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Impact of the quality of the farm water on cuts yield and meat quality of *Channa striata*

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Abstract
The murrel fish, or *Channa striata,* is a precious freshwater resource. Several recent studies on the nutritional content and bioactive compounds of murrel fish have been conducted. Based on farm water conditions, *C. striata*, the focus of this study but not the only Channa species with high protein content, can be estimated to have a high protein value. The average moisture content of this *C. Striata* fillet is 74.9 ± 0.87%, with significant variation between diets tested. Water salinity of 4 g/L was discovered to interfere with the physicochemical quality of the pond culture. Consumers deemed pond culture at salinities of 15, 25, and 35 g/L acceptable. In pond culture, however, tasters preferred a salinity of 15 g/L. The evidence of the species euryhalinity, the preservation of the physicochemical composition, and consumer acceptance support the conclusion that murrel fish can grow in salinities of 15, 25, and 35 g/L without losing quality. The sensorial analysis detected a salinity difference of 7 g/L with a standard sample of 35 g/L, but no differences were found between the salinities of 15 and 25 g/L and the salinity of 35 g/L ($p > 0.05$).

Keywords: Murrel Fish, animal, vegetable protein mixed diet, meat quality, farm water

1. Introduction

Modern aquaculture must be an activity aimed at producing safe and healthy food. With the continued worldwide growth of industrial aquaculture, there are increasing discussions about the negative potential that this activity can generate, both in terms of aggression to the environment and animal welfare (Naylor, *et al.* 2021). During fish farming, stressful conditions can be observed, from the initial stages to capture and slaughter. These effects can be minimized through the adoption of acceptable management practices. Failure to comply with an appropriate protocol can compromise the quality of the final product to be marketed. Therefore, the evaluation of murrel fish quality attributes and their possible dependence on capture and slaughter methods (effect on post-mortem changes and meat quality of murrel fish) must be evaluated (Naziba Tahsin, 2017). Identifying the cutting method that gives the best yields is also essential. As there is no filleting standard, there is disagreement regarding the best process to be used, that is, which form provides the highest fillet yield, operational ease and shorter processing time (Stien, *et al.*, 2006). The fillet yield of a fish, for example, depends on body weight, sex, body composition (visceral fat), anatomical characteristics (head/body ratio), degree of mechanization in filleting, filleting method and operator skill (Garduño-Lugo *et al.*, 2003). The Channa family of fish is a freshwater fish belonging to the Channidae tribe. The Channidae tribe consists of two genera: the genus Channa and the Parachanna. The genus Channa is primarily found in Asia, while Parachanna is found in Africa.

Murrel fish (*Channa striata*) is a freshwater fish that can be found throughout India and other Asian Countries (Milton, *et al.*, 2018). Murrel fish is one of the potential aquaculture fish because of its high economic value, prospective market, and high consumption level of local people. The economic value of snakehead fish is reflected in its price. The highest consumption of fresh snakehead fish in India is in the Southern States, with a consumption rate of 5.21 kg/capita/year Devi, *et al.* 2014); the level of fish absorption describes the size of the market in an area. The demand for snakehead fish is increasing because it is also used as a medical ingredient apart from consumption.

