Development And Evaluation of a Honey-Based Tibig (Ficus Nota) Spread Toward Instructional Intervention in Teaching Food Processing

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***Abstract*: This study focused on the development and evaluation of a honey-based Ficus nota (Tibig) spread as a value-added food product and instructional intervention in teaching Food Processing under Technology and Livelihood Education (TLE). A standardized formulation process was implemented to ensure product quality, safety, and consistency. Sensory evaluation was conducted by TLE teachers, TLE learners, and local processors, entrepreneurs, and nutritionists using a modified 4-point Hedonic Scale to assess color, aroma, taste, texture, and general acceptability. Results revealed that the honey-based Tibig (Ficus nota) spread with 50% Tibig formulation was the most acceptable treatment. Statistical analysis using ANOVA showed significant differences in aroma, taste, texture, and general acceptability, while color showed no significant difference. Post Hoc analysis indicated that differences in evaluation were primarily observed between learners and the other respondent groups. Based on these findings, an instructional workbook was developed using the ADDIE model. Overall, the study concludes that the optimized Tibig formulation demonstrates an acceptable sensory level and that the developed workbook enhances learners' practical skills, critical thinking, and engagement in Food Processing education.**

***Keywords*: ADDIE model, food processing instruction, formulation and development, honey-based ficus, nota spread, sensory evaluation, tibig fruit.**

1. Introduction

Food product development using indigenous resources plays a significant role in promoting sustainability, innovation, and contextualized learning in Technology and Livelihood Education (TLE). In the Philippines, Tibig (Ficus nota) is a native fruit-bearing tree with small edible fruits that have a mildly sweet and tangy flavor; however, despite its availability in many local areas, it remains underutilized in food processing and product innovation. In TLE, particularly in Food Processing, learners are expected to develop practical skills in food formulation, preparation, and processing, yet there is a need for instructional materials that are contextualized and based on locally available resources to enhance engagement and understanding. In response to this gap, the study aimed to develop and evaluate a honey-based Tibig spread and determine its acceptability compared to a commercial product, including identifying significant differences in sensory attributes and among different groups of respondents. Furthermore, the study developed an instructional intervention workbook based on the most acceptable formulation, guided by the ADDIE Model, to support experiential, learner-centered, and context-based teaching and learning in Food Processing. Specifically, the study focused on product development, sensory evaluation, comparison with a control product, differences in respondents' evaluations, and the creation of an instructional intervention material aligned with TLE competencies.

2. Methodology

This study employed a quantitative-descriptive, developmental, and experimental research design to develop and evaluate a honey-based Tibig (Ficus nota) spread as a value-added food product and instructional intervention material in Technology and Livelihood Education (TLE) in Barangay Salinas, Bambang, Nueva Vizcaya. Data were collected from a stratified sample of 45 respondents, consisting of TLE learners, TLE teachers, and local food processors, entrepreneurs, and nutritionists, representing both consumer and professional perspectives within the community. A structured sensory evaluation instrument using an adapted hedonic scale measured the product's color, aroma, taste, texture, and general acceptability, while a Likert-scale survey assessed its market potential, and the experimental component involved three formulations with varying proportions of Tibig pulp to determine the most acceptable treatment. Descriptive and inferential statistics were used to analyze the data, including mean to determine sensory acceptability, independent samples t-test to compare the control and most acceptable formulation, and one-way ANOVA with Fisher's Least Significant Difference (LSD) test to identify significant differences among respondent groups, all tested at a 0.05 level of significance. The study also developed an instructional workbook aligned with TLE competencies, guided by the ADDIE Model, and observed ethical standards such as informed consent, confidentiality, voluntary participation, and proper coordination with Salinas High School (Creswell & Creswell, 2018).

