RESEARCH ARTICLE Indian Journal of Animal Research, Volume 59 Issue 5: 885-891 (May 2025)

Sensory Attributes of *Channa striata* Through Dietary Supplementation of Selenium and Taurine in Inland Saline Aquaculture

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10.18805/IJAR.B-5566

ABSTRACT

Background: Stress management through a dietary approach is an emerging area in aquaculture which paves the way for sustainable aquaculture. Salinity-induced stress in aquaculture using inland saline groundwater (ISGW) can significantly impact the organoleptic characteristics of the fish.

Methods: This study investigates the influence of dietary selenium (Se) and taurine (Tau) enrichment on the organoleptic characteristics of *Channa striata* reared in ISGW at 12 and 14 ppt salinity. Juvenile *C. striata* were fed diets consisting different concentrations of Se (0, 0.1, 0.3 and 0.5 mg/kg) and Tau (0, 5, 10 and 15 g/kg) for 150 days at 12 and 14 ppt salinities. Fillet quality was assessed through colour analysis and sensory evaluation.

Result: Results indicated that at 12 ppt salinity, Se at 0.3 mg/kg positively enhanced fillet whiteness, texture and flavour intensity, while Tau at 10 g/kg improved muscle firmness and overall acceptability. Increased salinity negatively affected fillet colour and texture, but Se and Tau supplementation mitigated these adverse effects. Sensory evaluation revealed higher appearance, taste and texture scores in Se and Tau-supplemented groups, suggesting improved consumer appeal. These findings highlight the potential of Se and Tau as effective dietary interventions to enhance fillet quality in *C. striata* reared under saline conditions. The study provides valuable insights for aquaculture sustainability, demonstrating that strategic dietary modifications can optimize fish quality and consumer acceptance in challenging environments.

Key words: Consumer preference, Dietary intervention, Groundwater salinization, Organoleptic characteristics, Stress management.

INTRODUCTION

The rise in the human population has led the globe to face various significant environmental crises. One such problem is groundwater and land salinization due to multiple anthropogenic activities (Sandeep *et al.,* 2013; Paswan *et al.,* 2025). It was estimated that 8.62 million hectares (mha) of India's land was heavily affected by soil salinity, which is ultimately unsuitable for agriculture (Iffat *et al.,* 2020) and it also projected that the area in India affected by salinity will increase by 20 mha by 2050 (Sharma *et al.,* 2014). So, developing a mitigation strategy to utilize these unusable resources for sustainable food production for the growing population is important (Anantharaja *et al.,* 2023). In this regard, aquaculture can be a *via*ble option for effectively utilising these underutilized resources (Kumar *et al.,* 2016). However, due to the differing chemistry of inland saline groundwater (ISGW) from freshwater, it is challenging to develop inland saline aquaculture (ISA) (Murmu *et al.,* 2019; Patel *et al.,* 2022). Even though many countries have successfully employed fish farming in these saline-afflicted areas (Thirunavukkarasar *et al.,* 2022). Freshwater fish such as *Labeo rohita* (Patel *et al.,* 2022, 2023), *Cyprinus carpio haematopterus* (Singh *et al.,* 2020) and *Cyprinus carpio* (Iffat *et al.,* 2021) have been reared in the ISGW. However, further species diversification is needed for mankind's future food demand.

Channa striata (Bloch, 1793) or striped snakehead, is a highly prized food fish species farmed extensively in Southeast Asia (Kumar *et al.,* 2022). Since it is an air-breathing species, it is highly resilient to environmental stressors. Due to this, the culture of *C. striata* can be a promising approach for using inland saline aquaculture. But fishes reared in an unfavourable environment will face biological stress, that leads to changes in carcass quality

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How to cite this article: Dheeran, P., Verma, A.K., Krishnan, S., Krishnani, K.K., Hittinahalli, C.M., Campal, E.I. and Annadurai, R. (2025). Sensory Attributes of *Channa striata* Through Dietary Supplementation of Selenium and Taurine in Inland Saline Aquaculture. Indian Journal of Animal Research. 59(5): 885-891. doi: 10.18805/IJAR.B-5566.

