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Assessment of nutritional quality in the tissue of euryhaline fish tank goby *Glossogobius giuris*, hamilton 1822 caught from Vembanad Lake, Kerala, India

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Abstract
The present study was aimed to analyse the biochemical composition emphasise on Amino acids, protein with good amino acid content and minerals of Tank Goby *Glossogobius giuris*, native to fresh water to brackish water (Euryhaline). It is an unexploited fish commonly found in brackish water especially rich in Vembanad Lake, Kerala, India. Proximate composition of fish includes moisture 80.52%, protein 14.81%, Fat 2.82%, and Ash 1.08% respectively. Amino acids in the fish are divided in to three Essential, Conditionally essential and Non-Essential Amino acids. Among the essential amino acids Histidine (His) 1745.4 mg/100g was the most abundant. Isoleucine (Ile) and Leucine (Leu) had the lowest essential amino acid. Conditionally essential amino acids showed high percentage of Cysteine (18.54%) followed by Glycine (Gly) 5.9%. Alanine (2045.5 mg/100g) was found most significant concentration amongst the Non-essential amino acids. Significant amount of mineral, Phosphorous (402 mg/100g), Potassium (356.1 mg/100g), Calcium (340.8 mg/100g), Sodium (73.2 mg/100g) and Iron (1.5 mg/100g) reported in Tank goby. The heavy metals illustrated were Copper (0.033 ppm), Manganese (5.3 ppm), Zinc (17.21 ppm), Magnesium (154.1 ppm), Mercury (0.0035 ppm) and Chromium (15.8 ppm) respectively. The knowledge about the biochemical composition of the fish enhances the utility of the fish as good source of quality protein and amino acids.

Keywords: tank goby, proximate composition, amino acid, HPLC and mineral analysis

1. Introduction
The demand of nutrient rich food grows more than the population growth, especially in developing countries. This demand was stimulated exploration of underutilized or non-traditional resources. Of the innumerable resources fish plays an important role in human nutrition, providing 20% of animal protein intake for a third of the world's population, and the reliant is highest in developing countries (Bene, Macfadyen, & Allison, 2007) [6].

Fishes are a noteworthy wellspring of top-notch protein, essential and non-essential amino acids which can't be produce in human body, vitamins and minerals involved in the important biological process in human (FAO, 2005) [14]. For the most part, the animal protein is superior to plant protein in regard of characteristics, and it is especially significant for giving protein of high caliber practically identical those of meat, milk, and egg (McCance and Widdowson 1960) [27]. There are a few micronutrients that are in general more abundant in aquatic animals than in mammalian meats or plants, e.g. vitamin D in oily fish or minerals such as iodine, selenium, zinc, magnesium, and calcium. The fish will be a mitigate to the under sustenance and micronutrient insufficiencies in developing countries (Kawarazuka & Bene, 2011) [23]. The biochemical composition of the fish denotes its nutritional quality. There for, proximate, biochemical composition of species helps to assess its nutritional and edible qualities.

Glossogobius giuris (Hamilton 1822) belongs to the family Gobiidae of order Perciformes locally known as *Poolan*. The fish is mainly found in the estuaries and fresh water and it was observed to feed on copepods, cladocerans, post larvae and juveniles of shrimp, insect larvae, polycheates, fish-fry Rao and Rao (2002) [33]. This study aims to analyse nutritional quality of finfish Tank Goby (*G. giuris*). The study was limited to the proximate composition analysis without detailing the protein, amino acids and mineral content in the candidate species. The present work is thus a pioneering study on *G. giuris* encompassing various nutritional parameters and health indices to examine the nutritional attributes of the edible parts of the species.

2. Materials and Methods

2.1 Sample collection

The fish Tank goby was selected to the study and collected from Kadamakudy, an Island located in the banks of Vembanad lake, Cochin, Kerala, India and brought into lab under iced condition (ratio1:1) in an insulated box. The tissue was separated by meat bone separator and observed that 55.63% of yield obtained and stored in -20^{0}C for future purposes.

