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Research article

SENSORIAL EVALUATION OF DIFFERENT TYPES OF LEAF-WRAPPED SILVER POMFRET: A STUDY OF GUJARAT'S TRIBAL COMMUNITIES

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Abstract

This study examined how plant leaf wraps affect steamed fish's sensory qualities, customer preferences, and acceptance. Leaf-wrapped samples were rated on appearance, texture, saltiness, juiciness, and flavour using a hedonic scale. Leaf wrapping considerably affected sensory qualities, with *Musa paradisiaca, Curcuma longa*, and *Tectona grandis* being the most preferred materials because they improved fish look, moisture retention, and flavour. *M. paradisiaca* preserved juiciness, while *C. longa* and *T. grandis* added colour and aroma. *P. betel* was least liked due of its bitter phenolic taste. Flavour, saltiness, and juiciness determined consumer preference, according to MCA. This study shows that plant leaves can be used as biodegradable food wrappers with sensory and environmental benefits. The findings on consumer perceptions of leaf-wrapped fish may affect food sector marketing and product development. Future research should examine fish-leaf constituent, biochemical interactions and their antibacterial effects on food preservation and safety.

1. Introduction

Fish are good natural food sources for humans, and because of their excellent taste and high digestibility, they are preferred as a perfect diet (Abelti, 2016). Fishes are highly significant and nutritious food sources around the world and are among the best sources of proteins, vitamins, and minerals (Ruxton, 2011). Fish constitute a low-cost form of animal protein that is consumed worldwide (Fawole et al., 2007). It is an important part of many people's diets and typically contributes to a healthy lifestyle. A study conducted by Idris et al., (2010) concluded that fish protein currently takes precedence over other animal proteins and that its composition compares favourably to that of other amino acid supplements. Fish contains several nutrients, such as vitamin D, selenium, and iodine. It is high in protein and low in saturated fats (Ruxton, 2011). Fish are major sources of thiamine and riboflavin, as well as minerals, phosphatides, sterols, enzymes, hormones, hydrocarbons, and pigments (Larsen et al., 2007; Usydus et al., 2009).

Fish are a vital dietary source of n-3 long-chain polyunsaturated fatty acids (LCPUFAs), particularly docosahexaenoic acid (DHA) and eicosapentaenoic acid (EPA), which are essential for human health. These fatty acids play critical roles in brain development, cardiovascular health, and reducing inflammation (Swanson et al., 2012). However, the ability of the human body to convert basic n-3 fatty acids into their more biologically active long-chain forms is limited, especially in certain populations(Mahaffey et al., 2011). This makes fish an indispensable source of these nutrients, particularly in low-income regions where diets are often dominated by starchy foods and lack diversity. Fish are also rich in high-quality protein and contain omega-3 and omega-6 polyunsaturated fatty acids, which help lower blood cholesterol levels and support normal bodily functions(Mei et al., 2019). Globally, fish ranks as the third most consumed food by weight, following rice and vegetables (Hels et al., 2003; Minkin et al., 1997), underscoring its importance in human nutrition.

In the contemporary, time-constrained environment, there is an increasing demand for convenience products that are ready-to-eat and ready-to-cook. This trend has also influenced seafood, with traditional preparation methods such as roasting, steaming, frying, and smoking continuing to be widely used. These techniques have historically been employed across various cultures and societies, fulfilling both culinary and preservation functions (Laudan, 2013; Pauli, 1999). The selection of processing method markedly affects the nutritional, chemical, and physical characteristics of seafood, thereby influencing its overall quality and health benefits.

Traditional methods such as steaming, smoking, drying, and salting have long been used to extend the shelf life of perishable foods, especially seafood (Hattula et al., 2001; Varlet et al., 2006). Smoking, one of the oldest preservation techniques, dates back thousands of years and is valued for its ability to preserve fish while enhancing flavour and texture (Djinovic et al., 2008). Steaming, another traditional method, is widely used in artisanal fish processing and is particularly effective at retaining heat-sensitive nutrients such as omega-3 fatty acids and vitamins (Özden & Erkan, 2008; Wang et al., 2012). In addition, compared with boiling, steaming removes extra fat and reduces cyanotoxins (bacterial toxins) in fish by up to 26% within two minutes (Castro-González et al., 2015; Liam et al., 2014; Stancheva et al., 2014).

1.1. Organoleptic analysis

Sensory evaluation, also known as organoleptic assessment, is an important tool for determining the quality of food products. The five human senses—sight, smell, taste, touch, and hearing—are used to measure, investigate, and interpret the qualities of food (Olafsdottir et al., 1997). This method not only provides information about the sensory properties of food but also aids in understanding consumer preferences and acceptability. Studies have demonstrated that traditional techniques, such as preparing and serving fish with leaf wraps, enhance their sensory qualities, such as appearance, flavour, and taste. Furthermore, many plant leaves have strong antibacterial and antifungal activities that protect against environmental and foodborne infections (Sahu & Padhy, 2013). Polyphenols in these leaves can leach into food during cooking, enhancing their function as natural antioxidants (Somayaji & Hegde, 2016). The historical practice of consuming food on leaf plates, as noted by Acharya Charaka, is regarded as a holistic approach that links the senses with the mind, highlighting its cultural and socioreligious importance (Kora, 2019). Sensory evaluation frequently uses the hedonic scale, a quantitative approach for assessing consumer acceptance and preference. This scale generally spans from "like extremely" to "dislike extremely," enabling researchers to quantify subjective responses to food products (Lawless & Hayman, 1997). Food research commonly employs quantitative methods such as descriptive analysis and discriminative testing alongside hedonic scaling. For descriptive analysis, trained panels list and rate certain sensory characteristics. On the other hand, discriminative testing checks for detectable differences between samples (Stone et al., 2004).