Submitted: 10-02-2025 **Accepted:** 17-03-2025 **Online:** 31-03-2025

parameters, which leads to a change in consumer preference for aquaculture products (Dharani *et al.,* 2024). Similarly, higher salinities (12 and 14 ppt) of ISGW have altered the organoleptic characters of *C. striata*, explored in our previous work (Unpublished).

Preventing stress in fish can ultimately lead to enhanced farm productivity (Li *et al.,* 2022). Studies have shown that adopting a dietary interventional approach can mitigate stress effectively. It can be attained through the nutritional and non-nutritional compounds/additives supplementation of feed (Ciji and Akhtar, 2021). However, recent research has shown that minerals and amino acids can improve various fishes' resistance to environmental stressors. Selenium (Se) is a mineral element with immense antioxidant capacity, it significantly decreases free radicals produced from lipid peroxidation (Zhou *et al.,* 2009). The growth of the fish can be improved by Se (Ahmad *et al.,* 2024). Impact on supplementation of Se in various fishes such as *Cyprinus carpio* (Saffari *et al.,* 2017), *Oreochromis niloticus* (Dawood *et al.,* 2020), *Carassius auratus gibelio* (Zhou *et al.,* 2009), *Labeo rohita* (Swain *et al.,* 2019) and *Megalobrama amblycephala* (Long *et al.,* 2017) has revealed the nutritional importance of Se. So, it also can be utilized to improve the sensory attributes of fish affected by stress.

Taurine (Tau) is an amino acid which has a vital role in the various physiological processes (Wu, 2020). Recent studies have revealed that Tau positively affects meat quality (Li *et al.,* 2022). Previous work on the rice field eel (*Monopterus albus*) has shown that Tau has upregulated the expression levels of muscle development genes, reduced myofiber loss and maintained muscle homeostasis (Zhang *et al.,* 2022). Another study on *O. niloticus* has found that Tau plays a vital role in improving skin colour and promoting organoleptic characteristics (Urbich *et al.,* 2022). However, studies on the effects of Se and Tau on the organoleptic characteristics of fish are limited. So, the current research has aimed to explore the benefit of Se and Tau on the organoleptic characteristics of *C. striata* reared in varying salinities (12 and 14 ppt) of ISGW.

MATERIALS AND METHODS

Ethical statement

The study was done by employing the protocol of CPCSEA (Committee for the Purpose of Control and Supervision of Experiments on Animals), Ministry of Environment and Forests (Animal Welfare Division), Govt. of India on welfare and utilization of animals in scientific research. This study was approved by the ethical committee of ICAR-Central Institute of Fisheries Education, Mumbai, India.

Experimental animals and design

The experiment was carried out from June to November, 2023. Juveniles of *C. striata* with a mean weight of 4.74±0.09 g were acquired from an aqua consultant in Andhra Pradesh, India. After being transported to the ICAR-Central Institute of Fisheries Education (CIFE) regional centre, Rohtak, Haryana, India, the fish were acclimated in tanks containing freshwater for 15 days. After acclimatization, the juveniles with a mean weight of 6.21±0.03 g were progressively changed to salinities of 12 and 14 ppt, respectively, by adding 1 ppt every day within 15-day intervals. Throughout the acclimatization period, the fish were provided with a Growel commercial feed with 42% crude protein (CP), 3% crude fibre (CF), 8% crude lipid (CL) and 12% moisture content twice daily @ 5% biomass. The tanks were provided with proper aeration to maintain an appropriate DO level.