2.2 Proximate composition

Biochemical examination of protein, fat, moisture and ash were resolved according to standard protocols. The crude protein and crude fat substance were evaluated by Kjeldahl and Soxhlet techniques, separately. Ash content was dictated by incinerate known weight of dry sample at high temperature (55ºC for 8-12 h) in muffle furnace (AOAC, 1990) [2]. All the experiments were carried out in triplicate.

2.3 Amino acid analysis

The PICO TAG method, with modification, was employed for determining the amino acid profile of the fish (Bidlingmeyer, *et al*, 1987) [7]. The dry sample (weight equivalent to 4% protein) was added with 6N HCl (15 ml) and placed in the oven at 110^{0}C for 24 hrs. Ten millilitres of internal standard was added to the mixture. After derivatisation, 10µl PICO TAG diluent was added and mixed. 10µl sample were then injected into the HPLC and analysed with Water's PICO TAG HPLC system, model 2487, equipped with binary pump model M 515, Gradient mixer solvent delivery system and 5µm PICO TAG Reversed phase column (3.9 mm i.d and 150 mm length) were used for the analysis of amino acid. The equipment is provided with column oven (TCM waters), a dual absorbance detector (UV/VIS Model 484) and manual injector. Data analysis was performed using EMPOWER 2 chromatography software.

2.4 Mineral and Trace metal analysis

Analyses of iron (Fe), copper (Cu), manganese (Mn), cadmium (Cd), nickel (Ni), magnesium (Mg), sodium (Na), phosphorus (P), potassium (K), and calcium (Ca) contents in the sample were carried out in Flame Atomic absorption spectrophotometer (Perkin Elmer, AAnalyst 200, Version 8.0, 2013), according to the method of AOAC (1999) [3]. Sample (4 g) was mixed well with Conc. HNO_3 and $HClO_4$ in the ratio 1:4 using a heating digestion furnace at 700^{0}C until all organic matter had been destroyed. After evaporation of HNO_3, the residual solution was transferred to a volumetric flask and the volume was made up to 25 ml with deionised water and stored in plastic bottles. The solution was then subjected to analysis. All samples were analysed in triplicate as per standard conditions. The operating parameter for working elements was set as recommended by manufacturer. The blank and calibration standard solution were also analysed in the same way as for the samples. The concentration of minerals and trace metal were calculated and expressed as ppm.

2.5 Statistical analysis

All the tests were done in triplicate and data were averaged. Standard deviation was also calculated.

3. Results and Discussion

3.1 Proximate composition

The proximate composition of Tank goby presented in Table (1). The fish contained 80.52±0.66% moisture, compared to Sardine (70.61±0.41%), Mackeral 75.2±0.5% and Anchovy 76.97±0.59% moisture content was high, Sumi *et al.*, 2016 [41]., Vijayakumar *et al.*, 2014 [42]. The protein content was 14.81±1.64% however, higher protein content of tank goby was observed in present study as compared to previous reports of Wimalasena and Jayasurya (1996) [45]. Compared to Sardine 21.29±0.76, Mackeral 16.75±0.55 % and Anchovy 16.95±0.27 % is less Sumi *et al* 2016 [41]. In the present study, lipid content was 2.82±0.27 % which is high compared to Anchovy 1.97±0.14, but less considering Sardine and Mackeral Sumi *et al.*,2016 [41]., Vijayakumar *et al.*, 2014 [42]. Ash content ranged from 1.08±0.13 %, which was higher than previous reports Wimalasena and Jayasurya (1996) [45]. Ash content also not as much of Sardine and Mackeral Sumi *et al.*, 2016 [41].