1.2. Hedonic scale for sensory analysis

Hedonic scales are frequently employed in the sensory evaluation of food products to assess consumer preferences and perceptions for features, such as flavour, texture, or appearance. These scales often span from "extremely like" to "extremely dislike," enabling respondents to evaluate their degree of enjoyment or satisfaction with the product (Girardot et al., 1952; Peryam & Pilgrim, 1957). The data derived from hedonic scales assist researchers and food manufacturers in comprehending consumer preferences, pinpointing product enhancements, and ensuring that items align with the requirements of the target audience. Hedonic testing may utilize numerous scale types, such as 9-point, 5-point, or descriptive scales, contingent upon the needed analytical depth. This form of sensory evaluation is crucial for informing product development and marketing tactics.

This study seeks to investigate the effects of traditional practices, particularly the use of leaf wraps, while employing quantitative methodologies to evaluate their impact on food quality and safety. The aim of this research is to integrate organoleptic evaluation with sophisticated data analysis techniques to reconcile traditional knowledge with modern food science, providing insights into sustainable and culturally pertinent food preservation and preparation strategies.

2. Materials and methods

2.1. Study area

Daman, a union territory in India, is situated along the Arabian Sea at the mouth of the Daman Ganga River, near the southern border of Gujarat. It is geographically divided into two parts—Nani Daman (Little Daman) and Moti Daman (Big Daman)—by the Daman Ganga River, which holds cultural and economic significance for the region. Daman is known for its scenic coastline, Portuguese colonial architecture, and vibrant culture. The union territory's economy is driven by industries such as fishing, textiles (particularly ready-made garments), and plastics, which are among its most profitable sectors. Agriculture also plays a role, with major crops including paddy, ragi, bajra, jowar, groundnut, pulses, and beans. Daman experiences a tropical monsoon climate characterized by warm temperatures and distinct wet and dry seasons. The annual mean temperature ranges from 20°C to 38°C, with the hottest months being April and May. The region receives an average annual rainfall of 1,500 mm to 2,000 mm, most of which occurs during the monsoon season from June to September. The coastal location moderates extreme temperatures, making the climate relatively pleasant throughout the year.

2.2. Collection and preparation of fish samples

Silver pomfret (*Pampus argenteus* (Euphrasen, 1788)) was selected for the present study. The whole fish were purchased from the local market of Daman and Vapi. The fish were cleaned and sliced into small uniform pieces weighing 20–25 grams each for the steaming process. Leaves of twelve different plant species for wrapping were collected from nearby areas, agricultural fields, and forests or purchased from the vegetable market (Table-1). Leaves were washed with water to remove any dirt or residue. The prepared fish pieces were then wrapped with collected plant leaves and steamed in a pressure cooker for 20–30 minutes. Each sample is then coded unbiasedly for sensory analysis and presented to the panellists. One sample was used as a control (without leaf wrapping) to compare the data.

Table 1. List of plant species used for wrapping the fish samples

Sr. no.	Scientific Name	Common Name	Family
1	*Annona squamosa* L.	Custard apple	Annonaceae
2	*Artocarpus heterophyllus* Lam.	Jackfruit	Moraceae
3	*Brassica oleracea* var. *capitata* L	Cabbage	Brassicaceae
4	*Butea monosperma* Lam.	Flame of forest	Fabaceae
5	*Colocasia esculenta* L.	Colocasia	Araceae
6	*Curcuma longa* L.	Turmeric	Zingiberaceae
7	*Mangifera indica* L.	Mango	Anacardiaceae
8	*Musa paradisiaca* L.	Banana	Musaceae
9	*Piper betle* L.	Betel	Piperaceae
10	*Psidium guajava* L.	Guava	Myrtaceae
11	*Syzygium samarangense* (Blume) Merr. & L.M.Perry	Wax apple	Myrtaceae
12	*Tectona grandis* L.f.	Teak	Lamiaceae
13	*Terminalia catappa* L.	Indian Almond	Combretaceae

2.3. Sensory testing

Sixty informants from the local Koli community, aged 25–50 years, were selected randomly for the study. Participants were selected if they consumed the fish regularly and did not have any allergy to the fish. Two different tests (sensory and ranking) were carried out after the leaf-wrapped fishes were steamed. The prepared leaf-wrapped fish samples were then presented for testing to all the panellists in random order to avoid bias. Panellists were provided with clean warm water to clean the pallet after each sample was tested. A 9-point hedonic scale was used to record responses from the panellists and for further analysis. The organoleptic attributes of appearance, juiciness, saltiness, rancidity, flavour, and general acceptability of the fish samples were recorded (Table-2). The panellists were also asked to rank the fish samples in ascending order of preference from the most preferred to the least preferred for the ranking preference test (Cleaver, 2018).