After 15 days, twenty-four *C. striata* juveniles with mean biomass of (8.31±0.05 g) were randomly released in eight different experimental units for the Se experiment *viz*., (12 ppt) 0 mgSe (0 mg sodium selenite (inorganic form of Se) (Na_2SeO_3)/kg of diet), (12 ppt) 0.1 mgSe (0.1 mg Na_2SeO_3/kg of diet), (12 ppt) 0.3 mgSe (0.3 mg Na_2SeO_3/kg of diet), (12 ppt) 0.5 mgSe (0.5 mg Na_2SeO_3/kg of diet) were reared in 12 ppt salinity whereas, (14 ppt) 0 mgSe (0 mg Na_2SeO_3/kg of diet), (14 ppt) 0.1 mgSe (0.1 mg Na_2SeO_3/kg of diet), (14 ppt) 0.3 mgSe (0.3 mg Na_2SeO_3/kg of diet), (14 ppt) 0.5 mgSe (0.5 mg Na_2SeO_3/kg of diet) were reared in 14 ppt salinity in triplicates following a 2 × 3 factorial design for 150 days. Similarly, the fish were randomly stocked in another eight experimental units for the Tau experiment *viz*., (12 ppt) 0 gTau (0 g Tau/kg of diet), (12 ppt) 5 gTau (5 g Tau/kg of diet), (12 ppt) 10 gTau (10 g Tau/kg of diet), (12 ppt) 15 gTau (15 g Tau/kg of diet) were reared in 12 ppt salinity whereas, (14 ppt) 0 gTau (0 g Tau/kg of diet), (14 ppt) 5 gTau (5 g Tau/kg of diet), (14 ppt) 10 gTau (10 g Tau/kg of diet), (14 ppt) 15 gTau (15 g Tau/kg of diet) were reared in 14 ppt salinity in triplicates employing a 2 × 3 factorial design for an experimental period of 150 days. Circular fibre-reinforced plastic (FRP) tanks with a capacity of 400 L (1.0 m × 0.5 m) were used for experiments and 250 L water volume was maintained in every tank with proper aeration during the experiment trial. The *C. striata* were hand-fed two times daily (08:30 and 16:30 hrs.) @ 5% biomass to their satiation level. 30% water was exchanged regularly to eradicate the faecal matter and uneaten feed.

Preparation of experimental diet

The feed employed in this study is a commercial diet from Growel, India, having a size of 1.2 mm with 42.0% CP, 8.0% CL, 3.0% CF and 12.0% moisture and with this, Se and Tau were separately added through the surface coating method using the Unispray equipment (S. B. Panchal and Company, Mumbai). The feed additive Se was purchased from Merck Schuchardt OHG, Germany and Tau was procured from Virion Enterprises, Mumbai. As per the experimental requirement, Se and Tau were weighed and diluted in the commercial coating gel (Turbogel, Guybro Chemical) (50-70 ml/kg feed) according to manufacturer instructions and stirred for homogeneous distribution. After the even coating, the feed was dried at room temperature

for at least one day before feeding. The control diet was coated with the same coating gel to avoid an experimental error.

Preparation of fillets

After being cultured for 150 days, *C. striata* were euthanized by cervical dislocation following hypo-thermal stunning and placed in a cooler containing ice-cold water at 0-4°C. After being washed using freshwater, the grown *C. striata* were segregated into ten samples for every replicate and brought to the processing lab on crushed ice. To investigate fillet quality, a competent fish processor filleted the fish.

Colour analysis

Using a CR-300 chromometer (Minolta, Osaka, Japan), the colour of the *C. striata* fillet was assessed in both raw and cooked forms. The apparatus measures the CIE-L* brightness of the *C. striata* raw and cooked fillet (L× = 0 for black, L* = 100 for white), a* redness (a* > 0) and b* yellowness (b* > 0), with the chroma ((a*)2 + (b*)2)1/2 being the position in the colour space. The colour was recorded above the lateral line at three points on the *C. striata* fillet: close to the head, middle of the fillet and close to the tail. For every body component, the average of two measurements was taken. The L*C*H colour model was then used to translate measurements taken using the L*a*b* colour model, where L* stands for brightness and C* for chroma, which is equal to [(a*)2 + (b*)2]1/2 (Choubert *et al*., 1997). The same procedure was also followed to analyze the colour of the whole *C. striata* fish before making it into a fillet. The colour was recorded above the lateral line at three points for the entire *C. striata* fish: close to the head, in the middle and close to the tail. The illumination system was rotated 90 degrees between duplicate measurements for each position of the whole fish. For every body component, an average of two measurements was taken to measure the whiteness of the entire fish. The whiteness value of *C. striata* external colour of fish, raw fillets and cooked fillets was obtained using the formula,

