Original Research Article

Comparison of the Sensory Quality of Fresh and Steamed Organic Tilapia

ABSTRACT

This study aimed to evaluate the sensory attributes of steamed and fresh organic tilapia and determine the acceptability of both preparations among consumers. Fifty respondents, aged 15-60 years, participated in the sensory evaluation. The organic tilapia used in the study was of the GET ExCEL 2010 strain, harvested with an average weight of 60-100 grams after a four-month culture period. Both steamed and fresh tilapia were assessed for five sensory attributes: shininess of scales, color of eyes, color of gills, odor, and firmness. The sensory evaluation was conducted using a consumer preference test, and statistical analysis was performed using descriptive statistics and paired t-tests. The results indicated that both steamed and fresh tilapia were generally well-accepted, with no significant differences in sensory attributes between the two preparations (p-value > 0.05). Steamed tilapia scored higher in odor, with a mean of 8.0, "Like Very Much," while fresh tilapia received slightly lower scores in visual attributes such as shininess of scales and color of eyes. However, both forms maintained moderate acceptability in terms of odor and gill color, key indicators of freshness. The findings suggest that organic tilapia, regardless of preparation method, offers a consistent sensory experience, making it a versatile and appealing option for consumers. This study highlights the potential of organic tilapia as a sustainable and high-quality freshwater fish choice in the market..

Keywords: Organic Tilapia, Steamed Tilapia, Fresh Tilapia, Aquaculture, Sensory Analysis, Nutritional

1. INTRODUCTION

Tilapia is one of the most important aquaculture species globally and plays a significant role in the Philippines' fish farming industry. As a tropical country with abundant water resources, the Philippines has become one of the top producers of tilapia, contributing significantly to food security and local livelihoods (Guerrero, 2002). With growing demand for healthier food products, organic aquaculture is emerging as a viable alternative to conventional fish farming. Organic tilapia farming prioritizes natural feeds and sustainable methods, avoiding synthetic chemicals, and aligning with consumer preferences for organic products (Boyd & Tucker, 2012).

In the Philippines, tilapia farming supports both nutrition and the economy, especially in rural communities. Health-conscious consumers are increasingly seeking organic tilapia, seen as a healthier option due to its natural farming practices and reduced use of synthetic inputs (Rivera &Dulnuan, 2018). In addition to its nutritional benefits, organic farming is believed to

enhance the sensory attributes of tilapia, including its taste, texture, and overall acceptability, making it more appealing in both local and international markets (Watanabe et al., 2002).

Sensory quality is a critical factor influencing consumer preferences. In the context of organictilapia, how consumers perceive the fresh and steamed forms of the fish is important. Steaming, a common cooking method, is known to enhance the natural flavors and tenderness of fish, potentially leading to higher sensory ratings compared to fresh, uncooked tilapia (Aquerreta et al., 2002). Key sensory characteristics such as appearance, texture, and aroma are essential to consumer satisfaction, especially in the Philippines, where fish is highly valued (Olivar et al., 2020).

This study focuses on comparing the sensory quality of fresh and steamed organic tilapia, highlighting how preparation methods influence attributes such as taste, texture, and overall acceptability. Understanding these differences can help guide consumer choices and provide insights into the potential marketability of organic tilapia, contributing to the growing demand for healthier and more sustainable food options in the Philippines.

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2. METHODOLOGY

2.1 Respondents of the Study

The respondents of the study was composed of 50 people, 25 male and 25 with age ranged from 15-60 years old and not trained for sensory analysis but regular consumers of tilapia.

2.2 Experimental fish

The fish used in this study is organic improved GET ExCEL 2010 with an initial size of #24(Average Body Weight of 0.025 and Average Standard Length of 2.57 cm) with four (4) months culture period and harvested an average weight of 60-100g.

2.3 Preparation of tilapia for evaluation

100 pieces of organic tilapia were obtained from pond of BFAR-NFFTC Organic Aquaculture Farm located at CLSU compound Science City of Munoz, Nueva Ecija.The weight of fish harvested is in the range of 60-100 grams.

2.4 Data gathering instruments

To determine the appearance of fish, the fish were washed thoroughly with cold water, placed in an ice box. In terms of sensory attributes, the fish were steamed in an oven (62.8°C) for 20 minutes in a well packed foil then provide with an alpha-numerical code.

2.5 Sensory analysis

The panel consisted of 50people; age 15- 60 years old. Each was given a survey form which is the consumer preference test and will do the sensory evaluation of the steamed and fresh organic tilapia in terms of shininess of scales, color of eyes, color of gills, odor and firmness.

2.6 Statistical Treatment of Data

Descriptive statistics, including mean, were used to summarize the acceptability ratings of steamed and fresh organic tilapia for various sensory attributes, while a paired t-test was employed to determine significant differences in sensory qualities between the two preparation methods..

3. RESULTS AND DISCUSSION

3.1 Acceptability of Steamed and Fresh Tilapia

3.1.1 Mean acceptability of steamed organic tilapia

The high acceptability of steamed organic tilapia, particularly in terms of odor (mean score of 8.0, "Like Very Much"), reflects findings from previous research that emphasizes the importance of odor in consumer preferences for fish. According to Verbeke et al. (2007), odor is a crucial sensory factor that influences the overall perception of freshness and quality in fish food. Similarly, steaming as a method has been shown to enhance the natural flavors and aroma of fish, making it more appealing to consumers (Aquerreta et al., 2002). The moderate to high ratings for other attributes, such as shininess of scales and firmness, are consistent with research suggesting that the visual appearance of fish, particularly the condition of the scales and texture, plays a significant role in consumer decisions (Hempel & Hamm, 2016).

