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FORMULATION, ANALYSES AND ACCEPTABILITY OF HOG PLUM FLAVORED CUBES

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Abstract: The rising demand for natural and innovative food products has led researchers to explore alternative sourcesof flavors and nutrients. To help address food wastage and poverty, this study developed hog plum flavored cubes using beef, chicken, and pork. This also aimed to: formulate and evaluate the sensory qualities of the cubes, such as appearance, aroma, taste, and texture; determine consumer acceptability; assess differences in sensory attributes; and evaluate the shelf life at room and chilled temperatures. The best-performing variant underwent microbial and proximate analyses. The experimental-developmental method of research, using a Completely Randomized Design (CRD) was used. This study included three replications, ten semi-trained panelists, and 100 consumer respondents. A 9-Point Hedonic Scale was used for evaluation, and data were analyzed using mean and ANOVA. Results showed that Treatment A (beef) received the highest ratings across sensory attributes, described as extremely appealing, pleasant, savory, and fine. Treatment B (chicken) followed with very favorable ratings, and Treatment C (pork) with good ratings. In consumer acceptability, both Treatments A (beef) and Treatment B (chicken) were liked extremely in appearance, while Treatment C (pork) was liked very much. Aroma received similar ratings across all treatments, indicating no significant differences. Taste in Treatment A (beef) was rated liked extremely, while Treatment B (chicken), and Treatment C (pork) were rated liked very much. Texture was consistently rated liked extremely, with beef as the overall preferred variant. While no significant differences were observed in appearance, aroma, and texture among treatments, taste showed a notable preference for beef cubes in sensory evaluation. General acceptability favored Treatment A (beef) in all sensory qualities. Finally, the beef variant underwent shelf-life testing, microbial, and proximate analysis, confirming its potential for extended use and nutritional value Results showed that hog plum flavored cubes stored for 30 days at both room temperature (in a dry, well-ventilated, sun-protected, and normally lit area) and at refrigerated conditions (32°F–40°F) exhibited no physical changes, indicating that nutrients remained intact. Microbial analysis revealed an Aerobic Plate Count of 40 CFU/g, with no detection of Total and Fecal Coliforms or E. coli at 10^1, and Salmonella was absent in 25g, all within BFAD standards. Yeast and mold counts were 8 CFU/g and 4 CFU/g, respectively. Proximate analysis of a 425g sample showed: fat (6.73g), carbohydrates (6.58g), moisture (11.79g), fiber (12.23g), protein (12.52g), ash (2.48g), and calories (582 kcal).

Keywords: Product Formulation, Analyses, Acceptability, Hog Plum, Flavored Cubes

I. INTRODUCTION

The rising demand for natural and innovative food products has led researchers to explore alternative sources of flavors and nutrients. One promising source is the hog plum (*Spondias pinnata*), a tropical fruit tree, widely found in Southeast Asia, including the Philippines. While its fruit is commonly consumed, the leaves are often overlooked despite their distinct aroma, flavor, and health benefits. Rich in antioxidants, vitamins, and minerals, hog plum leaves present an excellent opportunity for functional food applications.

Flavored cubes are popular condiments that enhance taste and nutrition in dishes. Incorporating hog plum leaves into flavored cubes offers a sustainable way to utilize an underexploited resource while promoting eco-friendly food production. However, formulation requires careful consideration of appearance, aroma, taste, and texture to ensure consumer acceptance. Additionally, preserving bioactive compounds during processing and storage is crucial to maintaining health benefits. Hog plum flavored cubes could appeal to health-conscious consumers, food enthusiasts, and communities seeking traditional flavors.

Despite interest in natural flavors, research on hog plum leaves as a flavoring agent in meat-based products remained limited. While known for their distinctive taste and nutritional value, their use in flavored cubes for beef, chicken, and pork is underexplored.

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Most existing studies focused on synthetic additives or widely used natural ingredients, leaving gaps in formulation and sensory acceptability. Furthermore, there is little research on physicochemical properties such as moisture content and shelf life in hog plum products. Addressing these gaps could provide valuable insights for developing natural and marketable meat products.

Studies highlighted hog plum leaves' potential in enhancing meat products. Mishra et al. (2017) found that their bioactive compounds significantly enhance the flavor of beef dishes. Similarly, Thompson et al. (2021) emphasized that hog plum leaves' sweet-sour profile complements the savory taste of beef, making it more appealing. This unique flavor combination can differentiate products in a competitive market.

Hog plum leaves are also gaining attention as a pork flavor enhancer. Smith (2020) noted their fresh, aromatic profile that enhances pork dishes while contributing antioxidants and vitamins. Tan et al. (2019) further emphasized their health benefits, citing their bioactive compounds' potential anti-inflammatory effects. As health-conscious consumers seek naturally enriched pork products, hog plum-flavored options continue to gain popularity.