2.4. Statistical analysis

Multiple correspondence analysis (MCA) was performed to interpret the data and identify which sensory parameters are more important and play a major role in the overall preferences of the dish (Alhuzali et al., 2022; Greenacre, 1992). All the statistical analyses were performed in R (R Core team, 2022) statistical software via RStudio (Posit team, 2023).

3. Results and Discussion

The sensory assessment in this study was conducted to understand the preferences of different leaf-wrapped fishes. Data from 13 distinct leaf wraps were collected, and one sample was used as a control where no leaf was wrapped. Wrapping the plant leaves significantly improved the aroma and increased the preference.

These samples of plant leaves usually received the highest sensory scores in the hedonic preference test, and the panellists expressed a pleasant flavour and aroma of that particular plant species.

The wrapping of plant leaves to fish led to an evident change in the flavour of the fish, which was defined as herbal or spicy by the panellists after they were cooked. However, the flavours released in the other three groups, i.e., leaves of *M. paradisiaca, C. esculenta, A. heterophyllus*, and *C. longa,* were among the most common in the ranking test. Among the freshly steamed samples, the panellist did not prefer the flavour of the control sample because of its pungent flavour.

The leaf wraps that were liked by most of the participants in terms of appearance were *C. longa* (95%), followed by *T. grandis* (91%) and

M. paradisiaca (88%). The only wrap that had a different frequency distribution than the others was the *P. betel* leaf-wrapped sample, which received the lowest rating (high score under the category average and bad appearance). For the control and other leaf-wrapped fish samples, the frequency distribution was distributed the best, best and average (Figure 1).

Juiciness is the second parameter that was considered in the study, in which three options were given, of which one respondent had to give their feedback as per their own experience after testing the wrapped fish.

The participants reported that almost all the leaf-wrapped fish samples and the control samples were soft and juicy, with a frequency of more than 90% under the soft parameter (Figure 2). The fish samples wrapped in *C. esculenta* (91%) and *T. grandis* (68%) received the highest rating under the hard texture. Approximately 12% of the participants experienced hard textures for *T. catappa* and *M. paradisiaca* as well.

The third parameter was the saltiness of the leaf-wrapped fish samples. Almost all the participants said that they found most of the fish samples salty. Only the samples that were not found to be salty were wrapped in the leaves of *T. catappa* (32%), *B. oleracea var. capitata* (28%), the control (22%), and *P. guajava* (18%).

In terms of the responses to the specific flavour profile, the spicy flavour had the highest frequency, followed by the tasteless, sweet, and sour flavours. *B. monosperma* (58%) had the highest frequency of spicy flavours, followed by *C. longa* (50%), *T. grandis* (45%), and *C. esculenta* (45%). The control fish samples presented the highest frequency (68%) in the taste-less category, followed by *B. oleracea var. capitata* (48%), *T. catappa* (28%), and *P. guajava* (23%). The participants experienced a more bitter taste in the *P. betel* (47%) wrapped fish sample than in the *P. guajava* (25%) leaf-wrapped sample. *M. indica* (59%) and *T. catappa* (53%) leaf-wrapped fish samples presented the highest frequency values under sour taste. For the sweet taste profile, *M. paradisiaca* (48%) presented the highest frequency value, followed by *S. samarangense* (38%) and *A. squamosa* (30%) (Figure 3).

The overall preference and liking of the different leaf-wrapped fish samples were calculated on the basis of the above mentioned parameters (Table 3). A dominant and pleasant aroma was also observed for the samples wrapped with *M. paradisiaca*, *C. esculenta*, *M. indica*, and *C. longa*.

Considering the overall frequency of the classes created, more than 50% of the participants preferred to use leaf-wrapped fish at least once, whereas approximately 39% of them liked and would accept the preparation of a dish. The fish samples wrapped with *M. paradisiaca*, *C. esculenta*, *A. heterophyllus*, *M. indica*, and *T. grandis* were accepted and preferred over the other fish samples. For the remaining species, the results showed that the participants preferred it occasionally (Figure 4).

Only the *P. betel*-wrapped fish sample had the highest frequency in the not liked category, and the participants did not prefer it again. This sample had the least intense prepared fish flavour and odor and the smallest change in colour and texture from those of the fresh fish, which echoed the lowest hedonic ratings of all the mentioned attributes (Figure 4).