Snakehead fish is used in the health sector as medicinal freshwater fish, such as to speed up the healing process of post-operative wounds and childbirth (Sahid, *et al.*, 2018). Snakehead fish has very beneficial biomedical benefits, such as anti-inflammatory, anti-microbial, anti-nociception pain (nociception), and anti-cancer properties (Rahman *et al.*, 2018). Snakehead fish contains high protein, mainly albumin, essential amino acids, essential fatty acids, minerals, and several vitamins that are good for wound healing and health. In addition, clinical intervention of snakehead fish protein concentrate in the form of supplements has helped accelerate the healing of post-operative patients, burns, and strokes in hospitalized patients. A study stated that the amount of snakehead fish albumin protein reached 1.15 ± 0.07 g 100 mL-1 (Mustafa, 2012). The snakehead fish domestication technology has been declared successful. However, continuous and measurable production of snakehead fish is not accessible if it only relies on the natural spawning process. Considering the potential growth in murrel fish production in the country, it is essential to know the methods applied to obtain the fillet and other types of cuts. The increase in the supply of murrel fish necessarily involves standardization in the form of the presentation of the final product. These data are essential as they can provide subsidies to the processing industries and potential murrel fish farmers, as they will make it possible to estimate their economic gains from processing the species. With the prospect of growing murrel fish in coastal areas of the Northeast Region, it is also relevant to determine the effects of different gradients of water salinity on the quality of the species' meat. The present study aimed to determine the yields of cuts of murrel fish and evaluate the attributes of meat quality of the species cultivated in different gradients of water pH, DO, and salinity.

2.0 Material and Methods

2.1. Murrel fish quality attributes

To assess the quality attributes of murrel fish grown in laboratory, adult specimens were collected at the end of a fattening cycle. Prior to collection, the fish were subjected to involuntary fasting for 24 h. On the day of harvesting, the pond was drained, the fish concentrated, caught with a cast net and immediately transferred to transport boxes for stunning.

The following slaughter methods were evaluated:

1. Fish placed in a box without ice (SG): fish caught from the ponds were immediately placed in plastic boxes without ice.
2. Fish placed in a box with interspersed layers of ice (G): fish captured from the ponds were immediately placed in plastic boxes interspersed with ice layers of approximately 5 cm each and fish, the last being layer composed of ice.
3. Immersion in water and ice (IAG): the fish were immediately asphyxiated in ice water, in a water: ice ratio of 1:1 (temperature around 1°C), until unconsciousness, when they were considered dead. When no more visible vital reactions were noticed, the reaction to a stimulus on the body with a pin on the lateral line in the caudocranial direction and the eye rotation reflex with fish inversion were evaluated.
4. Bleeding with subsequent immersion in cold water (S): the fish captured from the ponds had their gill arches perforated with the aid of knives and later submitted to the same methodology of the IAG treatment (anoxia in cold water, under temperature around 1°C).

After death, all fresh fish from all groups defined above were sent to the laboratory for analysis and submitted to the following operations: (1) labelling; (2) weighing; (3) measurement of the D0 point (for the calculation of the Rigor Index – RI (Diouf, 1999)), and; (4) placed in a cold chamber at a temperature below -10°C, accommodated in plastic boxes with the abdominal cavities facing downwards, in two separate layers and covered by ice in large scales, including the underside of fish.

2.2 Full use of murrel fish

The methodology used to evaluate the full use of murrel fish was based on the work developed by Surasani, *et al.* (2016), carried out by a single person, applying six methods:

i) Whole gutted and headless.
ii) Whole gutted, headless and tailless.
iii) Flattened with skin.
iv) In posts.
v) Fillet with skin.
vi) Skinless fillet.

In all situations, the fillet was obtained from the dorsal musculature, on both sides of the fish in the longitudinal direction, along the entire length of the murrel fish's vertebral column and ribs. The procedures were performed in the processing room. Murrel fish specimens were subjected to the following cutting methods as described above. For yield analysis, total weight, standard length, skinless fillet weight, ventral abdominal and deep hypo axial muscle, residues (total weight minus total edible parts), raw skin (after skinning, with scales and muscle remains), clean skin (after scaling and fleshing) and fleshing (residues = scale, muscle and adipose tissue referring to the gross weight of the skin).

In addition to the fillet yield, the yield of the cut into slices, whole eviscerated, whole eviscerated and with removal of the spine was also considered. The specimens of murrel fish evaluated had a total length between 43 and 55 cm (1.3 to 1.7 kg, respectively). Chemical composition analyses (moisture, protein, fat and ash) were performed following the official methodology of the AOAC (2011).