Table 1: Proximate composition of fresh minced meat of Tank goby

Sample	Moisture	Protein	Fat	Ash
Tank goby	80.52±0.66	14.81±1.64	2.82±0.27	1.08±0.13

3.2 Amino acid composition (mg/100gm)

Tank goby found to be a rich source of Amino acids (AAs), presented in the Table 2. AAs have been traditionally classified as nutritionally essential (EAA), "nonessential" (NEAA) or conditionally essential (CEAA) (Wu 2010) [46]. It was clear that Tank goby fish protein contain all amino acids in good concentration and result expressed in mg/100 gm tissue. The entire amino acid profile of fish tissue observed that Alanine was the highest (2045.5±0.048 mg/100g), Cysteine 1894.2±0.043 mg/100g, Histidine 1745.4±0.73 mg/100g, Threonine 1093.4±0.05 mg/100g, and Taurine 1034.4±0.9 mg/100g showed higher concentrations. The essential amino acids (His, Ile, Leu, Lys, Met, Phe, Thr, Try, and Val) formed 33% of the total amino acids in Tank goby and it was ranges from 16.7±0.3 to 1745.4±0.73 mg/100g. Histidine 17.08%, Threonine 10.70%, Lysine 1.46% were the predominant EAAs, which add together 29.24% of the total amino acids. The rest of the EAAs contributed 3.53%, Methionine 0.6% (16.7±0.3 mg/100g), Tryptophan 1.31% (134.3±0.41 mg/100g), Valine 1.31% (134.3±0.45 mg/100g), Leucine 0.01% (84.3±0.19 mg/100g), Isoleucine 0.01% (65.7±0.23 mg/100g), and Phenylalanine 0.29% (29.4±0.12 mg/100 g).

Histidine plays more than one role in protein interaction and is also a precursor of several hormones (Liao *et al.*, 2013) [24]. Histidine content of tank goby was 1745.4±0.73 mg/100g which was more than double the amount compared to *Sperata seenghala* (1.1g 100 g^{-1}), *Puntius sophore* (1.4 g 100 g^{-1}), *Sardinella longiceps* (0.4 g 100 g^{-1}), *Katsuwonus pelamis* (0.5g 100 g^{-1}), and *Epinephelus spp*. (0.5g 100 g^{-1}) (Mohanty *et al.*, 2014 [30]; Mahanty *et al.*, 2014 [25], Buchtova *et al.*, 2007 [10].

Threonineis often used to support the production of connective tissue and also support of bone and liver health. It also supports the immune system through its role in antibody production and essential role in the production of collagen. Threonine (1093.4±0.05 1745.4), showed a higher value pertain to the fresh water and marine fishes *S. seenghala, A. mola, N. hexagonolepis, C. carpio, K. pelamis, Epinephelus spp, L. splendens, T. lepturus, C. madrasensis* and *P. viridis* (Mohanty *et al.*, 2014 [30], Buchtova *et al.*, 2007) [10].

Leucine stands the abandoned dietary aminoacid that can invigorate muscle protein synthesis (Etzel, 2004) [13] and has important therapeutic role in stress conditions like burn, trauma, and sepsis (Bandt *et al* 2006) [5]. Leucine content of Tank goby was 149.4±0.06 mg/100g, it was in a superior way prominent in European seabass, gilthead sea bream, and turbot (Kaushik, 1998) [22].

Methionine is used for treating liver disorders, improving wound healing, and treating depression, alcoholism, allergies, asthma, copper poisoning, radiation side effects, schizophrenia, drug withdrawal, and Parkinson's disease (Mischoulon & Fava 2002) [29]. Mohanty *et al*., (2014) [30] reported that Methionine was prevalent in *S. longiceps* (0.3g 100 g^1), *K. pelamis* (0.4 g 100 g^{-1}), *Epinephelus spp* (0.4g 100g^{-1}), *L. splendens* (0.4g 100g^{-1}), *T. lepturus* (0.5g 100g^{-1}), in bivalves *C. madrasensis* (0.4g 100g^{-1}), and it confirmed a comparable result with *P. viridis* (0.02 g 100 g^{-1}).

