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Development of Pomelo Bar: Basis for Crafting a Demonstration Guide for Bread and Pastry Production

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Abstract

Aim: This study developed a Pomelo bar and crafted a demonstration guide for bread and pastry production.

Methodology: The study utilized a completely randomized design consisting of a control and three formulations. The experimental development of Pomelo bar was evaluated by 50 respondents in its different formulations with three replications. F-test was employed to determine the significant difference of formulations utilizing Duncan's Multiple Range Test. Based on the sensory evaluation results, the most preferred formulation was identified and underwent nutritional analysis for the crafting of nutritional facts. The packaging of the preferred formulation was developed and evaluated by another 50 randomly selected respondents. Finally, the demonstration guide was crafted based on the development of the Pomelo bar and was evaluated to ensure it is appropriate resource material for bread and pastry production.

Results: The varying amount of Pomelo juice in different formulations affects the sensory qualities of pomelo bar in terms of texture, color and overall acceptability. Also, the amount of pomelo juice added in the formulation affects the specific sensory attribute in terms of sweetness. The formulation 2 with 250 grams of pomelo juice was identified as the most preferred formulation. The nutritional analysis results revealed that an individual slice of pomelo bar weighing 18 grams contains 70 calories from 2 grams of total fat, 13 grams of total carbohydrate and 1 gram protein. The most preferred formulation could produce 70 slices of Pomelo bar and can be sold at ₱15.00 per slice. A plastic clamshell is the recommended individual packaging material for the product. The package testing survey revealed that pomelo bar is visually appealing, unique, very high quality and has premium packaging. The crafted demonstration guide from the development of pomelo bar passed the review of evaluators.

Conclusion: The pomelo bar with 250 grams of juice could be a good business venture because of its 30% computed mark-up. Moreover, it is marketable due to its visually appealing packaging. Finally, the product can be shared through a demonstration guide which is a suitable learning resource material for bread and pastry production in senior high school.

Keywords: pomelo bar, sensory evaluation, demonstration guide

INTRODUCTION

The necessity for food innovation using locally available ingredients marks a challenge for educators in creating contextualized instructional material for learners. The Department of Education advocates the utilization of these materials to pique students' interests and facilitate an easy understanding of the lesson.

Students in the Technical Vocational and Livelihood track of the Senior High School master the competencies using hands-on training that involves manipulation of devices, tools, and equipment. According to Hussain (2020), the most effective teaching technique used for these courses is the demonstration method.

The demonstration method of teaching and learning involves performing activities in a systematic way. Moreover, demonstration techniques provide opportunities for students to apply theories to actual practice (Teachmint, 2022). For this method to be successful, a learning tool or demonstration guide that follows logical step-by-step process is needed (Damiani et al., 2021). However, the current curriculum has a limited number of contextualized and comprehensive demonstration guides, which could help students perform and learn competencies independently.

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A comprehensive demonstration guide for bread and pastry production must contain a detailed description of ingredients, method of preparation, product costing, suggested plating presentation, and recommended packaging. In addition, an ideal demonstration guide should feature a common but locally produced ingredient.

Pomelo is widely and locally grown in M'lang, Cotabato. It is the largest citrus fruit known for its pleasant sweet-tasting flesh with no overpowering bitterness and sour punch (Saligumba, 2023). The harvested fruits are usually exported or sold in the local markets. Yet, large quantities of Pomelo which are not of good quality, like undersized, oversized, or have defects in the rind, are wasted.

Citrus fruits are popular because of their tart flavor that balances the sweetness of pastries. Lemons, limes, oranges, and grapefruits are commonly used in making sweets, but only a few uses Pomelo (Resnick, 2022). Meanwhile, a lemon bar is a classic example of pastry that perfectly incorporated citrus flavor. According to Kravchuk (2021), lemon juice in the recipe could be substituted with different citrus juices. Since Pomelo is abundant in the locality, the researcher opted to replace lemon with Pomelo. However, Pomelo has an unusual and distinctive flavor that can either enhance or destroy a pastry product. Therefore, sensory evaluation of pomelo bar is essential to assess consumers' acceptability. With this, the researcher was challenged to develop a Pomelo bar and craft a demonstration guide for senior high school students.