2.3 Effect of salinity on murrel fish meat quality

To determine the effect of the pH, salinity of the cultured water on the quality attributes of the murrel fish meat, an experimental culture of the species was carried out in the current study. The juvenile murrel fishes were purchased from the local Market in Andhra Pradesh, India and transported in thermal boxes of the Trans fish type. After acclimatization in a masonry tank at pH 7.0 and salinity of 5 g/L for five days, the fish were stored in the experimental cultivation units 24 plastic boxes were used, with a lid and capacity of 1 m^3, equipped with aeration with porous stones and biological filter. The sector has an artesian well with an average salinity of 4 g/L. To obtain water with different salinities, hypersaline water (100 g/L) from a saline in the region was mixed with the healthy water in different proportions. The experiment lasted 60 days. Each experimental unit was populated with six animals with water at the same salinity as the masonry tank.

Over 20 days, there was a gradual change in the salinity of the culture tanks, adding water from the artesian well (salinity 4 g/L) until the desired experimental salinities were obtained. The experiment had five treatments corresponding to salinities of 4 (well water), 7, 15, 25 and 35 g/L. For each

treatment, four repetitions were used, totalling 24 experimental units. Daily food-management consisted of two feedings, until apparent satiation, with a commercial dry diet for marine fish containing, according to the manufacturer's label, 48% crude protein and 12% lipids.
Weekly, the culture tanks were siphons to remove accumulated residues at the bottom, and 50% of the water was replaced with water of the same salinity. The physicochemical variables of the water (dissolved oxygen, temperature, pH, turbidity, total ammonia and salinity) were checked daily in both feeding shifts. With the exception of salinity, the other parameters of water quality remained within the appropriate ranges for the development of the species.
After harvesting, samples of murrel fish muscles were collected. The fish were captured with a net, anesthetized with 50 mg/L benzocaine, weighed and measured. The animals were eviscerated, headless, vacuum packed and frozen in a freezer at -18°C until the time of the physical-chemical composition analyses carried out. Part of the muscle from the fish fillets was randomly collected, totalling four samples per treatment. The pH (Terra & Brum, 1998) and the percentage of moisture, crude protein, ethereal extract and ash were determined according to official methodology (AOAC, 2011).
For the sensory analysis, the multiple comparison test or the control difference test (Costell, 2002) was used to verify the existence of a significant difference (P < 0.05) between the samples and the standard (control, muscle sample of murrel fish cultivated in salinity 35 g/L) and to estimate the amplitude of this difference. Juveniles of murrel fish from the five salinities of cultivation were eviscerated, cut into half slices, washed with mineral water, and stored in Styrofoam with plenty of ice in scales. Subsequently, the samples were grilled on an electric grill and served on disposable plates to untrained judges for sensory analysis.
In the sensory analysis, each of the 32 judges received a control sample (identified with the letter "C") and the other samples (identified by codes containing three digits, including a control sample). The judge first tasted the control sample, and then compared that flavour with the other samples. The judgment was made with the help of a booklet, which presented a scale ranging from 1 (significantly better than the control) to 9 (extremely worse than the control), named "Multiple Comparison".
At the same time, the evaluators (not trained) also answered the hedonic scale, which consisted of a scale that ranged from 1 (highly disliked) to 9 (extremely liked). This type of test made it possible to determine consumer satisfaction with the tested product. The scores obtained could be measured, resulting in the percentage of preference as a function of the judges' numbers.
The acceptability index (AI) (Pleadin, *et al.* 2017) was calculated considering as 100% of the maximum score reached by the different formulations tested in the research. The decision criterion for this index to be considered acceptable is at least 70%. Therefore, for this calculation, the following mathematical expression was adopted:

$$AI\,(\%) = (average\ grade\ obtained\ for\ the\ product \div maximum\ grade\ given\ to\ the\ product) \times 100.$$