$$\text{Whiteness} = 100 - [(100 - L^*)2 + a^*2 + b^*2]1/2 \quad ...(1)$$

Sensory analysis of cooked fillets

A 9-point hedonic scale was used to assess the sensory aspects of cooked *C. striata* fillets, including appearance, colour, taste, texture, strength of flavour and odour and overall acceptability of cooked fillets (Peryam and Pilgrim, 1957). The assessments were carried out by a sensory panel of 30 people, both male and female, ages 20 to 40. The cooked fillets were randomly arranged on white porcelain plates at room temperature in the presence of natural light. The panellists scored the fillets on a 9-point scale, with 9 denoting “extremely like” and 1 denoting “extremely dislike.”

Statistical analysis

All the statistical analysis were carried out in SPSS (version. 25). Two-way analysis of variance (ANOVA) was carried at a significance level of 5%. All the data were presented in the mean±standard error.

Results and Discussion

Consumers prefer meat products for their nutritional value and appearance in terms of colour and other organoleptic characteristics. The present evaluation shows the effect of Se and Tau in the ISGW-reared *C. striata* on the organoleptic parameters.

Colour analysis

Effect of selenium

In the current work, the whiteness value of the external colour of the whole C. *striata*, is enhanced in raw fillet and cooked fillet, were noted in the (12 ppt) 0.3 mgSe group (Table 1). Similarly, Liu *et al.* (2017) recorded that muscle colour of the *Megalobrama amblycephala* was enhanced by the diets supplemented with nano-selenium (Nano-Se) (0.2 mg Se/kg) and Se-yeast (0.2 mg Se/kg). This is due to the antioxidant capacity of Se, which protects against detrimental reactions caused by lipid peroxidation (Zhan *et al.,* 2007).

Effect of taurine

In this research, an increased whiteness value of the external colour of the whole *C. striata*, raw fillet and the cooked fillet were observed in (12 ppt) 10 g Tau treatment and significantly ($p<0.05$) decreased in (14 ppt) 0 g Tau treatment (Table 2). As the salinity increases, the whiteness score of the external colour, raw fillet and cooked fillet of *C. striata* decreased significantly. This is due to declined growth in the presence of an environmental stressor (Portz *et al.,* 2006).

Sensory attributes

Effect of selenium

In this assessment, Se supplementation significantly ($p<0.05$) affected the cooked fillet of *C. striata* sensory attributes. Cooked fillets of (12 ppt) 0.3 mg Se treatment had greater appearance, texture, colour, odour intensity, taste, flavour intensity and overall acceptability of sensory scores, respectively, whereas it was decreased in (14 ppt) 0 g Tau treatment (Fig 1). Likewise in a previous study carried out by Liu *et al.* (2017) in *Megalobrama amblycephala* fed with diet supplemented with Se in the form of Nano-Se, Na_2SeO_3 and Se-yeast in varying concentrations. The results revealed that the 0.4 and 0.8 mg/kg of Se-yeast-fed fish group revealed better texture, which is similar to our study. Another study by Lin *et al.* (2014) in juvenile *Epinephelus malabaricus* fed with a diet supplemented with Se at varying concentrations (0, 0.3, 0.7, 1.0 and 1.5 mg Se/kg diet). The findings showed that the water-holding capacity of the muscle was higher and had high texture quality in fish fed with a diet less than 0.7 mg Se/kg-diets, which is in line with our current work.

Table 1: Effect of selenium supplementation on *Channa striata* external fish, raw fillets and cooked fillets colour.