Objectives

This study developed Pomelo bar and crafted a demonstration guide for bread and pastry production. Specifically, it aimed to:

1. determine the sensory qualities of Pomelo bar in terms of:
    1.1. texture;
    1.2. aroma;
    1.3. taste;
    1.4. color; and
    1.5. overall acceptability;
2. find out the specific sensory attribute of Pomelo bar in terms of:
    2.1. sweetness; and
    2.2. sourness;
3. determine if there were significant difference of the different formulations in terms of:
    3.1. sensory qualities; and
    3.2. specific sensory attribute;
4. analyze the nutrient content of the most recommended formulation;
5. evaluate the commercial edge of Pomelo bar in terms of:
    5.1. return on investment; and
    5.2. product packaging; and,
6. craft a demonstration guide from the development of pomelo bar.

METHODS

Research Design

This study utilized the Completely Randomized Design (CRD) consisted of a control and three formulations. The formulations for pomelo bar were based on Natasha Kravchuk (2021) recipe. The pomelo bar is made of shortbread crust with pomelo custard as filling.

The pomelo custard was composed of 12 grams lemon zest, 266 grams whole eggs, 602 grams granulated sugar and 125 grams all-purpose flour. Only the amount of pomelo juice added varies in each formulation.

The formulations are as follows:

- Control – no pomelo juice
- Formulation 1 – 375 grams fresh pomelo juice
- Formulation 2 – 250 grams fresh pomelo juice
- Formulation 3 – 125 grams fresh pomelo juice

The same amount of ingredients was used for short bread crust in all formulation which includes 226 grams unsalted butter, 100 grams sugar, 6 grams vanilla extract, 250 grams all- purpose flour and 2 grams salt.

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Population and Sampling

The respondents of the study were the randomly selected fifty (50) individuals consisting of twenty-five (25) males and twenty-five (25) females aged 20 to 45 years old from M'lang, Cotabato. They were selected to evaluate the sensory qualities and packaging material for Pomelo bar. These respondents were all in good health without sensory illness and non-smokers. Furthermore, the respondents were all linguistically competent for them to accurately rate and describe the sensory quality of the product.

The evaluators for the demonstration guide were composed of three public high school teachers with at least five years relevant experience in teaching bread and pastry production.

Instrument

The study used the 9-point Hedonic Scale to determine the sensory qualities of Pomelo bar (Lawless & Heymann, 2010). The rating scale contains the sensory evaluation parameters as to the taste, texture, aroma, color and overall acceptability of the product. It indicates the extent of respondents' liking or disliking for pomelo bar. All the sensory parameters were evaluated with the descriptive rating of Like Extremely, Like Very Much, Like Moderately, Like Slightly, Neither like nor Dislike, Dislike Slightly, Dislike Moderately, Dislike Very Much and Dislike Extremely with the numerical rating scales of 9, 8,7,6,5,4,3,2 and 1, respectively. Results of the sensory evaluation were then converted using Labeled Affective Magnitude (LAM) scale. The LAM is a line scale anchored from the nine phrases of the traditional hedonic scale (Lawless et al. 2010).

The Just About Right (JAR) scales in Table 4 were used to measure the sweetness and sourness of Pomelo bar. It measures the appropriateness of the level of a specific attribute and is used to determine the optimum levels of attributes in a product (Society of Sensory Professionals, n.d.). The sweetness and sourness of pomelo bar was evaluated using the descriptive rating of Much Too Strong, A Little Too Strong, Just About Right, A little Too Weak, and Much Too Weak with the numerical rating of 5,4,3,2 and 1 respectively.

The chosen packaging material of pomelo bar was evaluated using the Package Testing Survey Tool. It is a standardized tool used in testing package design.

The demonstration guide was evaluated using the evaluation rating sheet for print resources by the Learning Resources Management and Development System of the Department of Education. The rating sheet for the demonstration guide comprises of four factors, namely: content; format; presentation and organization; and accuracy and up-to-datedness of information. If the demonstration guide fails in at least one of the four factors then it will not be recommended for possible use (Guidelines and Process for LRMDS Assessment and Evaluation, 2009).