3. Results and Discussion
3.1 Yield of murrel filet in processing
The yields obtained for *C. Striata*'s between 1.4 to 1.8 kg were 65% for whole gutted and headed fish (G-H), 62% for whole gutted, headless and tailless fish (G-HWT), 54% for fish flattened with skin, 51% for slices, 40% for fillet with skin and 31% for skinless fillet (SF).
The best yields in the cut were the flattened with skin and slices. Both cuts have the potential to develop smoked products. The whole gutted cut has the potential for ready-to-bake seasoned products. The fillets, though of lower yield, are products of added value and can be marketed fresh or frozen.
The result of the Rigor Mortis Index showed that there was no significant difference between treatments in relation to this index (mean time of 15 ± 2 min.). The time was considered fast due to antemortem stress during the fish trawl during the capture and the delay in removing the animals from the nursery.
For a better result in the development of products based on fine cuts of murrel, it became evident the need for a larger animal that provides more robust cuts, increasing the possibility of new products from thin cuts of *C.Striata.* It is interesting to note that the weight of the head of the species reaches 25% of the weight of the whole fish. This suggests the need for a better use of this part of the animal, which is wasted or considered a by-product (waste).
Based on the results, it is suggested that the commercial size for the final consumer is between 1.2 and 1.5 kg (43 to 55 cm), while larger specimens are recommended for use in several cuts (fillets, loins, and slices). It can be concluded that this species of fish is promising to be used as a raw material in smoked products with high acceptability.

3.2 Effect of protein composition in diet on *C.striata's* quality attributes
The physical-chemical analyses showed that the *C.Striata fillet* has an average of 74.9 ± 0.87% moisture and that the values differ significantly between the Diets evaluated (P> 0.05; Table 1). According to Ding, *et al.* (2022) the fish muscle can contain 60 to 85% humidity, confirming normality in the values found in the studied species. Oliva-Teles, (2019) also found values within this normality. Although the protein concentration did not interfere with the humidity of the *C.Striata* meat, other factors, such as the seasons, can be influential. Šimat, *et al.* (2020) obtained moisture content for sardines of 73.92% during summer and 72.05% in winter and, for croaker, 79.27% during summer and 77.80% in winter, these values being within of the range referred to in for freshwater species. The water content in the cultured fish muscle tends to be lower than the of free-living fish and seems to reflect its best nutritional status. Asikin, (2018) also mentioned that the chemical composition varies depending on the fish's origin.
In the present study, the average mineral matter found in the *C.Striata* muscle did not differ significantly (P> 0.05) between the assessed diets (BASAL to FS50). The analyzed samples were within the range of 1.0% to 2.0% of ash, which according to Marimuthu, *et al.* (2012) is within the standard of ash content for freshwater fish. The results of mineral matter suggest that in all treatments, the number of mineral elements in the cultivation environment, associated with those provided by means of commercial feed, can be assimilated to the amount of mineral material found in the natural environment. This is due to the fish's ability to acquire these compounds from the environment and food. These minerals are essential components of fish meat for their nutritional value and for contributing to flavour.
In all Diets tested, the lipid content of the *C.Striata* muscle showed inequality in all tests (P<0.05). The concentrations of

lipids found in fish can vary widely, ranging from 0.6 to 36% (Marimuthu, *et al.* 2012). This variation may be due to the type of body muscle in the same species, sex, age, time of year, habitat and diet, among other factors. For example, in tuna, the dorsal meat contains 1 to 2% lipids, while the abdominal meat can reach up to 20%. It was observed by Bruschi (2001) that higher levels of lipids for sardines (Otero-Raviña 2007) and tuna 6.84% (Hiraoka, 2019).