Colour analysis	Components	Treatment								P value
		(12 ppt) $_{0\ mg\ Se}$	(12 ppt) $_{0.1\ mg\ Se}$	(12 ppt) $_{0.3\ mg\ Tau}$	(12 ppt) $_{0.5\ mg\ Se}$	(14 ppt) $_{0\ mg\ Se}$	(14 ppt) $_{0.1\ mg\ Se}$	(14 ppt) $_{0.3\ mg\ Tau}$	(14 ppt) $_{0.5\ mg\ Se}$	Salinity × Selenium
External colour	L*	25.81±0.05^{cB}	26.78±0.04^{dB}	27.13±0.24^{dB}	26.65±0.06^{dB}	23.88±0.04^{aA}	24.64±0.19^{bA}	25.37±0.08^{cA}	24.49±0.12^{abA}	<0.001
	a*	0.55±0.01^{bcA}	0.20±0.02^{aA}	0.23±0.06^{aA}	0.37±0.02^{abA}	0.77±0.05^{dB}	0.54±0.04^{bcB}	0.57±0.04^{cdB}	0.67±0.03^{cdB}	<0.001
	b*	4.84±0.14^{bcA}	4.35±0.45^{bA}	3.29±0.04^{aA}	4.49±0.07^{bA}	5.63±0.07^{cB}	4.17±0.07^{abB}	4.78±0.20^{bcB}	4.33±0.08^{bB}	<0.001
	Whiteness	25.56±0.04^{dB}	26.38±0.15^{eB}	26.92±0.27^{eB}	26.34±0.03^{eB}	23.56±0.03^{aA}	24.41±0.19^{bcA}	25.11±0.12^{cdA}	23.99±0.19^{abA}	<0.001
Raw fillet colour	L*	43.66±0.06^{deB}	44.77±0.50^{eB}	45.98±0.19^{fB}	43.33±0.03^{dB}	38.67±0.23^{aA}	39.62±0.14^{abA}	41.68±0.19^{cA}	39.89±0.18^{bA}	<0.001
	a*	9.40±0.53^{cdA}	2.39±0.69^{aA}	3.69±0.15^{abA}	4.51±0.43^{abA}	12.56±1.84^{dB}	11.90±0.88^{cdB}	7.49±1.09^{bcB}	7.97±0.50^{bcB}	<0.001
	b*	7.59±0.44^{abcA}	5.54±0.39^{aA}	6.34±0.45^{abA}	5.92±0.11^{abA}	10.69±1.26^{dB}	8.68±0.59^{bcdB}	10.47±0.68^{cdB}	7.39±0.08^{abB}	<0.001
	Whiteness	42.24±0.14^{dB}	44.35±0.42^{eB}	45.33±0.22^{eB}	42.73±0.03^{dB}	36.06±0.30^{aA}	37.70±0.09^{bA}	40.12±0.23^{cA}	38.79±0.22^{bA}	<0.001
Cooked fillet colour	L*	59.33±0.11^{cB}	60.69±0.16^{cdB}	61.91±0.04^{dB}	59.30±0.19^{cB}	52.52±0.69^{aA}	54.24±0.24^{bA}	55.57±0.23^{bA}	54.20±0.29^{bA}	<0.001
	a*	2.61±0.25^{aA}	3.76±0.56^{abA}	3.09±0.31^{abA}	4.41±0.93^{abcA}	6.40±0.80^{cB}	5.17±0.23^{bcB}	4.63±0.21^{abcB}	5.10±0.27^{abcB}	0.002
	b*	18.55±0.96^{aB}	19.10±0.28^{abB}	20.95±0.29^{bB}	17.93±0.62^{aB}	18.72±0.59^{abA}	18.32±0.04^{aA}	19.08±0.12^{abA}	18.74±0.26^{abA}	0.020
	Whiteness	55.16±0.42^{cB}	56.17±0.08^{cB}	56.42±0.14^{cB}	55.32±0.46^{cB}	48.58±0.42^{aA}	50.48±0.23^{bA}	51.50±0.14^{bA}	50.29±0.39^{bA}	<0.001

Note: Values are average of a minimum of three readings, presented as mean ± standard error (one-way ANOVA) and different lowercase letters (doses of Se) and uppercase letters (salinity variations) indicate statistically significant differences (DMRT at the 5% probability level) (Two-way ANOVA). Values in the same column with different superscripts are significantly different ($p<0.05$).
L*: Lightness; a*: Redness/Greenness, b*: Yellowness/Blueness.

