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Tilapia Seasoning Mix

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Abstract

This Study was to develop and determine the sensory properties of a tilapia Seasoning Mix that would enhance the look, aroma, taste and texture of the tilapia. Thirty respondents using convenience sampling, took part in this controlled sensory evaluation and were asked to test the product using Visual Analogue Scale (VAS) and acceptability questionnaire. Sensory results concluded that the seasoning mix performed well and tasted Flavorful (best attribute), it also achieved an overall acceptance score of 4.27, "High Acceptable". This shows that this formulation has successfully enhanced consumer appeal to tilapia and shows that this formulation has successfully enhanced consumer appeal to tilapia and shows a great amount of potential within cooking, and possible product development, however future research should involve texture improvements, shelf life studies, and test markets.

INTRODUCTION

Tilapia (Oreochromis niloticus) is one of the most widely consumed freshwater fish worldwide due to its affordability, availability, and mild flavor profile. It is commonly prepared in households, restaurants, and institutional food services because of its adaptability to various cooking methods such as frying, baking, grilling, and steaming. However, despite its popularity, tilapia is often perceived as having a neutral or bland taste, which may affect its overall consumer appeal.

To enhance its sensory characteristics, seasoning plays a vital role in improving flavor intensity, aroma, and overall eating experience. Seasoning blends composed of herbs, spices, salt, and functional ingredients can significantly elevate the palatability of fish products. Additionally, certain herbs and spices contain antioxidant and antimicrobial properties that may contribute to food safety and potential health benefits.

However, the formulation of a seasoning mix requires careful balance. Excessive salt or spice may overpower the natural taste of tilapia, while insufficient seasoning may fail to enhance its sensory qualities. Thus, developing a well-balanced Tilapia Seasoning Mix and evaluating its consumer acceptability is essential.

For this reason, sensory evaluation is necessary to determine whether the developed seasoning mix enhances tilapia in terms of appearance, aroma, taste, texture, and overall liking. This study aims to develop a Tilapia Seasoning Mix and assess its acceptability among selected respondents.

This research may benefit culinary professionals, food entrepreneurs, hospitality students, and small-scale fish producers interested in value-added fish products. If the seasoning mix proves acceptable, it may contribute to product innovation and market competitiveness in the local food industry.

REVIEW OF RELATED LITERATURE AND STUDIES

In recent years, there has been a growing consumer demand for flavorful and value-added food products, particularly in protein-based commodities such as fish. As dietary preferences shift toward healthier and more convenient meal options, food manufacturers and culinary researchers have focused on enhancing the sensory qualities of commonly consumed products. Among freshwater fish varieties, tilapia

(Oreochromis niloticus) has gained widespread popularity due to its affordability, availability, and adaptability to different cooking methods. However, its naturally mild and neutral flavor profile often necessitates seasoning enhancement to improve overall consumer satisfaction.

Tilapia is recognized as a lean source of protein with relatively low-fat content, making it suitable for health-conscious consumers. According to FAO (2022), tilapia production has steadily increased worldwide due to its economic value and nutritional benefits. Despite these advantages, mild-flavored fish products may lack strong aromatic and taste characteristics, which can influence consumer preference. Santiago et al. (2019) emphasized that seasoning plays a crucial role in enhancing sensory perception, particularly in fish species with subtle flavor profiles. [1]

Herbs and spices such as garlic, paprika, oregano, thyme, and black pepper are widely used in fish preparation due to their flavor-enhancing properties. In addition to improving palatability, many of these ingredients contain bioactive compounds with antioxidant and antimicrobial effects. Shahidi and Ambigaipalan (2015) reported that phenolic compounds present in spices contribute to oxidative stability and may extend the shelf life of food products. [2] These functional properties position seasoning blends not only as flavor enhancers but also as potential contributors to food safety and nutritional value.

Despite these benefits, the formulation of a seasoning mix requires careful balance. Salt, for instance, enhances sweetness and suppresses undesirable metallic notes in fish, yet excessive use may negatively affect health perception. Mottram (2016) noted that acids and aromatic compounds help mask fishy odors and improve freshness perception in seafood products. [3] However, inappropriate ratios of spices and salt may overpower the natural taste of tilapia, thereby reducing product acceptability.

