Product Development of Bamboo Shoot Chicharon

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ABSTRACT

This research paper focused on developing a new plant-based chicharon made out of bamboo shoot, offering a healthier and more sustainable alternative to pork rinds chicharon. Bamboo shoots are highly nutritious, rich in fiber, vitamins, and minerals, and are widely available in Nueva Vizcaya. The study aimed to determine the appropriate ingredients and processes in the development of Bamboo Shoot Chicharon, evaluate its acceptability in terms of appearance, aroma, taste, and texture, and identify the most suitable recipe. Three product samples were developed and tested: Recipe 1 with 100% bamboo shoot flour, Recipe 2 with 50% bamboo shoot paste and 50% cornstarch, and Recipe 3 with 60% bamboo shoot paste and 40% flour. A final formulation using 80% bamboo shoot paste and 20% cornstarch was also tested. Evaluation was conducted by chicharon producers in Solano, Nueva Vizcaya. Findings showed that Recipe 3 and the final recipe were both rated as "very much acceptable" across all sensory attributes, with the final recipe receiving the highest overall acceptability score. These results suggest that bamboo shoot chicharon is a promising, well-received alternative to traditional pork chicharon, suitable for health-conscious consumers and sustainable food innovation.

Keywords: acceptability, product evaluation**,** vegetable chicharon,

INTRODUCTION

Chicharon is traditionally made from pork rind and a little bit of fat. It is boiled and seasoned then deep-fried until it becomes light, crunchy, airy and is usually sold by the vendors on the streets, restaurants, markets, and other places.

One of the well-known brands of chicharon in the Philippines is made by R. Lapid's Chicharon & Barbecue, a business founded by Rey C. Lapid in 1974. He established the business, which has grown to become one of the largest manufacturers of chicharon in the Philippines (Valerio, 2021). Lapid's Chicharon & Barbecue is accredited by NMIS and FDA as a certified food manufacturer. It holds copyright (1996) and trademark protection (2000) and follows GMP and HACCP standards. In 2020, the business received certification from SGS Philippines (SGS Philippines, 2020)

According to Mendiola (2023), the chicharon capital of the Philippines is Bulacan, particularly municipality of Sta. Maria, where the Chicharon Festival is held every February. But when it comes to delicious and affordable chicharon, one place immediately comes to mind – Carcar, Cebu. Aside from its historical architecture, Carcar is also known for its many delicious foods, including lechon and chicharon.

Another brand of chicharon known for being one of the best local delicacies, maybe even unquestionably the best chicharon in Carcar, is produced by Mat-Mat Chicharon (Delicacies.ph (2023). Since the 1950s, Mat- Mat has been selling its products in the city. Besides this brand, Carmen Otic Crispy Chicharon was also identified as another player in having the best chicharon and Cebuano delicacies in town. They may also hold the title for having the best chicharon in Car-car.

Due to increasing health consciousness, there has been a growing demand for plant-based chicharon alternatives. In response, the researchers aim to develop a healthier version of chicharon using bamboo, which

is widely available in Nueva Vizcaya. This initiative aligns with the national bamboo and tree planting activity led by the Department of Environment and Natural Resources (DENR) and the Department of the Interior and Local Government (DILG), which recently saw over 7,000 bamboo propagules planted in the Cagayan Valley by about 2,000 volunteers.

METHODOLOGY

The researchers used experimental and descriptive design. The researchers determined which of the product experimentations from the first recipe to the final recipe was applicable in producing bamboo shoot chicharon. Also, in this experimentation, the researchers determined the acceptability of the product in terms of appearance, aroma, texture and taste. Specifically, four approaches were used to determine and enhance bamboo shoot chicharon. Firstly, there was an exploration of various ingredients and methods to systematically create the perfect combination for the product.

The opinions of individuals were later sought regarding bamboo shoot chicharon. The descriptive design was utilized in this stage through the use of surveys, questionnaires, and sensory evaluations to gather insights on the product's visual appeal, scent, taste, and texture with the aim of determining if people find the final product appealing.