Table 1. Acceptability of steamed organic tilapia

Attributes	Mean	Description
Shininess of scales	7.8	Like Moderately
Color of Eyes	7.2	Like Moderately
Color of Gills	7.3	Like Moderately
Odor	8.0	Like Very Much
Firmness	7.6	Like Moderately

3.1.2 Mean acceptability of fresh organic tilapia

In contrast, fresh organic tilapia received lower scores for attributes such as shininess of scales (6.3) and color of eyes (5.3), indicating a lesser degree of acceptability. This result aligns with research by Korzen et al. (2011), which found that consumers often associate fresh fish with less appealing visual characteristics compared to cooked fish, where steaming or baking can improve the texture and visual appeal. Moreover, the relatively low score for the firmness of fresh tilapia (5.8) mirrors findings by Grigorakis (2007), who suggested that post-harvest handling and the method of display can affect the firmness and overall quality of fresh fish, thereby influencing consumer perception.

Despite these lower scores, the color of gills and odor of fresh tilapia were still moderately liked by the respondents, with scores of 7.5 and 7.1, respectively. This finding supports the argument by Fauziah et al. (2019), who noted that while the visual appearance of fresh fish might be less appealing, the natural odor and gill color are often indicators of freshness, which still influence acceptability positively.

Table 2. Acceptability of fresh organic tilapia

Attributes	Mean	Description
Shininess of scales	6.3	Like Slightly
Color of Eyes	5.3	Neither Like nor Dislike
Color of Gills	7.5	Like Moderately
Odor	7.1	Like Moderately
Firmness	5.8	Neither Like nor Dislike

3.2Sensory Comparison of Steamed and Fresh Organic Tilapia

The sensory evaluation of steamed and fresh organic tilapia revealed comparable consumer perceptions across various attributes. The shininess of scales received similar ratings for both preparations, with a p-value of 0.08 indicating no significant difference. This result aligns with findings by Hempel and Hamm (2016), which highlight the critical role of visual appeal in consumer acceptance of fish food. While shininess is an essential indicator of fish

quality, steaming does not seem to significantly alter this characteristic, suggesting its preservation in both forms.

The color of the eyes, another key visual factor, also showed no significant difference between steamed and fresh tilapia (p-value of 0.08). According to Korzen et al. (2011), the color of the eyes is a strong indicator of freshness but may not be as impacted by cooking processes as odor or texture. This consistency indicates that both forms maintain a similar perception of freshness based on eye appearance.

For the color of the gills, a slight variation was noted, but the p-value of 0.16 suggests no statistically significant difference. Fauziah et al. (2019) pointed out that vibrant gill color is a marker of freshness, particularly in raw fish. The findings here indicate that steaming does not compromise this attribute, aligning with its role as a reliable indicator of freshness.
Odor, a critical sensory quality, also showed no significant difference between the two preparations, with a p-value of 0.22. Steaming is known to enhance the natural aroma of fish (Aquerreta et al., 2002), yet the results suggest that both steamed and fresh tilapia were perceived similarly in terms of odor, further emphasizing its role as a general freshness marker.

Finally, the firmness of the fish, an essential texture attribute, exhibited no significant difference (p-value of 0.08). Grigorakis (2007) highlighted that post-harvest handling and cooking methods can affect fish texture, but the short cooking duration of steaming may not have been sufficient to induce noticeable changes. This indicates that both preparation methods provide a similar texture experience.
In summary, the sensory evaluation demonstrated no statistically significant differences in shininess of scales, color of eyes, color of gills, odor, and firmness between steamed and fresh organic tilapia. These findings highlight the versatility of organic tilapia, with both preparations offering comparable sensory qualities that appeal to consumers.

Table 3. Statistical Analysis on Sensory Comparison of Steamed and Fresh Organic Tilapia

Attribute	t-comp	p-value
Shininess of scales	2.062	0.08
Color of Eyes	2.062	0.08
Color of Gills	-1.672	0.16
Odor	1.403	0.22
Firmness	2.062	0.08

4. CONCLUSION

The sensory evaluation of steamed and fresh organic tilapia revealed no statistically significant differences in consumer acceptability across key attributes, including shininess of scales, color of eyes, color of gills, odor, and firmness. These findings indicate that both preparation methods provide a comparable sensory experience, reinforcing the versatility and appeal of organic tilapia in various forms.

Steamed organic tilapia scored highly for odor ("Like Very Much"), aligning with previous studies emphasizing the role of enhanced aroma in boosting consumer preferences. Other attributes, such as shininess of scales and firmness, received moderate to high ratings, reflecting their importance in consumer decisions regarding fish quality. This supports research suggesting that steaming can preserve or enhance sensory characteristics without significantly altering key attributes.

In contrast, fresh organic tilapia exhibited slightly lower scores in visual attributes such as shininess of scales and color of eyes. However, it maintained moderate acceptability in terms of gill color and odor, which are critical indicators of freshness. These results align with findings that fresh fish, while less visually appealing, retains intrinsic qualities that positively influence consumer perception.

The t-test results for sensory quality confirmed that the differences in consumer perception between steamed and fresh organic tilapia were not statistically significant for any evaluated attribute. This consistency underscores the ability of organic tilapia to meet consumer expectations regardless of preparation method, providing flexibility for various culinary applications.

Overall, the study highlights that both steamed and fresh organic tilapia are viable options for consumers seeking high-quality food, with sensory attributes that cater to diverse preferences. The findings support the broader appeal of organic tilapia as a sustainable and versatile protein source in the market.

Disclaimer (Artificial intelligence)

Author(s) hereby declare that NO generative AI technologies such as Large Language Models (ChatGPT, COPILOT, etc.) and text-to-image generators have been used during the writing or editing of this manuscript.

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