Table.1. Summary of Evaluation of the Three Respondent Groups on the Honey-Based Tibig (Ficus nota) Spread in Terms of T0 and T2

Respondent	Guava Jam	Honey-based Tibig (Ficus nota) spread
TLE Teachers	3.71 Highly Acceptable	3.19 Acceptable
TLE Learners	3.09 Acceptable	3.07 Acceptable
Local Processors/ Entrepreneur/ Nutritionist	3.55 Highly Acceptable	3.08 Acceptable
Overall Mean	3.45 Acceptable	3.11 Acceptable

3. Results and Discussion

The results of this study indicate that the honey-based Ficus nota (Tibig) spread was successfully developed through a systematic process of formulation, preparation, and processing using controlled variation of Tibig pulp concentration, with guava jam serving as the control. Standardized ingredients and proper food processing techniques ensured product safety, consistency, and quality, supporting the utilization of indigenous resources for food innovation and instructional purposes (FAO, 2018). Among the experimental treatments, the 50% Tibig pulp formulation emerged as the most acceptable and was used for further evaluation.

In terms of sensory evaluation, all respondent groups rated both products as generally acceptable. Among TLE learners, guava jam (M = 3.09) and Tibig spread (M = 3.07) showed nearly identical acceptability. TLE teachers gave higher ratings to guava jam (M = 3.71, Highly Acceptable) compared to the Tibig spread (M = 3.19, Acceptable). Similarly, local processors, entrepreneurs, and nutritionists rated guava jam higher (M = 3.55) than the Tibig spread (M = 3.08). Overall, guava jam obtained a higher mean (M = 3.45) than the Tibig spread (M = 3.11), indicating stronger preference for the familiar product, although the developed spread remained within the acceptable range across all groups.

Table.2. Summary of T-test Computation on the Difference in the Sensory Attributes' Evaluation Between Guava Jam and Honey-Based Tibig (Ficus nota) Spread

Criteria	Groupings	Mean	Computed t-value	p-value	Remarks
color	Guava Jam	3.16	1.362	0.177	Not Significant
	Honey Based Tibig Spread	2.93			
Aroma	Guava Jam	3.44	3.585	0.001	Significant
	Honey Based Tibig Spread	2.89			
Taste	Guava Jam	3.53	0.915	0.362	Not Significant
	Honey Based Tibig Spread	3.40			
Texture	Guava Jam	3.64	4.733	0.000	Significant
	Honey Based Tibig Spread	2.98			
General Accepta-bility	Guava Jam	3.47	0.881	0.381	Not Significant
	Honey Based Tibig Spread	3.36			
Overall	Guava Jam	3.45	3.687	0.000	Significant
	Honey Based Tibig Spread	3.11			

Table.3. Summary of F-test Computation on the Difference in the Evaluation of the Three Groups of Respondents on the Guava Jam

Sensory Attributes	Groupings	Mean	Computed F-value	p-value	Remarks
Color	TLE Learners	3.00	3.297	0.047	Significant
	TLE Teachers	3.53			
	Local Processors/ Entrepreneur/ Nutritionist	2.93			
Aroma	TLE Learners	2.73	20.36	0.000	Significant
	TLE Teachers	3.80			
	Local Processors/ Entrepreneur/ Nutritionist	3.80			
Taste	TLE Learners	3.20	2.85	0.069	Not Significant
	TLE Teachers	3.73			
	Local Processors/ Entrepreneur/ Nutritionist	3.67			
Texture	TLE Learners	3.40	2.24	0.119	Not Significant
	TLE Teachers	3.80			
	Local Processors/ Entrepreneur/ Nutritionist	3.73			
General Acceptability	TLE Learners	3.13	3.63	0.035	Significant
	TLE Teachers	3.67			
	Local Processors/ Entrepreneur/ Nutritionist	3.60			
Overall Mean	TLE Learners	3.09	11.69	0.000	Significant
	TLE Teachers	3.71			
	Local Processors/ Entrepreneur/ Nutritionist	3.55			

For the comparison of formulations, results revealed no significant difference in color, taste, and general acceptability between guava jam and the Tibig spread. However, significant differences were observed in aroma, texture, and overall evaluation, with guava jam consistently obtaining higher mean scores (M = 3.45) than the Tibig spread (M = 3.11). These findings suggest that aroma and texture are more sensitive to ingredient substitution and play a critical role in shaping overall sensory perception (Wang et al., 2022; Stone & Sidel, 2020).