Different from the values of humidity, ash and lipids, the protein content present in the *C.Striata* fillet showed increasing results with an increase in the animal Proteins of the Diet (P <0.05). According to Gonçalves & Menegassi (2011) the protein value of a murrel is approximately 18.60%, correlated by Franco (1998) for FS50 (18.60%) and FS25 (18.70%). In the present study, a lower protein content (4.19%) was found in the Basal diet i.e (100% VP+0% AP), differing it from the other treatments. The total protein content of meat from farmed and free-living fish is similar. The samples had an average protein content of 13.45%, the protein composition of fish meat may vary depending on the species, size, sex and time of year; however, the muscle generally contains about 20% protein. It is noted by the data in Table 1 that the protein contents in the samples were included in the range published in the literature. The data presented in table 1 show that there was no significant variation between the samples analyzed since the standard deviation values found did not reach 0.5%. In addition, the results were close to those found by Yanar *et al.* (2006) in studies also on *tilapia* that presented 76.87% moisture, 18.23% protein, 2.64% lipids and 1.09% ash. In the case of carbohydrate contents, these were not analyzed, considering that in some treatments, the proximate composition exceeded the limit of 100%. According to Zhou, *et al.* (2013) the values of carbohydrates are not usually included in the results because the levels are less than 1%.

Table 1: Proximate composition and pH of the *C. Striata* fillet grown with different protein concentrations

Diet Category	Feed [Salmon Flour+Soybean meal [AP (%)+VP(%)]	Evaluated Parameters (%)					
		Moisture	Ashes	Lipid	Crude protein	pH	Protein content in Meat
Basal	51.4+16.1	74.97 ± 0.09[a]	4.86 ± 0.10 (0.89 ± 0.02[a])	9.86 ± 0.97 (3.37 ± 0.25[a])	90.26 ± 0.67 (19.61 ± 0.33[a])	6.42± 0.31[a]	13.70± 0.10[a]
FS12	45.0+24.6	74.10 ± 1.19[a]	4.38± 0.09 (0.91 ± 0.03[a])	9.78 ± 1.25 (3.21 ± 0.29[a])	82.36 ± 0.61 (19.77 ± 0.31[b])	6.39 ± 0.12[ac]	13.12± 0.50[a]
FS25	38.5+33.0	74.67 ± 1.32[a]	4.45 ± 0.37 (1.30 ± 0.11[a])	8.36 ± 1.09 (3.02 ± 0.12[a])	83.61 ± 2.36 (20.61 ± 0.33[b])	6.35 ± 0.02[a]	13.70± 0.12[a]
FS37	32.1+41.5	75.08 ± 0.63[a]	4.62 ± 0.01 (1.32 ± 0.003[a])	12.06 ± 0.61 (3.02 ± 0.22[a])	86.91 ± 0.61 (22.60 ± 0.38[b])	6.15 ± 0.03[ab]	14.71± 0.22[a]
FS50	25.7+50.0	75.71 ± 0.28[a]	4.71 ± 0.10 (1.34± 0.02[a])	12.61 ± 0.64 (3.02 ±0.11[a])	86.61 ± 0.61 (22.03 ± 0.01[b])	6.51± 0.03[ab]	14.77± 0.91[a]

Note: AP: Animal Protein; VP = Vegetable Protein; The values of moisture, ash, lipids and proteins are expressed as a percentage in dry and natural bases (in parentheses). Different letters in the same column indicate a statistically significant difference (P <0.05) according to the Tukey HSD test.

In the case of pH, this parameter ranged from 6.15 (FS37) to 6.51(FS50), with significant differences (P <0.05). However, there were differences between FS12 and FS37 (P <0.05) and FS12 and FS50 (P <0.05), it is clear that there is a slight variation between the results. According to Kumar, *et al.* (2008) [9], the pH of freshwater fish varies between 6.6 and 6.8, leading us to suggest that in all treatments, the pH is slightly more acidic. The pH is a component of fundamental importance since it interferes with the fish meat's texture.