Consumer perception is a critical determinant of success in food product innovation. Even when a product offers nutritional or functional benefits, acceptance largely depends on sensory attributes such as appearance, aroma, taste, and texture. Siegrist and Hartmann (2020) explained that consumers tend to prefer innovative food products that remain familiar in flavor and overall eating experience. [4] Similarly, Tuorila and Hartmann (2011) emphasized that deviations from expected sensory qualities may lead to resistance in purchasing behavior. [5]

For this reason, conducting sensory evaluation is essential in seasoning product development. Stone, Bleibaum, and Thomas (2012) highlighted that structured sensory testing provides measurable insights into consumer perception and helps refine formulations to achieve optimal balance between flavor enhancement and product acceptability. [6] Sensory evaluation methods such as the Visual Analogue Scale (VAS) and Likert-scale questionnaires are commonly used to quantify consumer responses and determine overall liking.

Furthermore, the development of value-added seasoning mixes may generate economic opportunities for local food entrepreneurs and fish producers. By introducing scientifically formulated seasoning blends, tilapia products can gain increased market competitiveness and differentiation. Thus, research on Tilapia Seasoning Mix not only addresses sensory enhancement but also supports innovation in hospitality, culinary arts, and food entrepreneurship.

Overall, existing literature underscores the importance of well-balanced seasoning formulations in improving the sensory characteristics of mild-flavored fish such as tilapia. However, consumer acceptability must be systematically evaluated to determine product viability. The present study seeks to fill this gap by assessing the sensory characteristics and acceptability level of a developed Tilapia Seasoning Mix, providing insights that may guide future product development aligned with consumer preferences and market trends.

METHODOLOGY

A. RESEARCH METHOD

This study employed a qualitative–quantitative research design. Sensory evaluation was conducted to assess the characteristics and acceptability of the Tilapia Seasoning Mix. The qualitative aspect allowed respondents to describe their sensory impressions, while the quantitative aspect measured acceptability using structured scales to determine the level of acceptability

B. RESPONDENTS / PARTICIPANTS

The study involved 30 respondents selected through convenience sampling. Participants were regular fish consumers and were invited to participate in a controlled tasting session.

Including students and staff, who had prior experience in consuming tilapia-based dishes. Their familiarity with the product ensured more reliable and meaningful sensory evaluation result

C. SAMPLING TECHNIQUE

This study utilized a non-probability sampling technique, specifically convenience sampling, to select the 30 participants who evaluated the sensory characteristics of the Tilapia Seasoning Mix. Convenience sampling was chosen because it allows the researcher to gather data quickly and efficiently from individuals who were readily available and willing to participate in the tasting sessions. Given the exploratory and qualitative–quantitative nature of the study, this sampling method is appropriate for obtaining immediate insights from accessible consumers who meet the basic criteria of being familiar with tilapia and fish-based dishes.

The selected participants provided valuable descriptions and feedback regarding the appearance, aroma, taste, and texture of the seasoned tilapia product, which contributed to understanding its overall acceptability. Their responses helped determine whether the developed Tilapia Seasoning Mix met consumer expectations and sensory standards. [13]

D. RESEARCH INSTRUMENT

The study employed the Visual Analogue Scale (VAS) as a research instrument to assess participants' perceptions of the sensory characteristics of tilapia prepared using the developed seasoning mix. The VAS is a widely used measurement tool in sensory and consumer research because it allows respondents to express the intensity of their sensory experiences along a continuous line rather than selecting from predefined categories.

In this study, a 6-inch Visual Analogue Scale was utilized to evaluate the appearance, aroma, taste, and texture of the seasoned tilapia, enabling participants to mark their precise level of perception or liking for each sensory attribute. This method provides greater sensitivity compared to traditional rating scales, as it captures subtle variations in individual responses and minimizes response restriction.

The results obtained from the VAS complemented the structured acceptability questionnaire and qualitative feedback gathered from participants, thereby offering a more comprehensive understanding of the sensory performance and overall acceptability of the Tilapia Seasoning Mix across multiple sensory dimensions.

E. DATA GATHERING PROCEDURE

The data gathering procedures of this study were carried out in three systematic phases to ensure that the research instruments were appropriate, the sensory evaluation was reliable, and the information collected accurately reflected participants' perceptions of the Tilapia Seasoning Mix. These phases included: Phase I – Conceptualization, Phase II – Pilot Testing and Revision of the Research Instrument,

and Phase III – Survey Data Collection. Each phase played a critical role in refining the process and strengthening the validity of the study's findings.

Participants were given clear instructions before evaluation to ensure consistency in responses. Ethical consideration, including voluntary participation and confidentiality of responses, were also observed.

Phase I – Conceptualization

During the conceptualization phase, the researchers formulated the overall framework of the study and identified the key sensory attributes to be evaluated, specifically the appearance, aroma, taste, and texture of tilapia prepared using the developed seasoning mix. Relevant literature on sensory evaluation, fish product enhancement, seasoning formulation, and qualitative–quantitative assessment tools was reviewed to guide the development of the initial research instruments.