The Cost and Return Analysis (CRA) of the pomelo bar was determined using the cost of output and amount of input enlisted. Return of investment was calculated using the formula of:

Cash-out- flow - Cash-in-flow = Net Cash Flow

Return of Investment (ROI) = (Net Cash Flow / Cash-out-flow) x 100

Data Collection

The Experimental Development of Pomelo bar was evaluated in its different formulations with three replications by means of codes. Coding of treatments was used to avoid misidentification by the participants.

In the evaluation of the product, rating sheets were distributed to the evaluators to rate the sensory quality of Pomelo bar. Answers were collected immediately after filling-up for data analysis. The most acceptable formulation was further tested to determine the nutrient content of the product which was the basis in drafting nutritional facts for the product label.

Based on the results gathered, a demonstration guide was crafted.

Treatment of Data

Data gathered in this study was statistically analyzed. The sensory qualities, specific sensory attribute and packaging were analyzed using descriptive statistics. F-test was employed to determine the significant difference of formulations in terms of sensory qualities and specific sensory attribute, utilizing the Duncan's Multiple Range Test by the Statistical Package for Social Science (SPSS) software.

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RESULTS and DISCUSSION

Table 1. Sensory quality of pomelo bar in terms of texture

Treatments	Mean (LAM Scale)	Interpretation
Control	77.09^{c}	Like very much
Formulation 1	77.44^{bc}	Like very much
Formulation 2	80.20^{a}	Like very much
Formulation 3	79.71^{ab}	Like very much

^{abc} Means followed by the same superscript are not significantly different at 5% level of significance

Table 1 shows the mean scores of the sensory quality of Pomelo bar based on texture of the four different formulations. It can be noticed that formulation 2 had the highest mean of 80.20 similar with formulation 3 with the mean of 79.71. Moreover, formulation 3 has similar texture with formulation 1 having 77.44 mean rating. Lastly, formulation 1 is alike with the formulation of control in terms of texture having 77.09 mean rating.

Table 1 also reveals the computed means indicates that all formulations were considered acceptable since all are interpreted as *like very much*. It can be also noticed that the significant differences among the mean scores of sensory qualities in terms of texture for the three formulations are due to varying amount of pomelo juice. The contrast of crisp, buttery shortbread crust and a smooth, creamy curd is a good combination in texture. Thus, texture plays a crucial role in influencing consumers' liking and preference of a food product (Williams, 2021).

Table 2. Sensory quality of pomelo bar in terms of aroma

Treatments	Mean (LAM Scale)	Interpretation
Control	76.73 ^{a}	Like very much
Formulation 1	77.63 ^{a}	Like very much
Formulation 2	80.03 ^{a}	Like very much
Formulation 3	79.71 ^{a}	Like very much

^{abc}Means followed by the same superscript are not significantly different at 5% level of significance.

Table 2 presents the mean ratings of the sensory quality of pomelo bar based on aroma of the four different formulations. Result reveals that formulation 2 obtained the mean of 80.30, followed by formulation 3 with 79.71, then by formulation 1 with 77.63 and the control with the mean rating of 76.73.

Results further shows that all formulations were rated *like very much*. This implies that there is no significant difference between the mean scores of different treatments in terms of aroma. Thus, addition of different amount of pomelo juice does not affect the aroma of the pomelo bar.

Aroma is intricately linked to taste that influence the overall sensory characteristics (Wirral Sensory Services, 2023) and plays a central role in the perception of food (Keeffe, 2019). Kirwan (2022) described the pomelo as not very strong but lemony and sweet. However, the addition of aromatics, extracts and oils could further enhance flavor of food (Keeffe, 2019).

Table 3. Sensory quality of pomelo bar in terms of taste

Treatments	Mean (LAM Scale)	Interpretation
Control	72.27^{b}	Like moderately
Formulation 1	76.10^{a}	Like very much
Formulation 2	78.61^{a}	Like very much
Formulation 3	78.75^{a}	Like very much

^{abc}Means followed by the same superscript are not significantly different at 5% level of significance.