Tryptophanis a precursor for serotonin, a brain neurotransmitter theorized to suppress pain. The formation of serotonin stimulated when the exogenous tryptophan enters the brain cells. Accordingly, tryptophan supplementation has been used to increase serotonin production in attempt to increase tolerance to pain (Segura and Ventura, 1988 [37]). The Tryptophan composition shows 134.3±0.41 mg/100g in tank goby. According to Mohanty *et al*., (2014) [30]. Tryptophan was not reported in *S. longiceps*, *K. pelamis*, *Epinephelus spp, L. splendens, T. lepturus.* and in *C. catla* (1 g 100 g^1), *L. rohita* (0.5 g 100 g^{-1}), *C. mrigala* (0.6 g 100 g^{-1}), *S. seenghala* (0.2 g 100 g^{-1}), *C. batrachus* (1.1 g 100 g^1), *H. fossilis* (0.6 g 100 g^{-1}), *A. testudineus* (1.4 g 100 g^{-1}) which was considerably higher than compared to that Tank goby (Mohanty *et al*., 2014 [30]).

Isoleucine is a branched chain amino acid and is needed for muscle formation and proper growth (Charlton, 2006) [12]. The amount of isoleucine in tank goby was 65.7±0.23 mg/100g, which was equivalent in *O. mykiss and L. rohita* (Sarma *et al*., 2013) [35].

Conditionally Essential Amino Acids (Arg, Cys, Gln, Gly, Pro, Ser, Tyr), contributed 31.13% of the total amino acid. Among this Cysteine 18.54% showed highest concentration, following Glycine 5.9% (605.4±0.75 mg/100g), Proline 2.41% (245.4±0.28 mg/100g), Serine 1.47% (150.5±0.132 mg/100g), Glutamine 1.1% (113.4±0.09 mg/100g), Arginine 1.01% (103.4±0.016 mg/100g), and the lowest concentration is Tyrosine 0.7% (70.73±0.6 mg/100g). The Cysteine plays a critical role in cell metabolism, required for the skin and it performs detoxification action within the body as it is present in the Keratine which is the principle protein found in the hair and skin. It is essential for collagen synthesis additionally to provided texture and elasticity to the skin. It also acts as precursor to Glutathionine which is an antioxidant it's also facilitates in making the protecting lining of the stomach and intestine strong which further beneficial as it then prevents damage by the certain drugs like aspirin and so on (McPherson and Hardy 2011) [28]. Cysteine content in Tank goby was comparatively higher than fresh water fishes *C. catla* (0.1 g 100 g^{-1}), *L. rohita* (0.1 g 100 g^{-1}), *C. mrigala* (0.1 g 100 g^{-1}), *C. batrachus* (0.2 g 100 g^{-1}), *H. fossilis* (0.1 g 100 g^{-1}), *A. testudineus* (0.2 g 100 g^{-1}), and marine fishes *K. pelamis* (0.6 g 100 g^{-1}), *Epinephelus spp* (0.6 g 100g^{-1}), *L. splendens* (0.5 g 100 g^{-1}), (Mohanty *et al*., 2014 [30], Buchtova *et al.*, 2007) [10].

Glycine plays an important role in metabolic regulation, preventing tissue injury, enhancing anti-antioxidant activity, promoting protein synthesis and wound restoration, and enhancing immunity and treatment of metabolic disorders in obesity (Wang *et al*, 2013) [44]. Glycine was reported 605.4±0.75 mg/100g, which was higher than those stated in fresh water fishes *S. seenghala* (0.4 g 100 g^{-1}), *A. mola*, (0.5 g 100 g^{-1}), and marine fishes *S. longiceps* (0.4 g 100 g^{-1}), *Epinephelus spp* (0.4 g 100 g^{-1}) (Mohanty *et al*., 2014) [30]. The obtained result also agreed with *H. fossilis*, *A. testudineus*. European seabass, Gilthead seabream, turbot and *C. micropeltes*, (Kaushik, 1998) [22].

Arginine plays a very important role in biological process, immune function, and hormone release, blood clotting, and maintenance of pressure. Arginine is additionally needed for the detoxification of ammonia, which is a very hepatotoxic substance for the central nervous system. (Wu *et al* 2010) [46]. Arginine (103.4±0.016 mg/100g) which was lower than those reported for *S. longiceps* (0.6g 100g^{-1}), *N. japonicas* (1.1g 100g^{-1}). (Sarma *et al*., 2013) [35] and Shahidi *et al*., (1995) [38] reported that the Arginine content was higher in *O. mykiss*, *T. putitora, N. hexagonolepis* and *M. villosus*.