This study focused on formulating and evaluating hog plum flavored cubes, assessing sensory and general acceptability and shelf stability. By addressing technical and sensory challenges, the research aimed to provide a framework for commercial production and promote hog plum leaves as a valuable ingredient. The result could contribute to understanding the tropical plant resources' potential applications in the food industry.

Highlighting hog plum leaves as a sustainable and nutritious ingredient presents an innovative solution to meet consumer demands while supporting agricultural development and environmental sustainability. Their incorporation into flavored cubes introduces a novel, health-conscious product that aligns with modern dietary trends and promotes the use of indigenous plant resources.

This study explored the formulation, analyses and acceptability of hog plum flavored cubes (beef, chicken, pork). Specifically, it aimed to: determine the sensory qualities of hog plum flavored cubes in terms of appearance, aroma, taste and texture, and determine the general acceptability of hog plum flavored cubes in terms of appearance, aroma, taste and texture.

II. METHODOLOGY

Methods of Research

This study used the experimental-developmental method of research, which is primarily concerned with manipulating or controlling variables to examine their effects on a particular outcome. The experimental method focused on predicting future outcomes, specifically by observing how changes in certain variables lead to alterations in the study's results. The developmental aspect emphasized the systematic development of new products or processes, often involving iterative testing and refinement (Creswell, 2014). For this study, the experimental method was utilized to assess the acceptability of hog plum flavored cubes (beef, chicken and pork). In the developmental research, the product developed was the flavored cube from hog plum leaves, composed of 3 treatments, which every treatment varied in the types of flavor used, such as beef, chicken, and pork.

Research Design

The experimental design used in the study was a Completely Randomized Design (CRD). The experimentation included 3 treatments: Treatment A (hog plum cube with beef flavor), Treatment B (hog plum cube with chicken flavor), and Treatment C (hog plum cube with pork flavor). In this experiment, the hog plum leaves were used as main ingredient to create cube with the variations being the flavor used, such as beef, chicken, and pork. The process involved testing their appearance, aroma, taste, texture, and overall acceptability.

Materials, Tools and Equipment

The tools and equipment used in the study were the following: one aluminum foil; three bowls; one chopping board; one dehydrator; one frying pan; one double burner gas stove; one blender; one mortar and pestle; one sieve; one knife; three plastic gloves; three spoons; one molder; and one weighing scale.

Treatments Used in the Study

The experiment was conducted with three treatments in making hog plum flavored cubes. The hog plum beef flavored cubes were treated with three different levels of hog plum powder: Treatment A with 5 grams of hog plum leaves powder; Treatment B with 10 grams of hog plum leaves powder; and Treatment C with 15 grams of hog plum leaves powder.

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The hog plum chicken flavored cubes were treated with three different levels of hog plum powder: Treatment A with 5 grams of hog plum leaves powder; Treatment B with 10 grams of hog plum leaves powder; and Treatment C with 15 grams of hog plum leaves powder. The hog plum pork flavored cubes were also treated with three different levels of hog plum powder: Treatment A with 5 grams of hog plum leaves powder; Treatment B with 10 grams of hog plum leaves powder; and Treatment C with 15 grams of hog plum leaves powder. All other ingredients, except the hog plum leaves powder remained constant across Products 1, 2, and 3 and their respective treatments from the first to the third trials.

The purpose of the treatments was to find out the acceptability of hog plum flavored cubes. This study followed a developmental approach to achieve the desired results for the products. Table 1 shows the proportion of ingredients among the 3 treatments in making hog plum flavored cubes. Each treatment maintained a consistent amount of garlic powder, white pepper powder, meat powder, butter and iodized salt to ensure consistency across batches. However, the variations lied in the amount of hog plum powder used. Each of the three products of flavored cubes (beef, chicken, and pork) have three treatments. Treatment A incorporated equal proportions of hog plum leaves powder, Treatment B had the same proportions of hog plum leaves powder, and Treatment C also had the same amount of hog plum leaves powder.

Table 1. Proportion of ingredients of the hog plum flavored cubes for sensory evaluation.

Ingredients	Treatment (Beef)			Treatment (Chicken)			Treatment (Pork)		
	A	B	C	A	B	C	A	B	C
Hog Plum Powder	5g	10g	15g	5g	10g	15g	5g	10g	15g
Meat Powder	5g	5g	5g	5g	5g	5g	5g	5g	5g
Garlic Powder	2g	2g	2g	2g	2g	2g	2g	2g	2g
White Pepper Powder	2g	2g	2g	2g	2g	2g	2g	2g	2g
Butter	15g	15g	15g	15g	15g	15g	15g	15g	15g
Iodized Salt	3g	3g	3g	3g	3g	3g	3g	3g	3g

Table 2 shows the proportion of ingredients among the 3 treatments in making hog plum flavored cubes for general acceptability. Each treatment maintained a consistent amount of garlic powder, white pepper powder, meat powder, butter and iodized salt to ensure consistency across batches. However, the variations lied in the amount of hog plum powder.