Table 2. Various parameters and informant response

Sr. No.	Scientific Name	Appearance				Juiciness			Saltiness		Flavour profile					
		Bad	Average	Good	Best	Hard	Normal	Soft	No	Yes	Tasteless	Bitter	Sour	Sweet	Spicy	Specific taste of leaf wrap
1	Control	0	17	19	24	0	1	59	13	47	38	11	0	6	5	0
2	*Annona squamosa* L.	0	9	22	29	2	0	58	5	55	10	8	1	18	8	15
3	*Artocarpus heterophyllus* Lam.	0	2	15	43	0	0	60	3	57	9	1	9	13	23	5
4	*Brassica oleracea* var. *capitata* L	0	2	20	38	3	1	56	17	43	29	11	4	9	7	0
5	*Butea monosperma* Lam.	0	1	15	44	4	0	56	0	60	15	0	0	1	35	9
6	*Colocasia esculenta* L.	0	2	5	53	55	0	5	1	59	11	3	3	16	27	0
7	*Curcuma longa* L.	0	1	2	57	5	0	55	0	60	8	10	0	1	30	11
8	*Mangifera indica* L.	0	3	14	43	5	0	55	0	60	0	2	31	4	9	14
9	*Musa paradisiaca* L.	0	2	5	53	7	0	53	5	55	6	10	5	29	9	1
10	*Piper betle* L.	10	23	15	12	2	0	58	0	60	3	28	0	11	11	7
11	*Psidium guajava* L.	0	5	21	34	1	0	59	11	49	14	15	0	15	9	7
12	*Syzygium samarangense* (Blume) Merr. & L.M.Perry	0	3	36	21	3	0	57	0	60	2	1	16	23	15	3
13	*Tectona grandis* L.f.	0	2	3	55	41	0	19	0	60	8	2	17	0	27	6
14	*Terminalia catappa* L.	0	7	32	21	7	0	53	19	41	17	5	32	5	1	0

Table 3. Overall ratings and preferences of different leaf-wrapped fish samples.

Sr. No.	Scientific Name	Rating classes		
		Least preferred	Preferred once	Most preferred
1	Control	6	46	8
2	*Annona squamosa* L.	6	39	15
3	*Artocarpus heterophyllus* Lam.	1	41	18
4	*Brassica oleracea* var. *capitata* L	0	45	15
5	*Butea monosperma* Lam.	1	36	23
6	*Colocasia esculenta* L.	1	19	40
7	*Curcuma longa* L.	0	12	48
8	*Mangifera indica* L.	1	27	32
9	*Musa paradisiaca* L.	0	17	43
10	*Piper betle* L.	27	28	5
11	*Psidium guajava* L.	2	44	14
12	*Syzygium samarangense* (Blume) Merr. & L.M.Perry	3	40	17
13	*Tectona grandis* L.f.	0	11	49
14	*Terminalia catappa* L.	5	51	4

Table 4. Different parameters and corresponding values for MCA dimension 1 and dimnesion 2

Name of variable	MCA Dimensions	
	Dim. 1	Dim.2
Appearance	0.37	0.46
Juicy	0.15	0.047
Salty	0.56	0.16
Flavour	0.69	0.72

MCA resulted in 11 dimensions, of which the first two were used together to explain 100% of the variation present within the data . Considering the values of the percentage of variance, 16.05% and 12.65% of the variation were explained by Dimension 1 and Dimension 2, respectively, and can depict the 28.70% variation present in the data and hence be considered for understanding the associations among the variables. Sensorial variables of dimensions 1 and 2 represent the eigenvalues only on the basis of this, it was observed that there were no clear differentiating values allocated to each of the obtained dimensions (Table - 4). The maximum value was 0.69 (flavour), followed by 0.56 (salt) for the first dimension and 0.72 (flavour) for the second dimension, followed by 0.46 (appearance). Appearance also contributed to the first dimension (value of 0.37). The most discriminant variables for dimension 1 hierarchically were flavour, salty, appearance, and juicy; for dimension 2, the most discriminant variables were flavour, appearance, salty and juicy. Flavour was a variable that had a strong association with both dimensions, whereas the other variables had a moderate association with either of the other dimensions, as in the case of salt or appearance (Figure 6).

Multiple correspondence analysis (MCA) further demonstrated that flavour, saltiness, appearance, and juiciness were the most discriminant variables affecting consumer preference. The biplot visualization revealed clear distinctions between the least preferred samples and the preferred samples, with some overlap between the preferred and most preferred categories. This suggests that while certain leaf wraps were distinctly favoured, individual taste preferences played a role in overall acceptability.