Table 3 shows the mean scores of the sensory quality of pomelo bar based on taste. The result indicates that formulation 3 with a mean of 78.75, formulation 2 with 78.61 and formulation 1 with a mean rating of 76.10 were all rated as *like very much*. This denotes that the three formulations taste the same. On the other hand, the

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control is different from other formulations which has the least mean value of 72.27 and a descriptive rating of *like moderately*.

The result implies that the participants perceived the taste differently between control and other formulations. Hence, there were no significant differences between the means of sensory quality in terms of taste due to varying amount of Pomelo juice. Since the control does not contain Pomelo juice, result indicates that the addition of different amount of juice does not affect the taste of the product.

Some of the respondents noticed the tanginess in the aftertaste of the pomelo bar in all pomelo juice containing formulations. However, they noted that this aftertaste is a distinguishing feature of pomelo to other citrus fruits and does not greatly affect their judgement in rating the taste of the product.

The perception of taste is the most influential factor in a person's selection of food (Kerry Health and Nutrition Institute, n.d.). The pleasantly sweet-tasting Pomelo with no overpowering bitterness and sour punch (Teague, 2020) makes the curd unique and its tart or acidic taste is a good partner for the buttery shortbread crust.

Table 4. Sensory quality of pomelo bar in terms of color

Treatments	Mean (LAM Scale)	Interpretation
Control	80.07^{ab}	Like very much
Formulation 1	79.29^{b}	Like very much
Formulation 2	81.53^{a}	Like very much
Formulation 3	81.14^{a}	Like very much

^{abc}Means followed by the same superscript are not significantly different at 5% level of significance.

The table 4 presents the mean ratings of the sensory quality of pomelo bar in terms of color. The mean values of the four different treatments of the product were interpreted as *like very much*. Formulation 2 has a mean of 81.53, formulation 3 with 81.14, the control with 80.07 and formulation 1 with mean value of 79.29.

Table 4 further reveals that formulation 2 is comparable with formulation 3 and control. On the other hand, the control is also comparable to formulation 1 in terms of color. Thus, there were significant differences between the mean scores of sensory qualities based on color for different formulations because of the varying amount of pomelo juice.

Color is commonly used to evaluate food's desirability and acceptability (Choi, 2019). The typical color of pomelo is pink but the baked product is brilliant yellow in color due to the plenty addition of eggs in the recipe (The Pancake Princess, 2020). Hence, the yellow color of pomelo curd and golden-brown color of shortbread crust makes the product attractive.

Table 5. Sensory quality of pomelo bar in terms of overall acceptability

Treatments	Mean (LAM Scale)	Interpretation
Control	76.72^{c}	Like very much
Formulation 1	77.62^{bc}	Like very much
Formulation 2	80.49^{a}	Like very much
Formulation 3	79.64^{b}	Like very much

^{abc}Means followed by the same superscript are not significantly different at 5% level of significance.

Table 5 presents the mean ratings of sensory quality of pomelo bar based on overall acceptability. Among the four treatments, formulation 2 obtained the highest mean of 80.49 which is significantly different from other treatments. The formulation 3 with a mean of 79.64 is like formulation 1 with 77.62 mean value but different compared to other formulations. Finally, formulation 1 is also similar in terms of overall acceptability to the control with the lowest mean of 76.72.

Table 5 also reveals that the computed means indicates that all treatments were interpreted as *like very much*. Moreover, it can also be noticed that there were significant differences between the mean scores of sensory qualities in terms of overall acceptability due to the different amount of Pomelo juice added in each formulation.

Overall acceptability in sensory evaluation is related to an individual preference, the food and in the environment in which the food is consumed (Fiorentini, Kinchla & Nolden, 2020).

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Table 6. Specific sensory attribute of pomelo bar in terms of sweetness

Treatments	Mean	Interpretation
Control	3.05[b]	Just About Right
Formulation 1	3.38[ab]	Just About Right
Formulation 2	3.55[a]	Just About Right
Formulation 3	3.69[a]	Just About Right

Means followed by the same superscript are not significantly different at 5% level of significance.

Table 6 shows the mean rating of the specific sensory attribute of pomelo bar based on sweetness of the different formulations. Formulation 3 which has a mean value of 3.69 is comparable to other formulations, formulation 2 with 3.55 mean values and formulation 1 with 3.38 mean rating. On the other hand, formulation1 is similar with the control with a mean of 3.05 but different from other formulations.