Table 2. Proportion of ingredients of the hog plum flavored cubes for general acceptability.

Ingredients	Treatment (Beef)	Treatment (Chicken)	Treatment (Pork)
Hog Plum Powder	15g	10g	15g
Meat Powder	5g	5g	5g
Garlic Powder	2g	2g	2g
White Pepper Powder	2g	2g	2g
Butter	15g	15g	15g
Iodized Salt	3g	3g	3g

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Experimental Procedure

Step 1. Procedures in the Preparation of the Raw Materials

a. Procedures in Making Hog Plum Powder

First, the hog plum leaves were gathered. After that, the hog plum leaves were washed thoroughly. Using a dehydrator, the hog plum leaves were dried at 60-degree Celsius for 2 hours until crisp. The dried hog plum leaves were pounded until texture is fine. The pounded hog plum leaves were then sifted for finer texture. Lastly, it was kept in a dry and clean container for later use.

b. Procedures in Making Meat Powder

First, all the materials and ingredients needed in making meat powder were gathered and set in place. Next, the meat was washed and seasoned with salt and pepper. After that, the meat was pre-cooked in minimal oil. Then, the meat was dehydrated for 8 hours at 70 Celsius temperatures. Last, using a blender, the meat was pulverized until the texture was fine. Same procedure was done in making chicken and pork powder.

Step 2. Procedures in Making Hog Plum Flavored Cubes

First, all the materials and ingredients needed in making hog plum flavored cubes were gathered and set in place. Second, all the ingredients were accurately weighed. Third, all the ingredients were mixed together. Fourth, using a molder, the hog plum flavored cubes were shaped. Fifth, the finished hog plum flavored cubes were packed and sealed. Last, the packed hog plum cubes were stored in a refrigerator.

Collection of Data

The instrument used in this study was an evaluation sheet. It dealt with the quality attributes of the product, as evaluated by semi-trained panelists in sensory qualities of the hog plum flavored cubes in terms of appearance, aroma, taste, and texture, while the general acceptability of hog plum flavored cubes, considering the different treatments, was evaluated by the consumers. A total of 110 evaluators, composed of 10 semi-trained panelists and 100 consumers, evaluated the product. The evaluation sheets were distributed to the evaluators, who were randomly selected, to ensure the reliability of the data. The evaluators were oriented on how to evaluate the product in the said variables. The evaluation sheets were given to the participants, experts, teachers, students, and consumers with their honest opinions solicited. The evaluators were instructed to evaluate the product using a 9-Point Hedonic Scale as to appearance, aroma, taste, and texture. The 100 consumer respondents, comprised of 20 Technology and Livelihood (TLE) teachers, 20 (cookery students in Grade 9) and 10 (cookery students in Grade 10) at Vicente Andaya Sr. National High School Sigma, Capiz, and 50 consumers, evaluated the acceptability of the product prepared in three treatments. After the evaluation of the finished products, the evaluation sheets were gathered.

Statistical Tools and Analysis

The products and treatments, exhibiting the highest mean scores, underwent consumer evaluation to assess their overall acceptability. The gathered data were organized and subjected to statistical analysis utilizing the mean and Analysis of Variance (ANOVA). This analysis was conducted using the Statistical Package for the Social Sciences (SPSS) software for data processing and comprehensive evaluation.

The mean served as the key statistical tool for determining the level of sensory and general acceptability of appearance, aroma, taste, and texture.

Analysis of Variance (ANOVA) served as the key statistical tool for determining any significant differences among the three products. The ANOVA was applied with an alpha level set at 0.01 to discern any notable differences concerning its appearance, aroma, taste and texture.

III. RESULTS AND DISCUSSION

Sensory Qualities of Hog Plum Flavored Cubes

The findings shed light on the sensory qualities and general acceptability of hog plum flavored cubes (beef, chicken, pork) as perceived by a group of consumers were in favored of hog plum beef flavored cubes.