The results of the sensory analysis showed that, according to the tasters, the FS12 differs from the FS50 treatment (standard sample), but there are no differences between the FS25 and FS37 with the FS50 (P> 0.05). This test leads us to conclude that there is a response in fish grown in different diets as they differ in taste when compared to the sample grown in the ideal protein concentration (FS50). In this test, it was not possible to compare the BASAL treatment as it had few samples. As for the results related to the electronic scale, most tasters opted for "slightly disliked" for the samples corresponding to the FS12 and FS25 treated fish represented by 38 and 22% of the tasters, respectively. Fish samples grown at FS25 level, on the other hand, showed the best results, with FS37 of the judges opting for "I liked it regularly". Diets of FS37 and FS50 were classified as "Indifferent" by 19 and 25% judges, respectively.

3.3. Effect of salinity on murrel fish quality attributes

The physical-chemical analyses showed that the murrel fish fillet has an average of 74.9 ± 0.87% of moisture and that the values do not differ significantly between the evaluated salinities (P > 0.05; Table 1). Water was the component with the highest concentration found in murrel fish fillets. According to Kuppu, *et al.* (2018) [11] the fish muscle can contain 60 to 85% moisture, noting normality in the values found in the species studied. Although the salinity of cultivation did not interfere with the moisture of the murrel fish meat, other factors can be influential, such as the seasons. Kumar, Rajesh. (2012) [10] obtained moisture contents of 73.92% for sardines during the summer and 72.05% in the winter, 79.27% during the summer and 77.80% in the winter, these values being within of the range referred to for murrel fish. The water content in the muscle of cultured fish tends to be lower than that of free-living fish and seems to reflect their better nutritional status. In the present study, the average mineral matter found in murrel fish muscle did not differ significantly (P > 0.05) between the evaluated salinities. The analyzed samples were within the range of 1.0% to 2.0% ash, according to Kumar, Rajesh. (2012) [10] within the ash content standard for marine fish. Similar results were also found by Kuppu, *et al.* (2018) [11]. The mineral matter results suggest that in all treatments, the number of mineral elements in the culture environment, associated with those supplied through commercial feed, can be assimilated to the amount of mineral material found in the natural environment. This is due to the fish's ability to acquire these compounds from the environment and food. These minerals are essential components of fish meat for their nutritional value and for contributing to flavor.

In all tested salinities, the lipid content of murrel fish muscle was equal in all tests ($P > 0.05$). The concentrations of lipids found in fish can vary widely, ranging from 0.6 to 36%. This variation may be due to the type of body muscle in the same species, sex, age, time of year, habitat and diet, among other factors. For example, in tuna, the dorsal meat has levels of 1 to 2% of lipids, while the abdominal meat can reach up to 20%. Differently from the values of moisture, ash and lipids, the levels of proteins present in the murrel fish fillet showed increasing results with an increase in the salinity of the water ($P < 0.05$). In the case of pH, this parameter ranged from 6.15 (salinity of 25 g/L) to 6.51(salinity of 35 g/L), showing significant differences. However, there were differences between salinities 7 and 25 g/L ($P < 0.05$) and salinities 7 and 35 g/L ($P < 0.05$), there is a slight variation between the results. According to Martinez-Conde (1984), the pH of fresh fish varies between 6.6 and 6.8, leading us to suggest that in all treatments, the pH is slightly more acidic. The pH is a component of fundamental importance, as it interferes with the texture of the fish meat.

The results of the sensorial analysis showed that according to the tasters, the salinity of 7 g/L differs from the salinity of 35 g/L (standard sample), but there are no differences between the salinities of 15 and 25 g/L with the salinity of 35 g/L ($P > 0.05$). This test leads us to conclude that there is a response in fish cultivated at different salinities, as they differ in flavor when compared to the sample cultivated at ideal salinity (35 g/L). In this test, it was not possible to compare the salinity of 4 g/L, as it had few samples. As for the results referring to the hedonic scale (Table 2), most panellists chose “I disliked it slightly” for the samples corresponding to salinities of 4 and 7 g/L, represented by 38 and 22% of the panellists, respectively. The samples of fish grown at salinity of 15 g/L showed the best results, with 28% of the judges opting for “I liked it regularly”. The salinities of 25 and 35 g/L were classified as “Indifferent” by 19 and 25% of the judges, respectively.