Table 6 also reveals that based on the computed means indicates that all treatments were considered acceptable since all are interpreted as *just about right* in terms of sweetness. It can be noticed that there was significant difference between the mean scores of sensory qualities in terms of sweetness due to varying amount of pomelo juice.

Pomelo tastes sweet with tartness and acidity but milder in flavor and less bitter than other citrus fruits (Lalomia, 2022). Moreover, it is regarded as delicious and tasty (Kirwan, 2022). The bitterness and tanginess of the pomelo (Todd, 2021) blended well with other ingredients resulting in a just about right sweetness.

Table 7. Specific sensory attribute of pomelo bar in terms of sourness

Treatments	Mean	Interpretation
Control	3.77[a]	Just About Right
Formulation 1	2.69[b]	A Little Too Unsour
Formulation 2	2.59[b]	A Little Too Unsour
Formulation 3	2.61[b]	A Little Too Unsour

[abc]Means followed by the same superscript are not significantly different at 5% level of significance.

Table 7 shows the specific sensory attribute of pomelo bar in terms of sourness. The result indicates that control got the highest mean of 3.77 rated as *just about right*. The other three remaining formulations were rated as *a little too unsour*. Formulation 1 has a mean rating of 3.77, followed by formulation 3 with 2.61 and formulation 3 with 2.59. This means that formulation 1, formulation 2 and formulation 3 are similar but control is too different from other formulations in terms of sourness.

The result implies that the participants perceived the sourness differently between control and other formulations. Hence, there were no significant differences between the means of varying amount of pomelo juice. Since the control does not contain pomelo juice, result indicates that the addition of different amount of juice does not affect the sourness of the product. This is due to its sweeter characteristics and subtle flavor than other citrus fruits (Veritable Vegetable, 2021).

Table 8. Nutrient analysis of the pomelo bar formulation 2

Analysis Name	Result	Methodology
Ash	0.52%	Gravimetric Method
Moisture	15.14%	Gravimetric Method
Crude Fat	8.74%	Acid Hydrolysis and Gravimetric Method
Crude Protein (N x 6.25)	5.39%	Kjeldahl Method
Total Sugar As Invert (TSAI)	44.67%	Lane-Eynon Method
Crude Fiber	0.96%	Conventional Method
Sodium	109.39mg/100g	Dry Ashing, Acid Digestion and Quantitation

Table 8 shows the nutritional content of the pomelo bar formulation 2. The sensory evaluation result reveals that formulation 2 which contains 256 grams pomelo juice appears to be the most acceptable formulation in terms of

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texture, aroma, taste, color and overall acceptability. The analysis by the SGS Philippines, Inc. revealed that the product contains 0.52% of ash and 15.14% of moisture using Gravimetric method. Crude fat content of the pomelo bar is 8.74% determined using acid hydrolysis and gravimetric method; it also has 5.39% of crude protein detected by the Kjeldahl method. Lane-Eynon method determined that the total sugar as invert is 44.67% while crude fiber is 0.96 percent based on conventional method analysis. Finally, sodium content of pomelo bar is 109.39mg per 100g was detected by dry ashing, acid digestion and quantitation.

The result of the analysis was used as basis to determine the exact nutritional value of food (Food Infotech, 2023). The 18 grams serving size of a pomelo bar contains 70 calories. Contributing to the calories were the 2 grams total fat, 13 grams total carbohydrate and 1 gram protein.

Figure 1. Nutrition Facts for the Most Preferred Formulation of Pomelo Bar

The Nutrition Facts label on packaged foods and beverages is a valuable tool to help people make more informed decisions about the nutritional content of the foods they purchase and eat (Institute of Food Technologist, 2021).