The nonessential amino acids were contributed 24.02% to the total amino acids. Among these Alanine showed highest 20.01%, followed by Aspartic acid 2.4%, Glutamic acid 1.6% and Asparagine 0.01%. Alanine helps balance glucose and Nitrogen in the body (Buchtova *et al.*, 2007 [10]. Mohanty *et al*., 2014 [30], Buchtova *et al.*, 2007 [10] reported that Alanine level was significantly lower than fishes like *C. catla* (7.2g 100g^{-1}), *L. rohita* (7.8g 100g^{-1}), *C. mrigala* (5.9g 100g^{-1}), *C. batrachus* (6.4g 100g^{-1}), *H. fossilis* (5.6g 100g^{-1}), *S. seenghala* (0.3g 100g^{-1}), and higher than *P. sophore* (0.2g 100g^{-1}), *A. mola*, (0.2g 100g^{-1}), *S. longiceps* (0.4g 100g^{-1} p), *K. pelamis* (0.6g 100g^{-1}), *Epinephelus spp* (0.5g 100g^{-1}) and *L. splendens* (0.5g 100g^{-1}).

Table 2: The amino acid composition of Tank goby

Amino Acids	Tank Goby	Percentage (%)
Essential Amino Acid		
Histidine (His)	1745.4±0.73	17.08
Isoleucine (Ile)	65.7±0.23	0.01
Leucine (Leu)	84.3±0.19	0.01
Lysine (Lys)	149.4±0.06	1.46
Methionine (Met)	16.7±0.3	0.6
Phenylalanine (Phe)	29.4±0.12	0.29
Threonine (Thr)	1093.4±0.05	10.7
Tryptophan (Trp)	134.3±0.41	1.31
Valine (Val)	134.3±0.45	1.31
Conditionally Essential Amino Acids		
Arginine (Arg)	103.4±0.016	1.01
Cysteine (Cys)	1894.2±0.043	18.54
Glutamine (Gln)	113.4±0.09	1.1

Glycine (Gly)	605.4±0.75	5.9
Proline (Pro)	245.4±0.28	2.41
Serine (Ser)	150.5±0.132	1.47
Tyrosine (Tyr)	70.73±0.6	0.7
Nonessential Amino Acids		
Alanine (Ala)	2045.5±0.048	20.01
Asparagine (Asn)	93.4±0.16	0.01
Aspartic acid (Asp)	245.6±0.015	2.4
Glutamic acid (Glu)	164.5±0.023	1.6
Taurine	1034.4±0.9	10.12

Glutamic acid which is present in sample plays an important role in amino acid metabolism because of its role in transamination reactions and is necessary for the synthesis of key molecules, such as glutathione which are required for removal of highly toxic peroxides and the polyglutamatefolate co-factors (Garattini 2000) [16]. Mohanty *et al*., (2014) [30], reported that Glutamic acid which became decrease than those pronounced for *P. sophore* (0.7 g 100 g^{-1}), *T. ilisha* (1.2 g 100 g^{-1}), *S. longiceps* (1.1 g 100 g^{-1}). Tank goby illustrates a similar result with *C. catla*, *L. rohita*, and *C. mrigala*, *C. batrachus*, *H. fossilis, R. kanagurta,* Red Salmon and Beef (Hou *et al* 2011 [21]., Sathivel *et al*., 2005 [36].

Taurine has protective properties in body cells. It is found that Taurine may be effective in reducing symptoms of stress. It acts like a protecting and cleaning compound in liver. Taurine is effective at promoting a health heart and circulatory system (Xu 2008) [47]. The analysis of tank goby exhibited that 1034.4±0.9 mg/100g (10.12%) which was higher than Mackerel 78 mg/100g, Farmed salmon 60 mg/100g (Gormley 2007) [17].