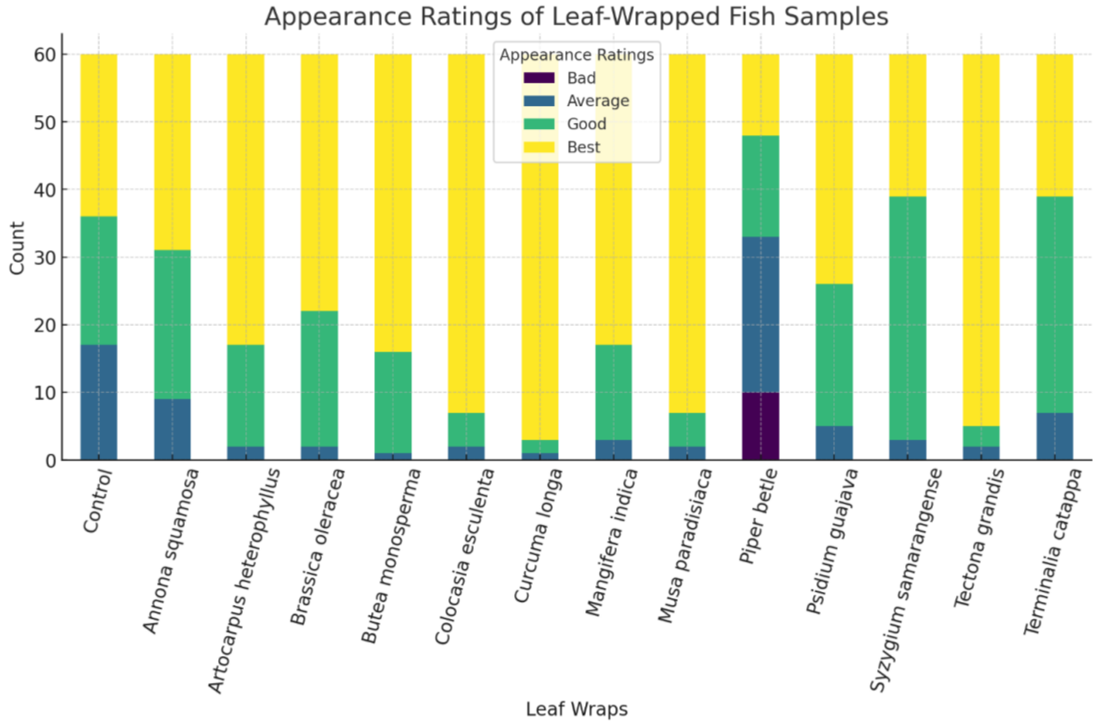

Figure 1. Appearance Ratings of leaf-wrapped Fish Samples

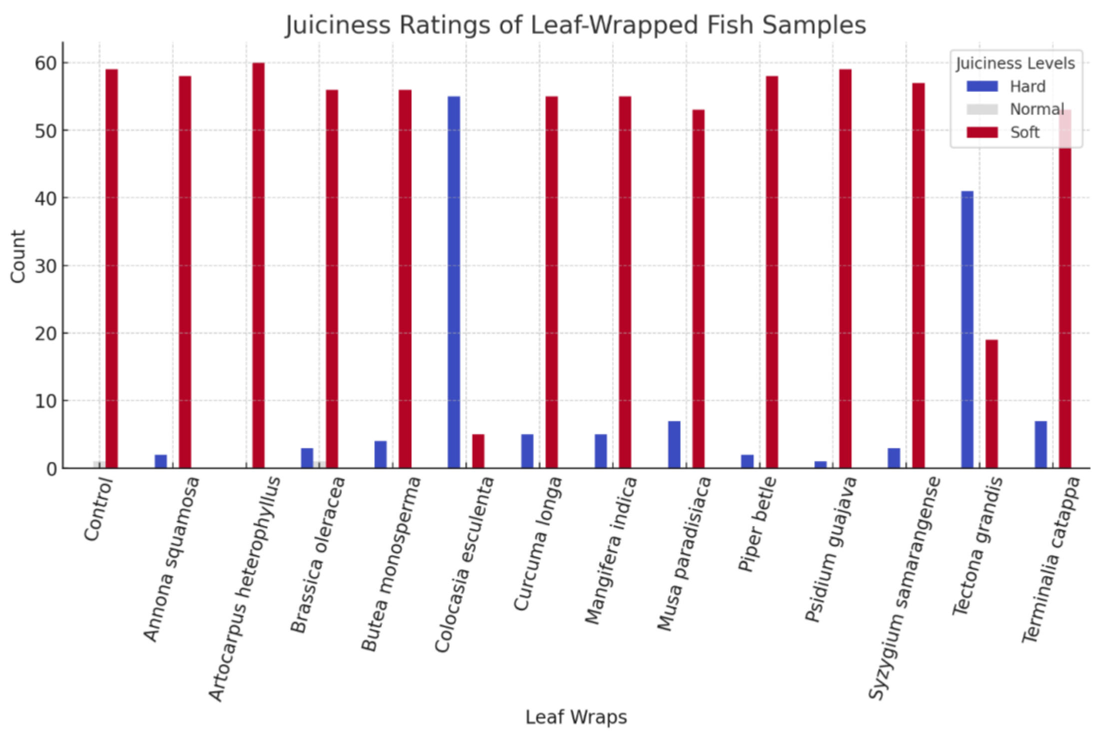

Figure 2. Juiciness Ratings of Leaf-Wrapped Fish Samples

An ellipse of the 95% confidence interval (CI) is drawn corresponding to each group. The data points of the least preferred group are very clearly distinguishable from those of the other two groups, and all the data points fall under the 95% CI ellipse. On the other hand, the data points of the most preferred and preferred groups have an overlapping area, and as a result, an ellipse of 95% for both groups overlaps each other. This most preferred group is small, and approximately 90% of the data points also fall in the ellipse of preferred points once. However, some of these two data points do not fall under the 95% CI ellipse because some uncommon combination of feedback corresponds to each parameter (Figure 7).

The study revealed that leaf wrapping generally enhanced the sensory appeal of fish, with participants showing a strong preference for certain leaf-wrapped samples over the control. The samples wrapped in *C. longa, T. grandis,* or *M. paradisiaca* received the highest ratings for appearance. Previous studies have shown that turmeric leaves contain bioactive compounds such as curcuminoids, which contribute to their vibrant colour and distinct aroma, making them suitable for culinary applications (Sahoo et al., 2021). Similarly, *T. grandis* and *M. paradisiaca* leaves are known for their phytochemical composition, which may increase the visual and textural appeal of food (Gbadamosi & Emi, 2017).