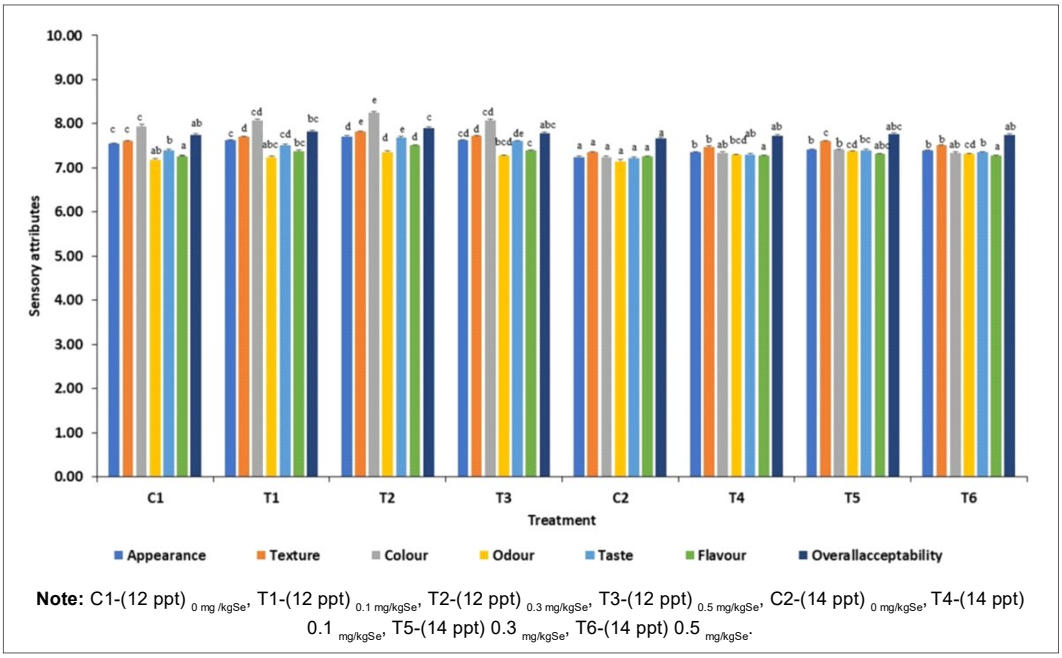
Table 2: Effect of taurine supplementation on *Channa striata* external fish, raw fillets and cooked fillets colour.