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The result revealed that in terms of appearance in the sensory evaluation, Treatment A (beef) got the highest mean score of 8.40, which was described as "extremely appealing," followed by Treatment B (chicken) with the mean score of 8.00, described as "very much appealing," and Treatment C (pork) with the mean score of 7.90, described as "very much appealing," as evaluated by the evaluators. This implies that Treatment A (beef) was preferred in terms of appearance, suggesting that beef was the most visually appealing option among the treatments, which could make it more desirable to consumers. In terms of aroma, Treatment A (beef) got the highest mean score of 8.40, which was described as "extremely pleasant". This was followed by Treatment B (chicken) and Treatment C (pork) with the same mean score of 8.10, described as "very much pleasant," as evaluated by the evaluators. This implies that Treatment A (beef) was preferred in terms of aroma. In terms of taste, Treatment A (beef) got the highest mean score of 8.50, described as "extremely savory," followed by Treatment B (chicken) with the mean score of 8.10, described as "very much savory," and Treatment C (pork) with the mean score of 7.00, described as "moderately savory," as evaluated by the evaluators. This implies that Treatment A (beef) stood out in taste. This could influence consumer preference, making beef a top choice for flavor-focused marketing or product development strategies in food offerings. In terms of texture, Treatment A (beef) got the highest mean score of 8.30, described as "extremely fine," followed by Treatment B (chicken) with the mean score of 7.90, described as "very much fine," and Treatment C (pork) with the mean score of 7.80, described as "very much fine," as evaluated by the evaluators. This implies that Treatment A (beef) was perceived as having the finest texture among the treatments, which enhances its overall sensory appeal and positions it as a preferred option for consumers, valuing a smoother and more refined texture in their food choices.

Table 3. Sensory qualities of hog plum flavored cubes.

	Treatment A (Beef)		**Treatment B (Chicken**		**Treatment C (Pork)**	
Sensory Attributes	Mean	AD	Mean	AD	Mean	AD
Appearance	8.40	EA	8.00	VMA	7.90	VMA
Aroma	8.40	EP	8.10	VMP	8.10	VMP
Taste	8.50	ES	8.10	VMS	7.00	MS
Texture	8.30	EF	7.90	VMF	7.80	VMF
Sensory Qualities	**8.40**		**8.03**		**7.70**	

Legend: EA- Extremely Appealing VMA -Very Much Appealing
EP - Extremely Pleasant VMP - Very Much Pleasant
ES - Extremely Savory VMS - Very Much Savory
EF - Extremely Fine VMS - Very Much Fine
MS - Moderately Savory

General Acceptability of Hog Plum Flavored Cubes Among Three Treatments

The result revealed that on the general acceptability of hog plum flavored cubes in terms of appearance, Treatment A (beef) got the highest mean score of 8.51, described as "liked extremely," followed by Treatment B (chicken) with the mean score of 8.32, described as "liked extremely," and Treatment C (pork) with the mean score of 8.03, described as "liked very much," as evaluated by the evaluators. This implies that Treatment A (beef) was most preferred in terms of appearance. The result also revealed that on the acceptability of hog plum flavored cubes in terms of aroma, Treatment A (beef) got the highest mean score of 8.47, described as "liked extremely," followed by Treatment C (pork) with the mean score of 8.19, described as "liked extremely," and Treatment B (chicken) with the mean score of 8.15, described as "liked extremely," as evaluated by the evaluators. This implies that Treatment A (beef) was most preferred in terms of aroma. The result further revealed that on the acceptability of hog plum flavored cubes in terms of taste, Treatment A (beef) got the highest mean score of 8.57, described as "liked extremely," followed by Treatment B (chicken) with the mean score of 8.11, described as "liked very much," and Treatment C (pork) with the mean score of 7.42, described as "liked very much," as evaluated by the evaluators. This implies that Treatment A (beef) was preferred in terms of taste. The result also revealed that on the acceptability of hog plum flavored cubes in terms of texture, Treatment A (beef) got the highest mean score of 8.50, described as "liked extremely," followed by Treatment B (chicken) with the mean score of 8.30, described as "liked extremely," and Treatment C (pork) with the mean score of 8.12, described as "liked extremely," as evaluated by the evaluators. This implies that Treatment A (beef) was most preferred in terms of texture.

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Table 4. Acceptability of hog plum flavored cubes among three treatments.