Juiciness was another important factor evaluated in this study. Most samples were rated as soft and juicy, except for those wrapped in *C. esculenta* and *T. grandis*, which had the highest percentage of responses, indicating a harder texture. This could be attributed to differences in moisture retention and heat penetration through the leaf layers. According to (Quan et al., 2023), *C. esculenta* leaves contain oxalates and other structural compounds that may influence the texture of wrapped food items.

The perception of saltiness varied across different leaf-wrapped fish samples. The samples wrapped in *T. catappa, B. oleracea var. capitata*, and *P. guajava* were found to be less salty, while the control sample was also categorized as having relatively mild saltiness. These findings suggest that certain leaves may influence the diffusion of salt into fish during cooking, possibly due to their chemical composition and permeability. Leaves, such as those from *P. betel*, are associated with a bitter taste, which likely contributes to their low preference scores. *P. betel* contains phenolic compounds such as eugenol and hydroxychavicol, which are known for their strong astringent and bitter flavours (Gunathilake et al., 2018).

Flavour profile analysis revealed that *B. monosperma*, *C. longa*, and *T. grandis* were associated with a spicy taste, whereas *M. indica* and *T. catappa* imparted a sour note to the fish (Figure 3). The use of mango leaves in traditional food preparation has been linked to the presence of terpenoids and flavonoids, which can contribute to a tangy or citrus-like flavour (Kumar et al., 2021). On the other hand, *M. paradisiaca* imparts a noticeable sweetness, likely due to the presence of natural sugars in banana leaves (Gbadamosi & Emi, 2017).

The overall preference ratings indicate that the fish samples wrapped in *M. paradisiaca*, *C. esculenta*, *A. heterophyllus*, *M. indica*, and *T. grandis* were the most liked. These findings align with previous research showing that banana leaves are commonly used in traditional cooking because of their ability to enhance food aroma while maintaining moisture content (Gbadamosi & Emi, 2017). In contrast, *P. betel* received the lowest preference rating, likely due to its bitter taste and strong medicinal aroma, which were less appealing to participants.

Among the all leaves tested, *M. paradisiaca*, *C. longa*, and *T. grandis* were the most preferred, primarily because of their ability to enhance appearance, maintain juiciness, and contribute favourable flavour (Figure 5). The high ratings for *M. paradisiaca* align with its traditional culinary usage, as its natural phytochemicals help retain moisture and impart mild sweetness. Similarly, *C. longa* and *T. grandis* presented vibrant colouration and aromatic qualities, which was supported by their bioactive compounds. Conversely, *P. betel* leaves were the least preferred owing to their strong bitter taste, which was attributed to the presence of phenolic compounds such as eugenol and hydroxychavicol (Gunathilake et al., 2018).