By incorporating both of these methods, this research aimed not only to create an excellent bamboo shoot chicharon but also to understand people's preferences. This way, improvements can be made to ensure the product's success.

This research approach was used to make bamboo shoot chicharon the finest it could be. Moreover, the naturalistic inquiry in qualitative research aims to attain an in-depth understanding of social phenomena in their natural settings (Libguide, 2022), in this case, the acceptability of the developed bamboo shoot chicharon.

The researchers purposively sampled the population for this study in Solano, Nueva Vizcaya. This was done to identify people with great knowledge and experience in chicharon making. Specifically, three different business firms labeled Evaluator 1, Evaluator 2, and Evaluator 3 were chosen. From each business, five respondents were recruited, comprising the owner plus four employees, all of whom had hands on experience and/or managerial insight into chicharon making. This approach ensured that the panel included individuals best qualified to evaluate product development and sensory qualities.

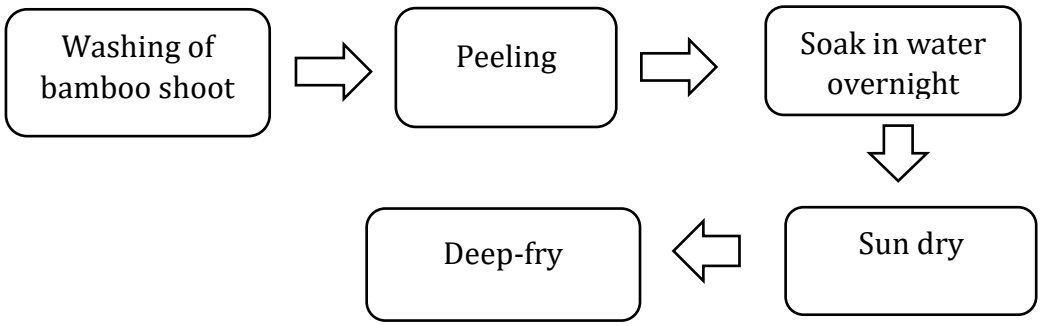
RESULTS AND DISCUSSION

Section 1. The Appropriate Ingredients and Processes Needed in the Development of Bamboo Shoot Chicharon

In testing the acceptability of Bamboo Shoot Chicharon, the following samples were considered:

Ingredients and Processes

Process on How to Prepare the Bamboo Shoot Chicharon



Recipe 1

Table 1: Ingredients, Materials and Procedures in Making Bamboo Shoot Chicharon Using the Treatment of 100% BSF

TREATMENT	INGREDIENTS	MATERIALS
100% Bamboo Shoot Flour	Bamboo Shoot Water Salt	Utility Bowl Mixing Bowl Wooden Spoon Measuring cup and spoon

To make the basic ingredient, which is bamboo flour, needs to be made, the bamboo shoot needs to be peeled and washed well first. The shoots will be cut into strips then sun-dried. When dried, the strips can now be ground into flour. Recipe 1 has five main steps in the preparation of bamboo shoot chicharon that were identified: washing of the bamboo shoots, peeling of the outer later to reveal the soft and edible part, soaking of the shoots overnight, sun-drying and finally, deep-frying.

Recipe 2

Table 2: Ingredients, Materials and Procedures in Making Bamboo Shoot Chicharon Using the Treatment of 50% Cornstarch and 50% BS Paste

TREATMENT	INGREDIENTS	MATERIALS
50% Cornstarch 50% Bamboo Shoot Paste	Bamboo Shoot Water Spices Oil Cornstarch Bamboo Shoot Paste	Utility Bowl Mixing Bowl Measuring Spoon Measuring Cup Food Processor or Grinder Mixer Cookie Cutter Large Sauce Pan Frying Wok Billow

Instead of bamboo shoot flour, bamboo shoot paste and cornstarch are used. As seen in the list of ingredients, spices are added to just salt. As Respondent 2 said, MSG should be added for more flavor and that Respondent 3 suggested making the product saltier for taste