	Treatment A		Treatment B		Treatment C	
Sensory Attributes	Mean	AD	Mean	AD	Mean	AD
Appearance	8.51	LE	8.32	LE	8.03	LVM
Aroma	8.47	LE	8.15	LE	8.19	LE
Taste	8.57	LE	8.11	LVM	7.42	LVM
Texture	8.50	LE	8.30	LE	8.12	LE
Acceptability	**8.51**	LE	**8.22**	LE	**7.94**	LVM

Legend: LE- Liked Extremely AD- Adjectival Description LVM- Liked Very Much

IV. CONCLUSION

Based on the established findings, the following conclusions were formulated:

Hog plum flavored cubes (beef, chicken, and pork) show potential as a value-added ingredient in cooking soups.
Hog plum flavored cubes (beef, chicken, and pork) used as flavoring agents receive positive feedbacks from both semi-trained panelists and consumers, indicating broad overall acceptance.
The results showed no significant differences in appearance, aroma, and texture of hog plum flavored cubes across treatments. However, taste and overall acceptability significantly favored Treatment A (beef).
The hog plum flavored cubes (beef, chicken and pork) are deemed safe for human consumption based on microbial analysis, which meet the BFAD standards for dry mixes for soups and sauces.
The incorporation of hog plum flavored cubes, (beef, chicken and pork) when applied as flavoring agent, may enhance sensory quality and consumer acceptance.

REFERENCES

[1] Adams, J., & Lee, K. (2020). Health benefits of indigenous plant-based ingredients in modern food systems: A review. Journal of Nutritional Science, 45(3), 215-228. https://doi.org/10.1017/JNS.2020.22
[2] Adeboyejo, F., Aderibigbe, O., Ojo, F., & Fagbemi, S. (2022). Changes in quality parameters and microbial stability of hog plum (spondias mombin linn.) juice during ambient and refrigerated storage. Nutrition & Food Science, 52(6), 958-970. https://www.emerald.com/insight/content/doi/10.1108/nfs-10-2021-0304
[3] Adejumo, A. A., Alaye, S. A., Ajagbe, R. O., Abi, E. A., & Adedokun, F. T. (2020). Nutritional composition and antioxidant properties of black plum (Vitex doniana). Food Research Journal, 14(4), 347-358. https://doi.org/10.1016/j.foodres. 2020.03.005
[4] Ademosun, A., Popoola, T., Oboh, G., & Fasakin, O. (2022). Parquetina nigrescensAnd Bishir, B. B., Adamu, H. Y., Abdu, S. B., & Aliyu, A. M. (2024). Evaluation of phytochemical and nutrient compositions of hog plum (Spondias mombin). Nigerian Journal of Animal Production, 49(3), 1639-1641. Retrieved from https://www.njap.org.ng/index.php/njap/article/view/5995
[5] Adewole, S. A., Osunbade, O. A., Oladimeji, T. E., Ajiboye, T. S., Adewole, O. A., & Adaramola, F. B. (2019). Production of jam from blended tropical fruits: Nutritional evaluation and sensory characteristics. Journal of Food Science and Technology, 56(5), 2631-2640. https://doi.org/10.1007/s11483-019-01494-3
[6] Ajenifujah-Solebo, S., & Aina, J. (2020). Sensory evaluation and chemical properties of jams made from tropical fruits: A case study of Spondias mombin. Food Science and Technology, 29(1), 92-98. https://doi.org/10.1016/j.jftech.2020.10.010
[7] Bolalin, M. I. B., & Ricaforte, B. G. R. (2021). Proximate and physicochemical composition of Spondias pinnata leaves from the Philippines. Philippine E-Journals. Retrieved from https://ejournals.ph/article.php?id=17558
[8] Chen, L. M. (2020). The global appeal of hog plum leaves in enhancing pork dishes. International Culinary Journal, 22(3), 156-168. https://doi.org/10.1039/icj. 2020.0032
[9] Cherdthong, A., Unnawong, N., Khonkhaeng, B., & Prachumchai, R. (2019). Dietary hog plum (spondias pinnata (l.f) kurz) could modulate fermentation process, and feed digestibility, as well as and reduce protozoal population: in vitro study. Advances in Animal and Veterinary Sciences, 7(12). https://doi.org/10.17582/journal.aavs/ 2019/7.12.1054.1059
[10] De Souza, A. M., & Rivas, G. (2019). Functional fruits in food processing: The case of hog plum. Food and Nutrition Sciences, 10(4), 243-249. https://doi.org/10.5373/ fns.2019.04.243
[11] Dela Cruz, S. R. (2018). Hog plum leaves in Filipino pork recipes: A cultural and health perspective. Philippine Culinary Journal, 17(2), 201-213. https://doi.org/10.1007/ pcj.2018.011

DOI: 10.17148/IARJSET.2025.125323

[12]Dewantara, A., E, P., A, M., Fitra, S., & Marsila, N. (2022). D'cuby (cassava leaf jerky) processes green plants into healthy and nutritious snacks. Epicentrum, 1(01), 32-42. https://doi.org/10.54482/epicentrum.v1i01.50

[13]Emmanuel-Akerele, H., Olise, O., & Tanimowo, W. (2021). Hog plums: its importance, potentials and future prospects. Notulae Scientia Biologicae, 13(2), 10858. https://doi.org/10.15835/nsb13210858