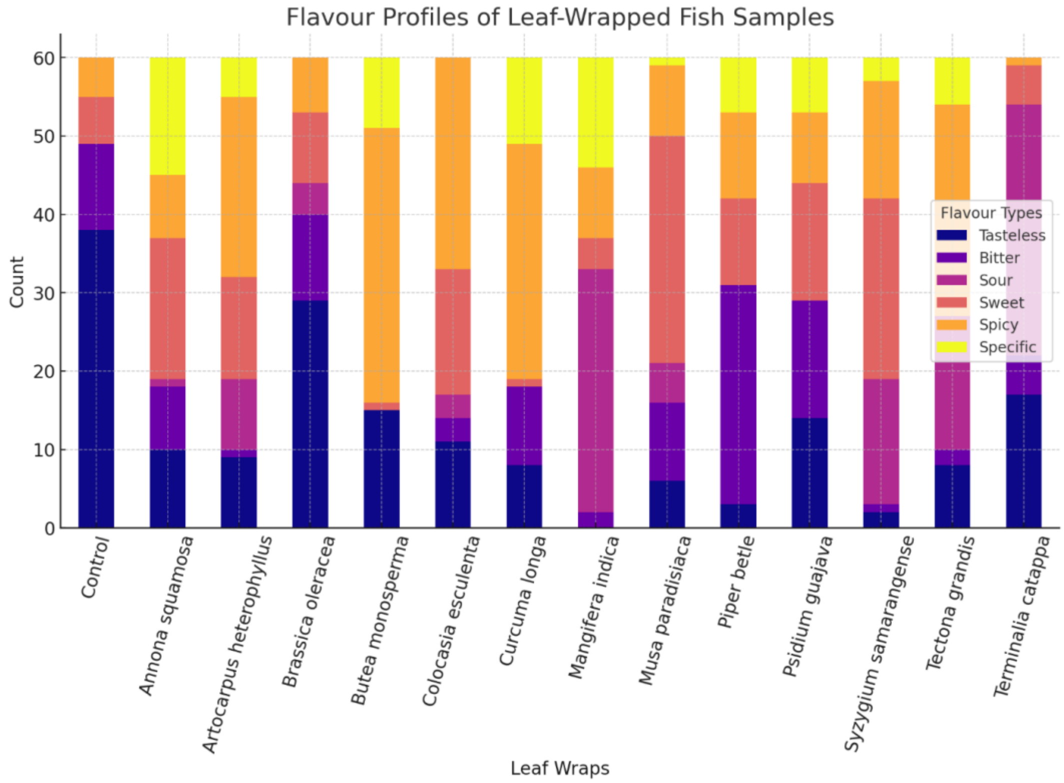

Figure 3. Flavour Profiles of Leaf-Wrapped Fish Samples

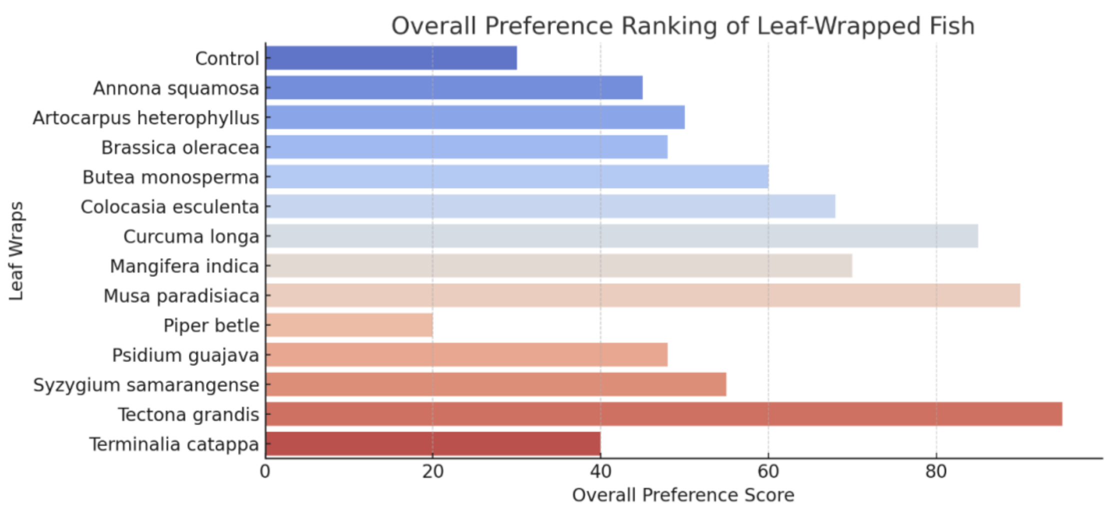

Figure 4. Overall preference Ranking of Leaf-wrapped Fish

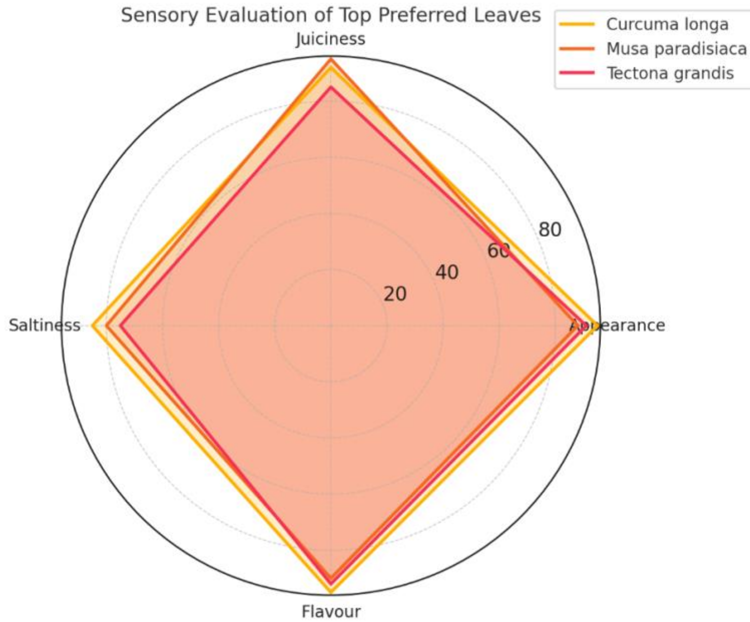

Figure 5. Sensory Parameters of Top Preferred Leaves

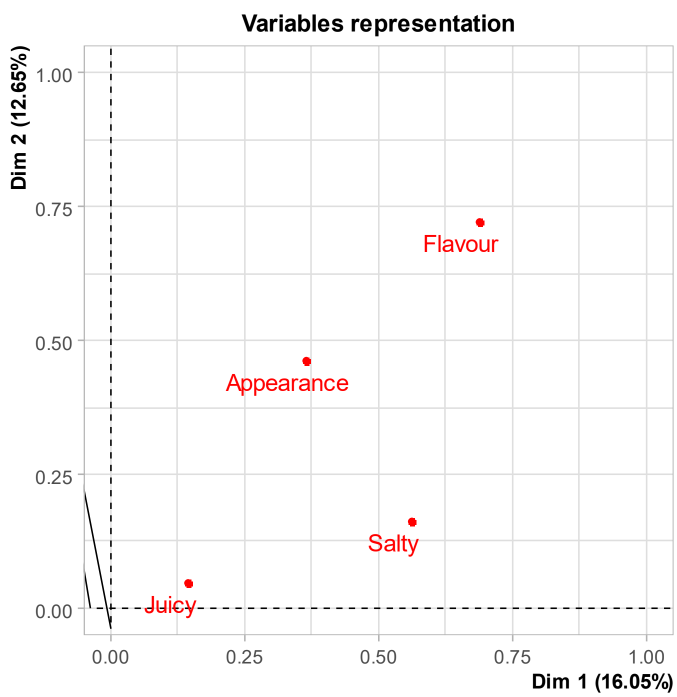

Figure 6. Scatter plot of dimension 1 and dimension 2

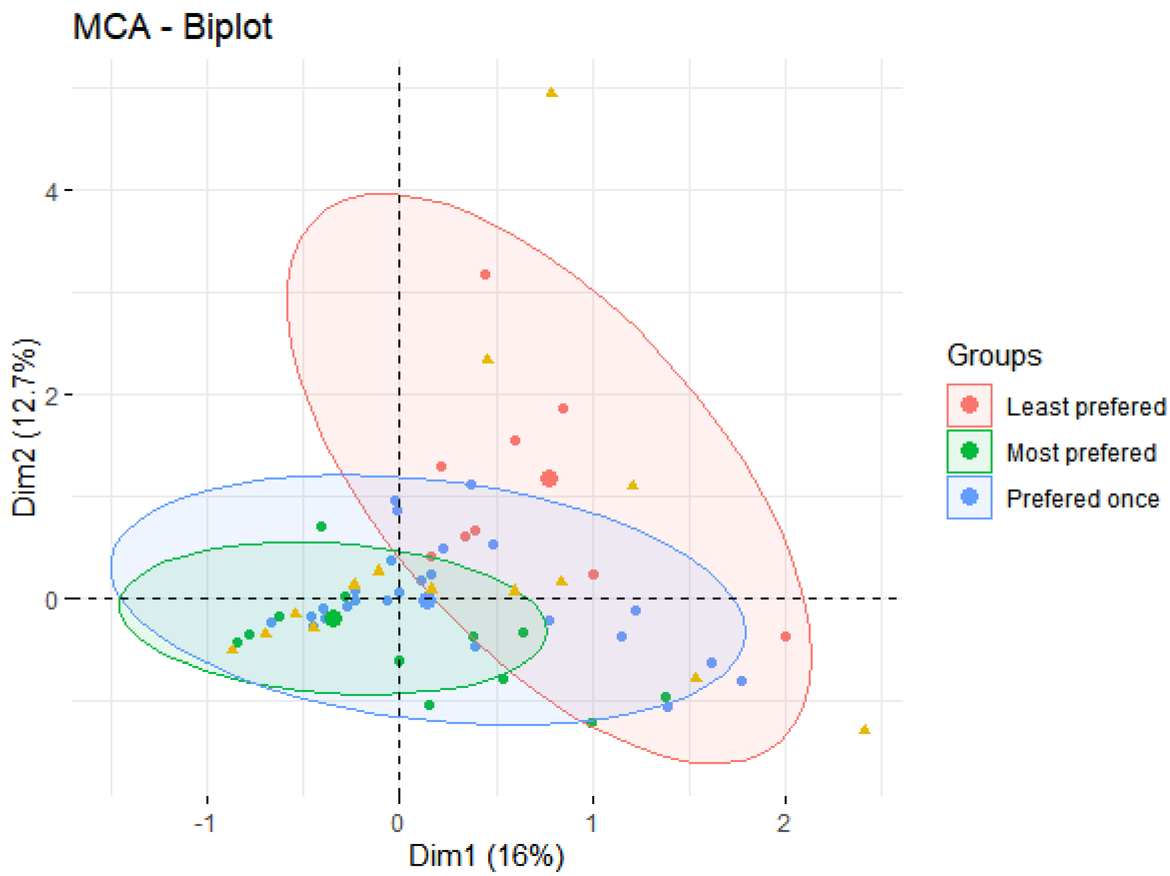

Figure 7. MCA biplot depicting the distribution of preferences among informants

4. Conclusions

The present study evaluated the sensory attributes and consumer preferences of fish samples wrapped in different plant leaves, highlighting their influence on their appearance, juiciness, saltiness, and flavour. The results demonstrated that leaf wrapping significantly altered the sensory properties of the fish, with some leaves imparting desirable flavours and aromas, whereas others were less preferred.

The study highlighted the impact of phytochemical interactions between leaves and fish during cooking, which affect salt diffusion and textural modifications. *C. esculenta* and *T. grandis* resulted in firmer textures, possibly because their structural components affect moisture retention. The variations in salt perception among different leaf-wrapped samples suggest differences in permeability and mineral composition, influencing the sensory balance of the dish. Multiple correspondence analysis (MCA) revealed clear clustering patterns, indicating that individual sensory attributes play a significant role in overall acceptability.

The results of this study hold potential implications for the food industry, particularly in promoting natural and sustainable food packaging alternatives. Traditional leaf-wrapping techniques provide not only sensory benefits but also eco-friendly and biodegradable food preparation methods. Moreover, the concept of leaf-wrapped steamed fish presents an opportunity for value addition in the food industry by improving economic and nutritional benefits. The changing consumer mindset toward natural and traditional culinary methods suggests the potential for entrepreneurial ventures that emphasize health and nutrition. Future research should further investigate the biochemical mechanisms underlying flavour transfer and texture modification in leaf-wrapped foods, potentially integrating nutritional and antimicrobial properties to expand their functional benefits in modern gastronomy. Additionally, the findings from this study could aid in the development of effective marketing strategies to promote traditional fish cuisine in contemporary food markets.

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