with a value of 1.82±1.13, and sample D has the lowest average value at 1.71±1.03.

In conclusion, the results indicate that there are no appreciable differences between the samples in terms of their overall acceptability, appearance, color, softness, taste, crispness, and aroma.

Summary

Using healthier substitutes, this study examined the nutritional and organoleptic properties of a standardized cookie recipe. A baked or cooked snack, biscuits are typically small, flat, and sweet, and they contain eggs, flour, sugar, and fat, oil, or butter of some kind. Although they are frequently eaten, biscuits are low in fiber, vitamins, and minerals and high in calories, fat, and carbs. A 100% oat flour blend, a 50% oat flour blend, a 25% flour blend, and a control consisting of healthy alternatives were all combined to create composite flour. While the alternative methods were assessed for taste, mouth-feel, umami, and attractiveness, the functional properties of the composite flour were identified and the quality of the produced cookies was assessed for taste, appearance, taste, color, crispness, softness, and overall acceptability for sensory properties. The results indicate that there is no discernible difference in the appearance, color, smoothness, taste, crispness, aroma, and overall acceptability between the taste samples A, B, C, and D.

Furthermore, samples D have a mouthfeel that is noticeably different from samples A, B, and C, even though samples A, B, and C are similar to one another.

The findings in Umami indicate that sample B is the only one that differs significantly from samples A, C, and D. The samples' levels of attractiveness are similar, with sample B being the most attractive and sample D being the least.

Conclusion

To sum up, cookies prepared with varying percentages of oats and flour—100%, 50%, and 75%—as well as the control exhibit notably disparate sensory evaluations. Overall acceptability and scores for organoleptic

properties (flavor, taste, color, softness, appearance, aroma, crispness, and so forth) were deemed acceptable. According to a proximate analysis, sample D has the highest taste value (2.33+1.02a), sample C has the highest mouthfeel value (2.22+0.67a), sample A has the highest umami value (2.11+0.77a), and sample B has the highest attractiveness value (2.22+0.67a).The product is new and tastes more like sweat than regular multipurpose flour biscuits, which could be why people prefer flour biscuits. Overall, the results show that sample D tastes better than the other samples, with sample C having the smallest taste.

Recommendations

Food manufacturers should provide cookies that are different from regular cookies in that they are healthier and more nutrient-dense by using other healthy sources of sweetness.

Healthy substitutes for regular cookies that replace essential ingredients offer a nutritious and healthy option for a better diet, so there should be intense awareness of this knowledge.

Cookies made with natural recipe gives our bodies a lot of nutrition. High in fiber, oatmeal cookies help stabilize blood sugar levels after meals and avoid insulin production spikes. Fiber can lower the risk of heart disease because it helps regulate cholesterol levels, so it should be recommended for convalescence and those with health conditions.

Consuming cookies that also include healthy fats, like coconut oil and nut or almond butters, is crucial for maintaining good health because these fat-soluble vitamins include A, D, E, and K.

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