Table 9. Cost and return analysis of pomelo bar

PARTICULARS	QUANTITY	COST Pesos/Unit		RECIPE COS
		A.P	E.P	
Pomelo	1kg	45/kg	45	45
Lemon	4pcs	15/pc	15	60
Eggs	7pcs	8/pc	8	56
Granulated Sugar	702g	58/kg	0.058	40.74
All-purpose flour	375g	54/kg	0.058	21.78
Unsalted butter	226g	42/bar	226	42
Confectioner Sugar	45g	112/kg	0.0112	1.25
Vanilla	6g	14/60ml	0.23	1.45
Salt	2g	11/250g	0.044	0.06
Plastic container				175
Labor				250
Electricity				100
Production Cost				793.28
Markup Cost (30%)				237.98
Selling Price				15

AP – As Purchased
% Yield = Edible Portion Weight / AP Weight
Edible Portion = AP / %Yield Recipe Cost = EP x Quantity
Mark up = Total Recipe Cost x Markup %

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Gross Rate
70 slices/ 15 per slice = 1031.26
Net Income
1031.26 – 793.28 = 237.98
Return of Investment
237.98 x 100 = 30%
793.28

Table 9 shows the formulation listed can produce 70 slices of pomelo bar and can be sold per slice. The recommended selling price is Php15.00 at 30% markup. The result reveals that formulation 2 got a ROI of 30%. This implies that formulation 2 can be a good business venture as this above the 15% threshold. However, ROI has some limitations and fails to reflect the time value of money. Hence, it is recommended to use other metrics such as Net Present Value (NPV) or Internal Rate of Return (IRR).

Table 10. Package testing for pomelo bar

	Frequency	Percentage
1. How likely would you be to purchase this product in the next 3 months?		
Very likely	40	80
Somewhat likely	10	20
Feel Neutral About it	0	0
Somewhat unlikely	0	0
Very unlikely	0	0
2. How visually appealing is the packaging?		
Very likely	44	88
Somewhat likely	6	12
Feel Neutral About it	0	0
Somewhat unlikely	0	0
Very unlikely	0	0
3. What adjective(s) below best describes the packaging design? Select all that apply.		
Attractive	50	100
Boring	0	0
Compelling	2	4
Distracting	0	0
Flashy	2	4
Ineffective	0	0
Irrelevant	0	0
Ordinary	0	0
Fresh	15	30
None of the above	0	0
4. How unique/different do you think the packaging is compared to others available today?		
Very unique and different	25	50
Somewhat unique and different	23	46
Feel neutral about it	2	4
Not so unique and different	0	0
Not at all unique and different	0	0
5. How would you rate the quality of the product based on its packaging?		
Very high quality	38	76
Somewhat high quality	12	24
Neither high nor low quality	0	0
Somewhat low quality	0	0
Very low quality	0	0

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Table 10. Continue

6. How premium would you rate the product based on the packaging?		
Very premium	31	62
Somewhat premium	15	30
Feel neutral about it	4	8
Somewhat not premium	0	0
Not at all premium	0	0
7. How well does the attached description fit with the package's design?		
Very well – I think the design fits the description extremely well	38	76
Pretty well – I think the design fits the description pretty well	12	24
Not sure – I'm torn on whether this design fits the description or not	0	0
Not that well – I don't think the design fits the description that well	0	0
Not well at all – I don't think the design fits the description well at all	0	0
8. When it comes to deciding if you would purchase this item, how do you fell about the amount of information shown on the packaging?		
Way too much information	14	28
Somewhat too much information	4	8
The right amount of information	32	64
Somewhat too little information	0	0
Way too little information	0	0
9. Of the information listed on the packaging, which is most important when making a purchase decision on this product?		
List of ingredients	8	16
Nutrition facts	36	72
Manufacturer's information	6	12
Other (Please specify) _____	0	0

Table 10 shows the result of package testing survey for pomelo bar. It reveals that 80 percent of the respondents are very likely to purchase the product in the next three months. However, the remaining 20 percent of the respondents are somewhat likely to purchase it in the next three months.

Table 10 also presents that 88 percent rated very likely in terms of visual appeal of the packaging and only 12 percent rated it as somewhat likely appealing.

The adjectives that could describe the packaging of the pomelo bar are attractive (100%), fresh (30%), compelling (4%) and flashy (4%).

Table 10 further reveals the uniqueness of the packaging compared to others that are available today. Fifty percent view the packaging as very unique and different, 46 percent as somewhat unique and different while the remaining 4 percent feel neutral.