Colour analysis	Components	Treatment								P value
		(12 ppt) $_{0\ g\ Tau}$	(12 ppt) $_{5\ g\ Tau}$	(12 ppt) $_{10\ g\ Tau}$	(12 ppt) $_{15\ g\ Tau}$	(14 ppt) $_{0\ g\ Tau}$	(14 ppt) $_{5\ g\ Tau}$	(14 ppt) $_{10\ g\ Tau}$	(14 ppt) $_{15\ g\ Tau}$	Salinity × Taurine
External colour	L*	25.71±0.05^{dB}	26.51±0.15^{eB}	27.00±0.28^{dB}	26.48±0.03^{dB}	23.78±0.04^{aA}	24.54±0.19^{bcA}	25.27±0.09^{cdA}	24.16±0.19^{abA}	<0.001
	a*	0.65±0.02^{bcdA}	0.30±0.02^{aA}	0.33±0.07^{aA}	0.47±0.03^{abA}	0.87±0.05^{dB}	0.64±0.04^{bcdB}	0.60±0.09^{bcB}	0.77±0.03^{cdB}	<0.001
	b*	4.63±0.46^{abA}	4.41±0.45^{abA}	3.35±0.07^{aA}	4.59±0.07^{abA}	5.67±0.12^{bB}	4.27±0.08^{abB}	4.74±0.63^{abB}	4.99±0.37b^{B}	0.018
	Whiteness	25.56±0.05^{dB}	26.38±0.15^{dB}	26.92±0.23^{dB}	26.34±0.04^{dB}	23.56±0.04^{aA}	24.41±0.19^{bcA}	25.11±0.13^{cdA}	23.99±0.19^{abA}	<0.001
Raw fillet colour	L*	43.56±0.07^{deB}	44.70±0.47^{efB}	45.84±0.17^{fB}	43.23±0.03^{dB}	38.34±0.31^{aA}	39.52±0.15^{bA}	41.58±0.19^{cA}	39.79±0.19^{bA}	<0.001
	a*	9.50±0.53^{aA}	2.49±0.69^{aA}	3.79±0.16^{abA}	4.61±0.43^{abA}	12.66±1.84^{dB}	12.00±0.88^{cdB}	7.59±1.09^{bcB}	8.07±0.50^{bcB}	<0.001
	b*	7.68±0.43^{abcA}	5.64±0.39^{aA}	6.43±0.45^{abA}	6.02±0.12^{abA}	10.77±1.29^{dB}	8.78±0.59^{bcdB}	10.57±0.68^{cdB}	7.49±0.09^{abB}	<0.001
	Whiteness	42.24±0.14^{dB}	44.35±0.43^{eB}	45.33±0.23^{eB}	42.73±0.03^{dB}	36.06±0.31^{aA}	37.69±0.09^{bA}	40.12±0.24^{cA}	38.79±0.22^{bA}	<0.001
Cooked fillet colour	L*	59.43±0.12^{cB}	60.79±0.16^{cdB}	61.97±0.02^{cB}	59.40±0.19^{cB}	52.62±0.69^{aA}	54.34±0.25^{bA}	55.71±0.23^{bA}	54.30±0.29^{bA}	<0.001
	a*	3.67±1.25^{abA}	3.86±0.57^{abA}	3.12±0.35^{aA}	4.51±0.93^{abA}	6.49±0.80^{bB}	5.27±0.24^{abB}	4.73±0.21^{abB}	5.20±0.27^{abB}	0.062
	b*	18.63±0.95^{aB}	19.19±0.28^{abB}	21.05±0.29^{bB}	18.03±0.62^{aB}	18.82±0.59^{aA}	18.42±0.04^{aA}	19.18±0.13^{abA}	18.84±0.26^{abA}	0.018
	Whiteness	55.16±0.42^{cB}	56.17±0.09^{cB}	56.42±0.15^{cB}	55.32±0.47^{cB}	48.58±0.42^{aA}	50.48±0.23^{bA}	51.49±0.14^{bA}	50.29±0.39^{bA}	<0.001

Note: Values are average of a minimum of three readings, presented as mean ± standard error (one-way ANOVA) and different lowercase letters (doses of Tau) and uppercase letters (salinity variations) indicate statistically significant differences (DMRT at the 5% probability level) (Two-way ANOVA). Values in the same column with different superscripts are significantly different ($p<0.05$).
L*: Lightness; a*: Redness/Greenness, b*: Yellowness/Blueness.