In terms of differences among respondent groups, ANOVA results for the control product showed significant variation in color, aroma, general acceptability, and overall evaluation, while taste and texture showed no significant differences. In contrast, the Tibig spread exhibited a significant difference only in color, while all other attributes, including overall evaluation, showed no significant variation, with mean scores ranging from M = 3.07 to M = 3.19. Post hoc analysis further revealed that most differences occurred between TLE learners and the other respondent groups, suggesting that evaluator background and experience influence sensory judgments, while trained and industry-related respondents tend to show more consistent evaluations (Stone & Sidel, 2020).

Overall, the honey-based Tibig spread is an acceptable indigenous-based food product, though improvements in aroma and texture are recommended to enhance its sensory quality. The study also resulted in the development of a Learner's Workbook in Food Processing guided by the ADDIE Model, which supports experiential learning, competency development, and contextualized instruction aligned with TLE standards (Branch, 2009; Kolb, 2015; DepEd, 2023).

4. Conclusion

Based on the results and discussion of the study, it can be concluded that the honey-based Ficus nota (Tibig) spread was successfully developed as a value-added indigenous food product and an effective instructional material for Food Processing in TLE through a systematic process of formulation, preparation, and processing using controlled variation of Tibig pulp, with the 50% formulation identified as the most acceptable. Sensory evaluation results show that both products were generally acceptable, although guava jam consistently obtained higher mean ratings across all respondent groups, with learners rating guava jam (M = 3.09) and Tibig spread (M = 3.07) almost equally acceptable, teachers rating guava jam (M = 3.71) higher than the Tibig spread (M = 3.19), and local processors/entrepreneurs/nutritionists also favoring guava jam (M = 3.55) over the Tibig spread (M = 3.08), resulting in an overall higher mean for guava jam (M = 3.45) compared to the Tibig spread (M = 3.11). Statistical analysis further revealed no significant differences in color, taste, and general acceptability, while significant differences were observed in aroma and texture, indicating that these attributes (Tibig aroma M = 2.87–3.33 vs. control M = 3.44–3.80; Tibig texture M = 2.80–3.13 vs. control M = 3.40–3.80) strongly influence overall product perception, which is supported by the significant difference in overall evaluation favoring guava jam. Additionally, respondent group analysis shows generally consistent evaluations across teachers, learners, and industry-related respondents, except for color where variation in perception was observed, confirming that evaluator background has minimal effect on overall acceptability. Overall, the findings conclude that the honey-based Tibig spread is an acceptable alternative indigenous food product, with aroma and texture identified as key areas for improvement, and that its integration into an ADDIE-based instructional workbook further validates its effectiveness as a contextualized, experiential, and competency-based learning tool in TLE Food Processing.

A. Recommendations

Based on the findings and conclusions of this study, the following recommendations are proposed:

First, food technology educators are encouraged to further optimize the honey-based Ficus nota (Tibig) spread by improving formulation, processing techniques, preservation methods, and shelf life. Similar studies may also explore other indigenous fruits to promote innovation and strengthen contextualized learning in TLE Food Processing.

Second, the Tibig spread formulation should be further validated through expanded sensory evaluation with a larger and more diverse group of respondents. Improvements may focus on color, aroma, and texture, which showed variations, and the product may be used as an instructional material to enhance learners' understanding of food evaluation and indigenous food use.

Third, Future product development should focus on improving aroma and texture, as these were the most affected sensory attributes. Adjustments in ingredient ratios and processing methods may help achieve better flavor balance and a smoother, more acceptable consistency.

Fourth, refinement of the product should also focus on improving color consistency, while maintaining its acceptable performance in taste, aroma, texture, and general acceptability to ensure more uniform evaluation across different users.

Fifth, the ADDIE-based workbook should be fully implemented in TLE Food Processing classes to support experiential and competency-based learning. Teachers may use it in both lectures and laboratory activities, while future enhancements may include digital features and more indigenous product activities to increase learner engagement.

Lastly, future researchers are encouraged to further develop the Tibig spread by exploring different formulations and conducting nutritional, microbiological, and shelf-life studies. Market acceptability, packaging, pricing, and production scalability should also be examined to assess its potential as a commercial indigenous food product while supporting sustainable food innovation and contextualized education.

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