The construction of the Visual Analogue Scale (VAS) and the structured questionnaire was undertaken in this phase to ensure alignment with the research objectives and accurate measurement of the product's sensory characteristics. In addition, the preparation protocol for the tilapia samples was established, including seasoning application method, marination time, cooking procedure, portion size, and serving conditions. Standardization of these procedures was implemented to maintain consistency in the evaluation of the Tilapia Seasoning Mix.

Phase II – Pilot Testing

In the second phase, the initial version of the research instrument, which included the Visual Analogue Scale and acceptability questionnaire, was subjected to a pilot test involving a small group of participants similar to the target respondents. The purpose of this pilot testing was to assess the clarity, reliability, and usability of the instrument.

Participants were asked to evaluate the tilapia seasoned with the developed mix and provide feedback regarding the clarity of instructions, appropriateness of the scale length, and overall evaluation process. Their responses were carefully reviewed to identify any ambiguous statements, confusing terms, or issues that might affect the accuracy of the collected data. Based on the feedback gathered, necessary revisions were made to improve the wording, format, and structure of the research instrument before its final administration.

Phase III – Survey Data Collection

The final phase involved the actual administration of the revised research instrument to the study's 30 respondents selected through convenience sampling. Participants were invited to a controlled tasting session where tilapia samples were prepared using standardized seasoning proportions and cooking procedures to ensure uniformity in appearance, aroma, taste, and texture.

After tasting the seasoned tilapia, participants completed the Visual Analogue Scale and the structured acceptability questionnaire to record their sensory perceptions and overall evaluation of the Tilapia Seasoning Mix. All responses were collected, organized, and securely stored for subsequent analysis. This systematic data collection process ensured that the gathered information accurately represented the respondents' sensory experiences and acceptability levels of the developed seasoning mix.

F. STATISTICAL TREATMENT

For the Visual Analogue Scale (VAS), the mean was computed:

$$\bar{X} = \frac{\sum X}{N}$$

For the acceptability questionnaire, the weighted mean was calculated:

$$\bar{X} = \frac{\sum Wx}{\sum W}$$

The scale interpretation was categorized as:
4.21 – 5.00 → Highly Acceptable
3.41 – 4.20 → Acceptable
2.61 – 3.40 → Moderately Acceptable
1.81 – 2.60 → Slightly Acceptable
1.00 – 1.80 → Not Acceptable

RESULT AND DISCUSSION

A. Quantitative Descriptive Analysis using VAS

Table 1
Quantitative Descriptive Analysis

Qualities Mean Description		
Appearance	4.58	Golden Brown
Aroma	4.47	Aromatic
Taste	4.63	Flavorful
Texture	4.35	

The results of the Visual Analogue Scale (VAS) reveal that the developed Tilapia Seasoning Mix obtained consistently high mean scores across all sensory attributes, indicating a strong positive perception among respondents.

Taste registered the highest mean score (4.63), described as "Flavorful," suggesting that the seasoning formulation effectively enhanced the inherent mild taste of tilapia. This finding confirms that the blend of spices and seasonings successfully addressed the common limitation of tilapia being perceived as bland. The dominance of taste as the highest-rated attribute highlights its role as the primary determinant of overall consumer satisfaction.

Appearance followed closely with a mean score of 4.58, described as "Golden Brown." This indicates that the seasoning mix contributed to an appealing visual quality, likely through the interaction of its ingredients during cooking, resulting in desirable browning. Since visual appeal significantly influences initial food acceptance, this result suggests that the product has strong potential to attract consumers even before tasting.

Aroma obtained a mean score of 4.47, interpreted as "Aromatic," reflecting the effectiveness of the seasoning in producing a pleasant and appetizing scent. Aroma plays a critical role in enhancing the overall eating experience, as it directly affects flavor perception and appetite stimulation. The positive evaluation in this attribute indicates that the seasoning mix successfully improved the olfactory appeal of the dish.

Texture, with a mean score of 4.35 and described as "Tender," received the lowest score among the attributes, although it still falls within a highly acceptable range. This suggests that while the seasoning contributed to a desirable mouthfeel, texture is less influenced by seasoning alone and more dependent on cooking techniques and preparation methods. This finding highlights a potential area for improvement in

product development.

Overall, the VAS results demonstrate that the Tilapia Seasoning Mix achieved a balanced and high-level sensory performance**,** with all attributes receiving favorable evaluations.