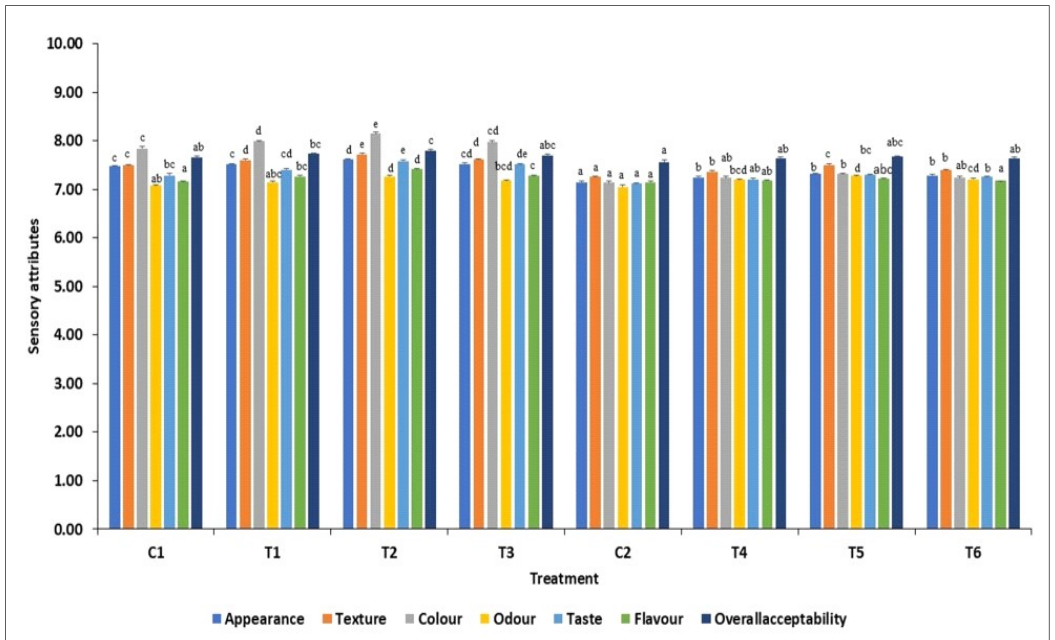
Effect of taurine

In this work, addition of taurine significantly ($p<0.05$) affected the cooked fillets of *C. striata* sensory attributes. Cooked fillets of (12 ppt) 10 g Tau treatment had greater sensory attributes and overall acceptability, respectively, whereas it decreased in (14 ppt) 0 g Tau treatment (Fig 2). Previous work has shown that the inclusion of Tau can enhance the texture and taste of the fish fillet (Li *et al.,* 2009). The current evaluation proved that the fillet quality was improved in the fish from the (12 ppt) 10 g Tau group. Similarly, Kotzamanis *et al.* (2020) showed that the Tau supplementation significantly reduced the drip loss in the fillets and improved the cooked fillet quality of *Dicentrachus labrax* reared in natural seawater (35 ppt) fed with 10 and



Note: C1-(12 ppt) $_{0\ mg\ /kgSe}$, T1-(12 ppt) $_{0.1\ mg/kgSe}$, T2-(12 ppt) $_{0.3\ mg/kgSe}$, T3-(12 ppt) $_{0.5\ mg/kgSe}$, C2-(14 ppt) $_{0\ mg/kgSe}$, T4-(14 ppt) 0.1 $_{mg/kgSe}$, T5-(14 ppt) 0.3 $_{mg/kgSe}$, T6-(14 ppt) 0.5 $_{mg/kgSe}$.

Fig 1: Effect of Se on the sensory attributes of *Channa striata.*



Note: C1-(12 ppt)$_{0\ g/kg\ Tau}$, T1-(12 ppt)$_{5\ g/kg\ Tau}$, T2-(12 ppt)$_{10\ g/kg\ Tau}$, T3-(12 ppt) $_{15\ g/kg\ Tau}$, C2-(14 ppt) $_{0\ g/kg\ Tau}$, T4-(14 ppt)$_{5\ g/kg\ Tau}$, T5-(14 ppt) $_{10\ g/kg\ Tau}$, T6-(14 ppt)$_{15\ g/kg\ Tau}$.

Fig 2: Effect of Tau on the sensory attributes of *Channa striata.*

20 g/kg of Tau in diets, respectively. In our study, the sensory scores of the cooked fillet were higher in the fish from the (12 ppt) 10 g Tau group. Similarly, the sensory quality of fillets was higher in fish fed with a diet supplemented with 20 g/kg of Tau (Kotzamanis *et al.,* 2020). So, it has been revealed that optimum dietary Tau inclusion levels can act as a growth promoter and result in the improved sensory attributes of fillets.

Conclusion

The results of the present evaluation can be concluded that the organoleptic characteristics of ISGW-reared *C. striata* were effectively improved by the Se and Tau at an inclusion level of (12 ppt) 0.3 mg Se and (12 ppt) 10 g Tau at 12 ppt salinity. This suggests the efficiency of dietary intervention and the importance of using minerals and amino acids in the stress management of finfish aquaculture, which promotes sustainability.

Acknowledgement

The authors would like to acknowledge the Director, ICAR-Central Institute of Fisheries Education, Mumbai, for the support.

Conflict of interest

The authors declare that they have no conflict of interest to disclose.

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