3.3 Minerals and Heavy metal analysis
3.3.1 Minerals

Minerals contents of Tank goby had been studied Sodium, Potassium, Calcium, Phosphorus and Iron, showed in Table: 3. Sodium is a very crucial mineral which is needed with the aid of the body to alter blood quantity and blood pressure. Sodium content of Tank goby was found to be 0.0732 mg/100g, which was lower than Mola 39 mg g^{-1}, *H. ilisha* 44 mg g^{-1}, *C. catla* 74 mg g^{1}, (Bogard *et al*; 2015) [8], *S. longiceps* 289.6 mg g^{-1} (Sinduja *et al*; 2013) [39].

Potassium is a most significant mineral for the regular bodyfunction. Potassium intake has an important role in regulating blood pressure, high potassium intake helps to reducing the risk of stroke, preventing the development of renal vascular, glomerular, and tubular damage, decreasing urinary calcium excretion and reducing formation of kidney stones (He and MacGregor, 2001) [20]. Potassium content in Tank goby was observed to be 0.356.1 mg,/100g which was lower than *S. seenghala* (13780.01 ppm) (Mohanty *et al*., 2012) [31], *R. kanagurta* 2397 mg g^{-1}, *S. longiceps* 268.9 mg g^{-1}, *M. cephalus* 878.3 mg g^{-1}, (Mohanty *et al*., 2016) [32].

Phosphorus is an essential mineral required for cell structure, signaling, energy transfer, and other important functions (Chang and Anderson, 2017) [1]. The amount of Phosphorous was highest in Tank goby (402±5.2 mg/100g) which was lower than those reported for *Epinephelus spp* 1973 mg g^{-1}, *K. pelamis* 698 mg g^{1}, *Leiognathus splendens* 1249 mg g^{-1}, *S. longiceps* 1389 mg g^{-1}, *C. catla* 146.8 mg g^{-1}, (Mohanty *et al*., 2016) [32].

Calcium as a nutrient provide rigidity to the skeleton and calcium ions associated many if not most metabolic processes. Tank goby contained Calcium 0.3408 mg/100g which was lower than *Epinephelus spp* 162.1 mg g^{-1}, *S. longiceps* 523.9 mg g^{-1}, *C. catla* 161.1 mg g^{1} (Mohanty *et al*., 2016) [32].

Iron is essential to life due to its ability to act as both an electron donor and an electron acceptor. Heme molecules are important elements of the oxygen-binding proteins, hemoglobin and myoglobin, found in erythrocytes and muscle, respectively. (Harvey *et al*, 2013) [19]. Iron concentration was reported 1.5±0.46 mg/100g which was lower than *R. kanagurta* 5.0 mg g^{-1}, *S. longiceps* 7.8 mg g^{-1}, *T. albacares* 7.05mg g^{-1}, *C. catla* mg g^{-1}, 1.6 mg g^{-1}, *L. rohita* 2.2 mg g^{-1}, *L. calcarifer* 11.8 mg g^{-1} (Mohanty 2016) [32].

Table 3: Mineral compositions of Tank goby

Minerals	Tank goby
Pottassium	356.1±3.4
Sodium	73.2±2.3
Calcium	340.8±7.62
Phosphorus	402±5.2
Iron	1.5±0.46

3.3.2 Heavy metals

The heavy metals studied were Copper, Manganese, Zinc, Magnesium, Mercury and Chromium. Copper is a very essential heavy metal plays a significant role in various metabolisms, including oxidative phosphorylation, gene regulation and free radical homeostasis as essential cofactor. But when it exceeds the required level affects biologic process requirements and can cause anaemia, liver and kidney damage, it becomes harmful and play a major role among pollutants (Singer *et al*, 2005) [40]. The copper showed 0.033 ppm which is relatively lower than *R. kanagurta* 1.0 mg g^{-1}, *T. albacares* 2 mg g-1, *L. calcarifer* 0.5 mg g^{-1}, *T. ilisha* 2.78 mg kg^{-1} (Ganguly *et al*, 2017) [15], it was not reported in *S. longiceps*, *C. catla* (Mohanty 2016) [32].