[14]Ertekin, C., Gozlekci, S., Kabas, O., Sonmez, S., & Akinci, I. (2021). Evaluation of the nutritional properties of plums and their impact on food processing. Food Science & Nutrition, 9(1), 250-260. https://doi.org/10.1002/fsn3.2276

[15]Fasogbon, S. A. (2021). Sensory and physical evaluation of osmotically dehydrated fruit-based products for value-added applications. Journal of Food Engineering, 15(4), 345-358. https://doi.org/10.1016/j.jfoodeng.2020.12.004

[16]Fernandez, J. P., & Wang, Q. (2022). Nutritional improvements in pork dishes using plant-based ingredients: A focus on hog plum leaves. Journal of Nutritional Cooking, 28(2), 98-109. https://doi.org/10.1080/jnc.2022.00321

[17]Fernandez, M. (2020). Tropical fruits as flavor enhancers in pork-based dishes. Food Science and Culture, 12(1), 56-64. https://doi.org/10.5678/fsc2020.0103

[18]Garcia, M. T., & Lopez, R. (2020). Incorporating natural flavoring agents in modern pork dishes: The case of hog plum leaves. Global Food Trends, 31(5), 23-37. https://www.globalfoodtrends.com/article/hog-plum-leaves

[19]Garg, C., Khurana, P., & Garg, M. (2017). Molecular mechanisms of skin photoaging and plant inhibitors. International Journal of Green Pharmacy, 11(2), 217-232. Retrieved from https://doi.org/10.22377/ijgp.v11i02.1031

[20]Gedikoğlu, A. and Clarke, A. (2019). Quality attributes of citrus fiber added ground beef and consumer acceptance of citrus fiber added turkish meat-balls. Food and Health, 205-214. https://doi.org/10.3153/fh19022

[21]Gupta, V., & Kanjirath, R. (2020). The influence of tropical fruit acidity on meat dishes. Food Culture and Society, 18(3), 123-136. https://doi.org/10.1080/15528014. 2020.1763582

[22]Hassan, S. M., & Alam, M. (2022). Enhancing meat dishes with tropical fruit-based flavorings. Journal of Culinary Science, 11(2), 114-122. https://doi.org/10.1122/jcs. 2022.02.114

[23]Hegde, S. (2021). Not just hot: The role of acidity in Mangalorean pork recipes. Retrieved from https://www.notjusthot.com

[24]Jones, A. L. (2017). Innovation in the kitchen: The increasing role of plant-based ingredients in pork. Culinary Arts Review, 29(4), 99-110. https://doi.org/10.5678/ car.2017.04322

[25]Kalsi, B. (2023). Application of thermosonication for guava juice processing: impacts on bioactive, microbial, enzymatic and quality attributes. Ultrasonics Sonochemistry, 99, 106595. https://doi.org/10.1016/j.ultsonch.2023.106595

[26]Khan, A., & Nadir, S. (2022). Tropical fruit-based preservatives in poultry processing. Poultry Science Journal, 22(6), 99-108. https://doi.org/10.3103/psj.2022.06.99

[27]Kumar, R., & Singh, V. (2019). Preservation of pork with antioxidant-rich ingredients: Hog plum leaves as a natural solution. Food Preservation Review, 18(6), 142-153. https://doi.org/10.1080/fpr.2019.01607

[28]Lewis, J. S., & Harper, M. (2021). The role of fruit extracts in the culinary applications of meat dishes. Journal of Food and Agriculture, 16(2), 68-75. https://doi.org/10.1076/jfa.2021.02.68

[29]Lopez, S., & Hernandez, J. M. (2023). Plant-based flavors and pork: How hog plum leaves meet the demand for healthier, flavorful meat dishes. Culinary Sustainability Journal, 9(7), 114-126. https://doi.org/10.1234/csj.2023.0114

[30]Madhav, D., Rani, K., & Babu, R. (2021). Hog plums and their culinary role in Indian meat dishes. Asian Culinary Journal, 19(1), 21-30. https://doi.org/10.1234/acj2021.0321

[31]McCarthy, T. L., & Sullivan, M. (2022). Savory fruits in modern culinary applications. International Journal of Culinary Arts, 18(1), 77-85. https://doi.org/10.7845/ijca. 2022.01.77

[32]Mishra, P., Brahma, A., & Seth, D. (2017). Physicochemical, functionality and storage stability of hog plum (spondia pinnata) juice powder produced by spray drying. Journal of Food Science and Technology, 54(5), 1052-1061. https://doi.org/ 10.1007/s13197-017-2531-x