The rating for the quality of the pomelo bar based on its packaging reveals that 76 percent presume that the packaging is very high quality compared to 24 percent rating of somewhat high quality.

The rating for the premium quality of the pomelo bar based on its packaging reveals that 62 percent presume that the packaging is very premium compared to 30 percent rating of somewhat premium and 8 percent feel neutral about it.

The result of how well the attached description fits the package's design shows that 76 percent answer very well, they think the description fit with the package's design while the 24 percent thinks that the design fits the description pretty well.

The result in terms how the participants feel about the amount of information shown in the packaging, result shows that 64 percent thinks that the packaging of the pomelo bar has just the right amount of information while 28 percent believe that there is way too much information, and the 8 percent rated the product packaging as somewhat too much information.

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Finally, the aspect of what information listed on the packaging is the most important in making decision to purchase the product, it appears that 72 percent considers the nutrition facts as the most important compared to the 16 percent who choose the list of ingredients as the most essential information and the 12 percent believes that manufacturer's information is the most important information in the packaging.

The results of the packaging test survey suggest that the developed pomelo bar packed in a plastic clamshell is marketable due to its visually appealing, unique, very high quality and very premium packaging. Moreover, the packaging contains the right amount of information with the nutrition facts as the most essential. The results conformed to the conclusion of Monisha (2023) that packaging influences consumer's purchase decision. Moreover, they further concluded that packaging elements like color, material, design of wrapper and innovation are the most important factors a consumer considers in buying a product.

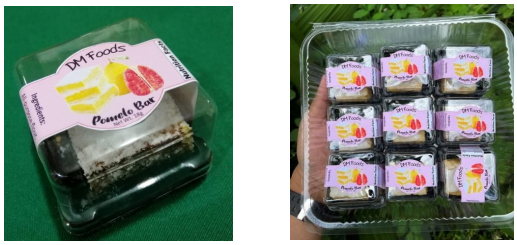

Figure 2. Packaging of Pomelo Bar

Figure 2 shows the packaging material for a slice of pomelo bar. The plastic clamshell provides perfect protection to the delicate product and excellent product visibility (Qiaowang, 2023). The label has the image of a stacked pomelo bar and a pomelo fruit, which is the main ingredient of the product. This image translates that the main ingredient of the item is pomelo, thus it provides awareness to possible buyers.

Table 11. Evaluation of Demonstration Guide

Factor	Evaluator 1	Evaluator 2	Evaluator 3	Mean	Verbal Description
Content	25	26	27	26	Pass
Format	70	72	69	70	Pass
Presentation and Organization	20	19	19	19	Pass
Accuracy and up-to-datedness o Information	24	24	24	24	Pass

Table 11 shows the result of the evaluation for the demonstration guide. It was rated by three public school teachers who were teaching bread and pastry production for at least five years. Result reveals that the demonstration guide evaluated for its content got a mean value of 26, for the format a mean of 70, for presentation and organization a mean of 19 and for accuracy and up-to-datedness of information the mean is 24. Based on the mean ratings for each factor, the demonstration guide passed the evaluation. Hence, it is recommended to be used as learning material for teaching bread and pastry production specifically in preparing pastry products.

Demonstration method will only be effective if students had a logical step-by-step guide for easy understanding of concepts and development of skills (Damiani et al., 2021).

Conclusions

The formulation 2 with 250 grams Pomelo juice was the preferred formulation of Pomelo bar since it got the highest mean among all formulations in terms of texture, aroma, color and overall acceptability. It was also identified as significantly different in terms of texture and overall acceptability. The product is marketable and could be a good business venture due to its 30% computed mark-up and visually appealing packaging. Further, products can be shared through a demonstration guide which is a suitable learning resource material for bread and pastry production in senior high school.

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Recommendations

It is recommended to utilize the formulation 2 with 250 grams of pomelo juice in making pomelo bar and utilize the demonstration guide as aid of teaching in bread and pastry production. Also, it is recommended to introduce the pomelo bar as a healthy snack for students and encourage vendors to engage in making this product due to its market acceptability. Researchers are encouraged to conduct further study determining the complete nutrient content of the pomelo bar as well as its shelf life and use different varieties of citrus fruits in making bars.

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