Recipe 3

Table 3: Ingredients, Materials and Procedures in Making Bamboo Shoot Chicharon Using the Treatment of 40% Cornstarch 60% BS Paste

TREATMENT	INGREDIENTS	MATERIALS
40% Cornstarch 60% Bamboo Shoot Paste	Bamboo Shoot Water Spices	Utility Bowl Mixing Bowl Measuring Spoon

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	Oil Cornstarch Bamboo Shoot Paste	Measuring Cup Food Processor or Grinder Mixer Cookie Cutter Large Sauce Pan Frying Wok Billow

In this Recipe, Peel and wash bamboo shoot first and boil it for 45 minutes. Then grind it to make a paste. After turning it into a paste, mix 250 grams of BS paste and 100 grams of cornstarch. Researchers use cookie cutter and cut into batches. Sun dried for at least 2 days. Lastly, Fry in hot oil.

Final Recipe for Taste Testing

Table 4: Final Testing: Ingredients, Materials and Procedures in Making Bamboo Shoot Chicharon Using the Treatment of 20% Cornstarch 80% BS Paste

TREATMENT	INGREDIENTS	MATERIALS
20% Cornstarch 80% Bamboo Shoot Paste	Bamboo Shoot Water Spices Oil	Utility Bowl Mixing Bowl Measuring Spoon Measuring Cup Food Processor or Grinder Mixer Cookie Cutter Large Sauce Pan Frying Wok Billow

In this Final Recipe, the procedure is to peel and wash the Bamboo Shoot and boil it for 45 minutes. Grint it to make a paste. Mix 200 grams of BS Paste and 50 grams of cornstarch. Add the flour to the mixture, to make a dough. To cut it into batches, use a cookie cutter. Lastly, fry it in a hot boil.

Based on the interview with the respondents, common themes emerged. First, most of them suggested the use of MSG as seasoning and increasing the saltiness of the chicharon. In traditional pork rind chicharon, doing this balances the richness of the fat and creates a satisfying flavor profile that many people find appealing. Reid and Price (2023) said that MSG is found in ingredients labeled “hydrolyzed protein,” “yeast extract,” and even “natural flavors.” On the other hand, in terms of its cooking process, most of the seller stated that bamboo shoot chicharon should be deep fried. Chicharon in the Philippines as per Raymund (2020) is deep fried to achieve a puffed consistency. The recipe includes involves baking the pork rind first, but the final step is deep-frying to achieve the desired crispy texture. The respondents suggest that this deep-frying should be done to the bamboo shoot chicharon to achieve the needed crunch.

Challenges in Product Development from Drying to Frying

When it comes to challenges in product development from drying to frying, Respondents 1 and 6 did not mention any. On the other hand, Respondent 2 stated “*Hindi Masyadong Drying* (Not too dry)” saying that the mixture may not dry as much as it needs to which Respondent 7 also mentioned. Respondents 3 said that air

drying may be a challenge while Respondents said, *"Tapok/alikabok sa labas habang nag sun-dry* (Dust outside while drying)" which highlights the problem of the mixture being exposed to dust when sun drying.

Tips

In terms of tips, Respondents 2, 4 and 6 suggested the use of MSG while Respondent 3 mentioned air drying.

Majority of the sellers recommended adding MSG to bamboo shoot chicharon which can provide an extra umami flavor and enhance the overall taste profile of the dish. MSG, or monosodium glutamate, is known for its ability to boost savory flavors without overpowering other ingredients. It is a commonly used flavor enhancer in many Asian cuisines. When used in moderation, MSG can help bring out the natural flavors of the bamboo shoot and complement the crispy texture of the chicharon. However, it is important to be mindful of the quantity used to avoid making the dish overly salty. Experimenting with small amounts of MSG and adjusting to taste can help achieve a balanced and delicious flavor profile in your Bamboo Shoot Chicharon.