Table 2: Result of the hedonic scale in response to murrel fish cultivated in different salinity gradients of the cultured water

	Cultured Water Salinity (g/L)				
Hedonic Scale	**4**	**7**	**15**	**25**	**35**
1. I disliked it very much	-	3 (9%)	1 (3%)	4 (13%)	1 (3%)
2. I disliked it a lot	3 (19%)	2 (6%)	1 (3%)	1 (3%)	1 (3%)
3. Disliked Regularly	2 (13%)	4 (13%)	1 (3%)	5 (16%)	3 (9%)
4. Disliked Slightly	6 (38%)	7 (22%)	3 (9%)	4 (13%)	3 (9%)
5. indifferent	2 (13%)	3 (9%)	4 (13%)	6 (19%)	8 (25%)
6. Liked it Slightly	1 (6%)	4 (13%)	5 (16%)	6 (19%)	5 (16%)
7. Liked Regularly	2 (13%)	6 (19%)	9 (28%)	3 (9%)	6 (19%)
8. I liked it a lot	-	2 (6%)	8 (25%)	3 (9%)	2 (6%)
9. I really liked it	-	1 (3%)	-	-	3 (9%)

The values correspond to the number of tasters, followed by their percentage.

It is possible to emphasize the preference of the judges regarding the salinity of 15 g/L, since counting all the scores from 6 (I liked it slightly) to 9 (I liked it very much) it is verified that this salinity represents 69% of acceptance of consumers, while the salinity of 4 g/L presents only 19%. The treatment that resulted in the best Acceptability Index (AI) was the salinity of 15 g/L, which obtained an AI more significant than 70%. Below these indexes are the salinities of 25 and 35 g/L, which presented the Acceptability Index at an average of 60%. Then the salinities of 4 and 7 g/L, with AI around 50%. Analysing all the results of the sensorial analyses, it can be seen that the values followed the same response pattern. This suggests that murrel fish grown at salinity of 15 g/L present better results of acceptance by the consumer, even though they do not differ, in terms of preference, from salinities of 25 and 35 g/L.

4.0 Conclusion

Murrel fish is a freshwater fish with an elongated body shape and a flat head. The surface and sides of the back are dark in colour and are patterned in a combination of black and dark yellow wane, like white on the belly. Fish are found in rivers, lakes and swamps. Sometimes it is found in brackish water with low salt content, and can also live in dirty water with low oxygen levels and is even resistant to drought. Through the present study, it was possible to conclude that water salinity of 4 g/L interfered in the physicochemical quality of pond culture. The sensory analysis results showed that, according to the tasters, the FS12 treatment is different from the FS50 treatment (standard sample). Still, there are no differences between the FS25 and FS37 with the FS50 ($P > 0.05$). This was shown by the fact that the FS12 treatment received higher positive ratings overall. Pond culture cultivated at salinities of 15, 25 and 35 g/L showed acceptance by consumers. However, salinity of 15 g/L in pond culture provided greater preference for tasters. Due to the evidence of the species' euryhalinity, the maintenance of the physicochemical composition and consumer acceptance, it can be concluded that murrel fish can be grown in salinities of 15, 25 and 35 g/L without loss of quality. The sensory analysis found a difference in salinity of 7 g/L with a standard sample of 35 g/L; however, no differences were found between the salinities of 15 and 25 g/L and the salinity of 35 g/L ($P > 0.05$). The standard sample had a salinity of 35 g/L. This test demonstrates an effect on the fish, as the fish grown at lower salinities (25g/L and below) have a distinct flavour compared to those grown at higher salinities (35g/L and above).

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