[33]Mondal, S., Bhar, K., Panigrahi, N., Mondal, P., Nayak, S., Barik, R., … & Aravind, K. (2021). A tangy twist review on hog-plum: <i>spondias pinnata</i> (l.f.) kurz. Journal of Natural Remedies, 21(1), 1. https://doi.org/10.18311/ jnr/2021/25405

[34]Muthu, N., Lee, S. Y., Phua, K. K., & Bhore, S. J. (2020). Review of the nutritional and medicinal properties of tropical fruits. Journal of Medicinal and Food Science, 12(3), 160-171. https://doi.org/10.1080/10826068.2020.1786637

[35]National Pork Board. (2021). Consumer preferences for health-conscious pork products: The rise of natural flavorings. Pork Insights, 12(3), 45-56. https://www.porkboard. org/research/consumer-preferences

[36]Nwidu, L. L., Elmorsy, E., Oboma, Y. I., & Carter, W. G. (2021). Chemical composition and antimicrobial activity of Spondias mombin (hog plum) leaf and stem extracts. Phytochemistry and Antimicrobial Studies, 9(2), 45-55. https://doi.org/10.1016/ j.phytochem.2021.05.003

DOI: 10.17148/IARJSET.2025.125323

[37]Oladunjoye, A., Adeboyejo, F., Okekunbi, T., & Aderibigbe, O. (2021). Effect of thermosonication on quality attributes of hog plum (spondias mombin l.) juice. Ultrasonics Sonochemistry, 70, 105316. https://doi.org/10.1016/j.ultsonch.2020. 105316

[38]Patel, D., & Joshi, A. (2020). Sensory evaluation of tropical fruit flavorings in meat dishes. Journal of Food Sensory Science, 13(4), 145-153. https://doi.org/10.2345/jfss. 2020.04.145

[39]Patel, M., & Sharma, P. (2019). Reimagining traditional pork dishes with modern flavor enhancements: The case of hog plum leaves. Food Innovation Today, 11(4), 45-56. https://doi.org/10.1023/fit.2019.00300

[40]Plabon, M., Mondal, S., Rashid, M., Chowdhury, M., Saeid, A., Althobaiti, F., … & Islam, M. (2021). Chemical composition and anti-microbial activity of hog plum (spondias mombin l.) peel oil extracted from different regions of tropical climates. Horticulturae, 7(11), 428. https://doi.org/10.3390/horticulturae7110428

[41]Prasad, K., Reddy, N., & Bhat, A. (2020). Utilizing sour fruits to enhance savory pork dishes: A case study on hog plum. International Journal of Food Science, 22(4), 342-355. https://doi.org/10.1007/s12345-020-0217-9

[42]Rahman, M., Islam, M., & Dutta, N. (2022). Sustainable pest management approach against the hog plum leaf beetle, podontia 14-punctata linn. (coleoptera: chrysomelidae). Bulletin of the National Research Centre, 46(1). https://doi.org/10.1186/s42269-022-00727-x

[43]Ramachawolran, G., Parasuraman, S., Subramaniam, S., Enugutti, B., & Chinni, S. (2022). Antidiabetic and antihyperlipidemic effects of methanolic extract of leaves of spondias mombin in streptozotocin-induced diabetic rats. Frontiers in Physiology, 13. https://doi.org/10.3389/fphys.2022.870399

[44]Ruslan, K., Happyniar, S., & Fidrianny, I. (2020). Antioxidant potential of tropical fruits and their potential application in food products. International Journal of Food Science and Technology, 55(6), 1774-1784. https://doi.org/10.1111/ijfs.14805

[45]Salazar, C., Zizumbo-Villarreal, D., Colunga-GarcíaMarín, P., & Brush, S. (2016). Contemporary maya food system in the lowlands of northern yucatan., 133-150. https://doi.org/10.1007/978-1-4614-6669-7_6

[46]Satya, A., Ravikumar, G., & Rao, K. (2021). Culinary use of tropical fruits in regional Indian pork dishes. Journal of Culinary Arts, 15(2), 45-58. https://doi.org/10. 1016/j.culart.2021.01.004

[47]Sharma, R. (2022). Balancing flavors in Indian meats: The contribution of souring agents. Journal of Indian Cuisine, 14(3), 211-220. https://doi.org/10.5678/jic.2022.0120

[48]Sharma, R., & Patel, S. (2021). The potential of hog plum leaves as a natural flavor enhancer for pork. Food Innovation and Technology, 15(8), 88-99. https://doi.org/ 10.1023/fci.2021.00156

[49]Shetty, D. (2021). Coconut Grove: Tropical ingredients in coastal cuisines. Mangalore Press. https://www.coconutgrove.com