Recommendations for the Appearance, Aroma, Taste, and Texture

Participants recommended MSG as a practical ingredient to enhance the product's umami quality. But to minimize the effects of MSG on health, it was used in moderation to amplify flavor while preserving the natural taste of bamboo shoots. Its inclusion was aligned with consumer expectations and recognized food safety standards, reinforcing its role as a sensible seasoning option when applied responsibly

Moreover, in terms of initial sales insights evaluators verbatim said *"Mabili sa pansitan* (Can sell quickly in *pansitans)"* (Respondent 1) and "*Mabenta kapag ibenta sa tindahan*(Better sell it in stores)*"* (Respondent 2). These statements emphasize the importance of strategic placement and visibility for rapid product movement.

In the context of flavor expectation, they have positive statement as such "*Na malasahan ang bamboo shoot (*rabong)" (Respondent 3) and "Bamboo shoot should be tasted in the product" (Respondent 4) highlights that the natural bamboo flavor must remain prominent. In line with this, Resondent 5 suggested adding more bamboo shoot paste or flour and even MSG to determine the optimal ingredient ratios.

Based on the responses, three themes emerged namely conditions that the product is sold quickly; expectations on the taste of bamboo shoot; and delicious taste of the product.

Section 2. Combined Sensory Evaluation

Table 6 Combined Sensory Evaluation Table

Sensory Attributes	**Recipe 1 Mean ± SD**	**Qualitative**	**Recipe 2 Mean ± SD**	**Qualitative**	**Recipe 3 Mean ± SD**	**Qualitative**	**Final Recipe Mean ± SD**	**Qualitative**
Appearance								
1.1. Brown appealing color	2.67 ± 1.18	Acceptable	2.87 ± 0.92	Acceptable	3.13 ± 0.92	Acceptable	3.13 ± 0.92	Acceptable
1.2. Airy structure	2.53 ± 0.99	Acceptable	2.87 ± 0.92	Acceptable	3.00 ± 0.92	Acceptable	3.00 ± 0.92	Acceptable
Aroma								
1.3. Slightly smoky aroma	2.73 ± 0.88	Acceptable	2.73 ± 0.96	Acceptable	2.87 ± 0.74	Acceptable	2.87 ± 0.74	Acceptable
1.4. Distinct and savory	2.53 ± 0.99	Acceptable	2.80 ± 0.86	Acceptable	3.13 ± 0.83	Acceptable	3.13 ± 0.83	Acceptable

scent								
Taste								
1.5. Mild and slightly sweet	2.67 ± 0.90	Acceptable	2.60 ± 0.91	Acceptable	2.80 ± 0.86	Acceptable	2.80 ± 0.86	Acceptable
1.6. Salty and savory	2.73 ± 0.88	Acceptable	2.73 ± 0.70	Acceptable	3.13 ± 0.83	Acceptable	3.13 ± 0.83	Acceptable
Texture								
1.7. Slightly tender and crunchy	2.93 ± 0.96	Acceptable	2.87 ± 0.92	Acceptable	3.00 ± 0.85	Acceptable	3.00 ± 0.85	Acceptable
Overall Acceptability	2.68 ± 0.97	Acceptable	2.78 ± 0.88	Acceptable	3.01 ± 0.85	Acceptable	3.01 ± 0.85	Acceptable

This table provides a comprehensive overview of its sensory attributes of the different recipes. Columns 2 and 3 present the results for Recipe 1. This analysis is critical for understanding consumer perceptions and the overall acceptability of the product within the culinary landscape. From the data presented, it is evident that each sensory attribute was assessed on a quantitative scale, yielding mean scores along with their respective standard deviations. The sensory attributes are categorized into four distinct domains: appearance, aroma, taste, and texture.