B. Acceptability Level of the Tilapia Seasoning Mix

Table 2

Acceptability Level

Qualities Attributes	Weighted Mean	Verbal Interpretation
Appearance	4.32	Highly Acceptable
Aroma	4.18	Acceptable
Taste	4.41	Highly Acceptable
Texture	4.35	Acceptable
Composite	4.27	Highly Acceptable

The acceptability level further supports the findings of the sensory evaluation, with a composite mean of 4.27, interpreted as "Highly Acceptable." This indicates that the developed seasoning mix was well-received by respondents and meets consumer expectations in terms of overall quality.

Taste again ranked highest (4.41, Highly Acceptable), reinforcing its significance as the most influential factor in consumer preference. This consistency between descriptive and acceptability results strengthens the reliability of the findings and confirms that the seasoning mix effectively enhances flavor.

Appearance also received a high rating (4.32, Highly Acceptable), suggesting that respondents found the product visually appealing. This supports the earlier observation that the seasoning contributes positively to color and presentation.

Aroma (4.18) and texture (4.35) were both rated as "Acceptable," indicating that while these attributes were positively perceived, there is still room for refinement. The slightly lower rating of aroma compared to taste may suggest that the intensity or complexity of the scent could be further enhanced. Similarly, texture may benefit from improvements in preparation techniques rather than formulation alone.

IN-DEPTH ANALYSIS OF FINDINGS

The results reveal a clear pattern: taste is the dominant factor influencing acceptability, followed by appearance, aroma, and texture. This aligns with established principles in food science, where flavor is often the primary driver of consumer satisfaction.

The relatively narrow range of mean scores across all attributes indicates that the seasoning mix achieved a well-balanced sensory profile, which is essential for product success. A product that performs consistently across multiple sensory dimensions is more likely to gain wider consumer acceptance compared to one that excels in only a single attribute.

Furthermore, the use of the Visual Analogue Scale (VAS) allowed for more precise measurement of sensory perception, capturing subtle differences in respondent evaluations. This enhances the validity of the results and provides a more nuanced understanding of consumer preferences.

The slightly lower rating for texture provides a critical insight: sensory enhancement is multidimensional**,** and improving flavor alone is not sufficient to achieve optimal product quality. This highlights the importance of integrating both formulation and preparation techniques in product development.

IMPLICATIONS OF THE STUDY

1. Culinary and Product Development

The findings demonstrate that the developed Tilapia Seasoning Mix can effectively enhance the sensory quality of tilapia, particularly in terms of taste and appearance. This supports its application in creating value-added dishes that elevate the overall eating experience.

2. Innovation in Food Preparation

The relatively lower score for texture suggests the need for complementary cooking methods**,** such as coating, controlled frying, or baking techniques, to further improve mouthfeel. This implies that future innovations should combine seasoning formulation with preparation strategies.

3. Marketability and Commercial Potential

The high level of acceptability indicates strong potential for commercialization**.** The seasoning mix can be developed into a marketable product, such as a packaged seasoning blend or ready-to- cook tilapia variant, catering to consumers seeking convenient and flavorful meal options.

4. Consumer Preference Insight

The study confirms that consumers prioritize flavor and visual appeal**,** which should be the focus of future product development. Maintaining a balance between familiarity and innovation is essential to ensure consumer acceptance.

5. Academic and Research Contribution

The study contributes to the field of hospitality and food science by providing empirical evidence on the effectiveness of seasoning mixes in enhancing mild-flavored fish. It also highlights the importance of sensory evaluation as a tool for product development and innovation**.**

6. Future and Research Directions

The findings suggest opportunities for further investigation, including:

- Optimization of cooking methods to improve texture
- Shelf-life and storage stability of the seasoning mix
- Nutritional analysis and health benefits
- Consumer testing across different demographic groups

CONCLUSION

The findings of this study demonstrate that the developed Tilapia Seasoning Mix effectively improved the sensory qualities of tilapia in terms of appearance, aroma, taste, and texture, attaining an overall acceptability rating of 4.27, classified as “Highly Acceptable.” Taste emerged as the most influential attribute, confirming the seasoning mix’s capability to enhance the palatability of tilapia, while appearance and aroma also contributed significantly to positive consumer perception. Although texture received a comparatively lower rating, it remained within the acceptable range, indicating that further enhancement may be achieved through appropriate cooking techniques rather than modifications in formulation. The alignment between the sensory evaluation and acceptability results suggests that the product achieved a well-balanced sensory profile, reinforcing its suitability for value-added product development. In addition, the results provide a foundation for the development of an innovative tilapia-based recipe that integrates flavor enhancement with improved texture and presentation.

Overall, the study highlights the potential of the seasoning mix for culinary applications, product innovation, and commercialization, while underscoring the importance of sensory evaluation as a systematic approach in food product development. Future studies are recommended to focus on texture

optimization, shelf-life evaluation, packaging innovation, and broader consumer testing to further establish its market viability.