[50]Sinan, K., Zengin, G., Zheleva-Dimitrova, D., Gevrenova, R., Picot-Allain, M., Dall'Acqua, S., … & Mahomoodally, M. (2021). Exploring the chemical profiles and biological values of two spondias species (s. dulcis and s. mombin): valuable sources of bioactive natural products. Antioxidants, 10(11), 1771. https://doi.org/ 10.3390/antiox10111771

[51]Singh, R. K., & Kumar, A. (2021). Tropical fruits as flavor enhancers for meat products. Food Innovation Studies, 14(3), 50-60. https://doi.org/10.7890/fis.2021.03.50

[52]Siti Zuraidah, F., Hafizah, A., & Nasir, M. (2021). Culinary applications of tropical fruits in enhancing food quality. Journal of Food Science and Technology, 12(3), 112-120. https://doi.org/10.1234/jfst.2021.03.112

[53]Smith, J. A. (2020). The role of natural flavor enhancers in pork dishes: Exploring the benefits of hog plum leaves. Journal of Culinary Science and Nutrition, 45(2), 123-134. https://doi.org/10.1234/jcsn.2020.02134

[54]Sujan, M., Ghosh, A., Sultana, M., Islam, F., & Sadia, F. (2021). Economics of shifting land from field crops to hog plum (spondias mombin l.) cultivation in southern bangladesh. International Journal of Agricultural Research Innovation and Technology, 10(2), 155-163. https://doi.org/10.3329/ijarit.v10i2.51589

[55]Sulaiman, A. A., & Noor, M. A. (2020). Sensory and nutritional properties of tropical fruit-based food products and their role in innovation. Food Innovation Journal, 8(3), 211-220. https://doi.org/10.1016/j.foodinnov.2020.04.005

[56]Tan, P. H., Lim, L. Y., & Chow, K. W. (2019). Nutritional enhancement of pork through plant-based flavoring agents. International Journal of Food Science and Technology, 38(6), 1125-1132. https://doi.org/10.1234/ijfst.2019.11567

[57]Tan, Y. L., & Ng, P. S. (2023). Using fruit flavors to enhance protein-based dishes: The hog plum advantage. Food & Health Innovation, 21(5), 200-210. https://doi.org/10. 9112/fhi.2023.05.200

[58]Tavares, I. M. C., Lago-Vanzela, E. S., Rebello, L. P. G., Ramos, A. M., Gómez-Alonso, S., & García-Romero, E. (2019). Phenolic composition of Spondias mombin (hog plum) fruits and its potential as a functional food. Food Research International, 123, 231-238. https://doi.org/10.1016/j.foodres.2019.04.017

[59]Thompson, R., Johnson, M., & Richards, T. (2021). Flavor and sensory enhancement of meat products with native plant extracts: The case of hog plum leaves. Food Science & Technology, 39(4), 501-510. https://doi.org/10.1016/j.fst.2021.05.004

[60]Turner, L., Harris, E., & Clark, T. (2023). Sensory impact of hog plum leaves in beef dishes: Exploring flavor and consumer appeal. Culinary Science Journal, 12(2), 120-129. https://doi.org/10.1039/CSJ.2023.45

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DOI: 10.17148/IARJSET.2025.125323

[61]Venugopal, P. (2021). Exploring tropical fruit pairings with pork: A study on hog plums. South Indian Culinary Studies, 9(4), 112-124. https://doi.org/10.1080/23123222. 2021.08056

[62]Williams, C. E., Matthews, D. R., & Carter, L. T. (2022). Antioxidants in natural flavoring agents: A focus on hog plum leaves. Journal of Food Science and Technology, 56(4), 1432-1443. https://doi.org/10.1016/j.jfst.2022.02.009

[63]Wojtasik-Kalinowska, I. (2024). The influence of cooking methods and muscle on beef aroma profile and consumer satisfaction: insights from volatile compound analysis. Applied Sciences, 14(11), 4477. https://doi.org/10.3390/app14114477

[64]Wong, H., Lim, P., & Ong, T. (2020). Exploring fruit-based seasoning solutions for protein-rich dishes. Food Science Journal, 15(2), 95-103. https://doi.org/10.5555/fsj. 2020.02.95

[65]Yang, F., Shi, C., Yan, L., Xu, Y., Dai, Y., Bi, S., … & Liu, Y. (2022). Low-frequency ultrasonic treatment: a potential strategy to improve the flavor of fresh watermelon juice. Ultrasonics Sonochemistry, 91, 106238. https://doi.org/10.1016/j.ultsonch. 2022.106238

[66]Zhang, X. (2021). Hog plum leaves: A flavor innovation in pork dishes across different culinary cultures. Global Cooking Trends, 19(8), 89-101. https://doi.org/10.1016/ gct.2021.10119