Section 3. Defining the Right Recipe of Bamboo Shoot Chicharon

When it comes to necessary changes: two suggestions surfaced: adding MSG and adding bamboo shoot. This emphasized the importance of MSG and Rabong to the sensory acceptability of the bamboo shoot chicharon. According to Sinha (2023), MSG, or monosodium glutamate, is a flavor enhancer that has a long history of use in cooking. It is a white, crystalline powder made from glutamic acid, an amino acid naturally found in many foods like tomatoes, cheese, and mushrooms. When added to food, MSG enhances the savory, or umami, taste, making it more appealing and palatable. This is because MSG interacts with taste receptors on the tongue, stimulating a sensation of deliciousness that can be described as "brothy" or "meaty." MSG does not add its own distinct flavor, but rather amplifies the existing flavors of the dish, making them more pronounced and enjoyable. While some people may experience mild side effects like headaches after consuming MSG, it is generally considered safe in moderate amounts and is widely used in cuisines around the world. When it comes to Bamboo shoot chicharon, being a crunchy snack, it might not naturally possess strong savory notes, but MSG could potentially amplify any existing savory elements.

The addition of MSG and Rabong is a common practice aimed at elevating the taste, aroma, and texture of the chicharon. MSG, known for its flavor-enhancing properties, can intensify the savory notes of the bamboo shoot and chicharon, creating a more satisfying culinary experience. Rabong, or bamboo shoots, add a unique texture and earthy flavor to the dish. By balancing the use of these ingredients, sellers can create a harmonious blend that entices customers and sets their bamboo shoot chicharon apart in terms of taste and quality. This deliberate choice of ingredients reflects a commitment to delivering a flavorful and enjoyable product to consumers, ultimately contributing to the success and popularity of their chicharon offerings.

The themes emphasize the importance of MSG and additional bamboo shoot to the product. Adding it to bamboo shoot chicharon could amplify existing savory notes, making the snack more appealing and palatable. It could also lead to a unique and potentially more appealing bamboo shoot chicharon product.

CONCLUSION AND RECOMMENDATIONS

Conclusion

Bamboo shoot chicharon is acceptable in terms of sensory attributes such as appearance, aroma, taste, and

texture, with both Recipe 3 and the Final Recipe receiving the highest average scores of 3.01 and above, all within the "acceptable" range. The optimal formulation consists of 80% bamboo shoot paste and 20% cornstarch. This recipe consistently demonstrated the most balanced and favorable attributes across all sensory criteria, supported by low standard deviation scores indicating consistent responses. Interview findings revealed that MSG and bamboo shoots (rabong) are key ingredients preferred by sellers. MSG enhances savory flavor, while rabong contributes to the texture and distinctive flavor that consumers associate with the product. The combination of a crispy texture and savory flavor makes the product widely acceptable, reinforcing the conclusion that bamboo shoot chicharon can be a viable, plant-based alternative to traditional pork chicharon.

Recommendations

To the Chicharon Producers

1. Explore new flavors of bamboo shoot chicharon (e.g., spicy, cheese, vinegar, or barbecue) to expand market appeal and cater to diverse taste preferences.
2. Develop a health-forward version of the product with reduced sodium and oil content to cater to consumers seeking nutritious snack alternatives. This supports the broader trend toward functional foods and can increase consumer trust and product differentiation.
3. Continue using locally sourced ingredients, particularly bamboo shoot, to strengthen the product's regional identity and sustainability narrative.
4. Engage in further research and product development to refine seasoning balance and enhance aroma without compromising the natural flavor profile.
5. Collaborate with food technologists and local entrepreneurs for future iterations and commercialization strategies, particularly focused on shelf life, packaging innovations, and healthier formulations.

To the Department of Trade and Industry, they may provide financial support through funding programs to promote innovation of products from agricultural resources.

To the School of Accountancy and Business, faculty and students may conduct thorough market analysis, including consumer surveys, competitor analysis and market segmentation to know the potential market size.

Finally, for Future Researchers, future research could focus on expanding the knowledge base regarding bamboo shoot chicharon. This could involve exploring different processing methods to enhance flavor and texture, investigating the potential health benefits of bamboo shoot chicharon, and conducting consumer studies to understand preferences and market demand. Additionally, research could explore the potential for using different varieties of bamboo shoots or incorporating other ingredients to create unique flavor combinations. Furthermore, research on sustainability and economic viability of bamboo shoot chicharon production would be valuable for promoting this innovative snack.

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