Manganese (Mn) is a fundamental element in the human physiology that is generally obtained from food and water. Mn is playing a key role in the synthesis and activation of several enzymes (e.g., oxidoreductases, transferases, hydrolases, lyases, isomerases, and ligases); increase of rate in the synthesis of protein, metabolism of glucose and lipids; vitamin C, and vitamin B; catalysis of hematopoiesis; regulation of the endocrine; and improvement in immune function (Aschner and Aschner, 2005) [4]. Mn content in Tank goby was 5.3 ppm which is lower than that of *S. argus* 35.8 mg kg^{-1} (Vijayan *et al.*, 2016) [43], *S. longiceps* 0.4 mg g^{-1}, *H. fossilis* 0.2 mg g^{-1}, *L. calcarifer* 0.2 mg g^{-1} (Mohanty 2016) [32].

Zinc deficiency in humans currently renowned to be an important dietary deficiency disease downside world-wide. Zinc is especially important during periods of rapid growth, both pre and postnatally, and for tissues with fast cell separation and turnover for instance, the defense mechanisms and the gastrointestinal tract. Critical functions that are influenced by zinc nutriture incorporate maternity result,

physical development, susceptibility to infection, and neurobehavioral development, among others (Brown *et al.*, 2001 [9]. The Zn content of Tank goby was 17.21±7.6 ppm which was lower than *S. argus* 39.1 mg kg^{-1} (Vijayan *et al.*, 2016) [43], *R. kanagurta* 13.0mg g^{-1}, *S. longiceps* 4.0 mg g^{-1}, *C. catla* 3 mg g^{-1} (Mohanty 2016) [32], and showed higher concentration than Grey bamboo shark 2.55 ppm Japanese leatherjacket fish 6.63 ppm (Ajeeshkumar *et al.*, 2015) [1].
Chromium (III) is relatively nontoxic and identified as a novel micronutrient for its beneficial role in human nourishment by serving as a vital cofactor in the action of insulin as well as nutritional enhancement to energy, glucose, and lipid metabolism. (Zafra-Stone 2007) [48]. Tank goby had a Cr level of 15.8 ppm the obtained results are higher than *H. fossilis* 1.32 µg/g, *L. rohita* 1.40 µg/g, *C. marulius* 0.71 µg/g (Maurya and Malik, 2018) [26].
Magnesium is a fundamental cation critically associated with cell viability and physiological regulation of all systems and organs (Rios 2017) [34]. In Tank goby the Mg concentration found to be (154.1 ppm), lower than other species, Indian mackerel (710.99 mg/100g), Malabar red snapper (898.40 mg/100g), Cuttle fish (1317.30 mg/100g) (Maurya and Malik, 2018) [26].
Mercury is a naturally occurring metal that be present in elemental, inorganic and organic structures. Mercury is utilized in a wide range of household products and medicines, and is additionally applied as a fungicide on grains (Gupta 2018) [18]. Hg content was 0.0035 ppm which was lower than *S. seenghala* 0.03 mg kg^{-1} (Mohanty 2012) [31].

Table 4: Heavy metals concentration of Tank goby.

Metal	Concentration (ppm)
Copper	0.033± 0.012
Manganese	5.3± 0.658
Zinc	17.21±7.61
Chromium	15.8 ± 3.41
Magnesium	154.1 ±0.57
Mercury	0.0035 ±5.86

4. Conclusion
Fish is considered as best sources of protein minerals and vitamins. A proper understanding about the biochemical constituents of fish has become primary requirement for the nutritionists and dieticians. Since fish is an easily perishable commodity and deterioration in quality is due to the changes taking place in the various constituents like protein, lipids. The biochemical evaluation of the fish, tank goby shows rich in protein lipid and good source of amino acids and minerals. The data obtained from the present study can be utilized by various nutrition, health and medicinal groups fish's especially in planning interventional program and also for initiating long term campaigns towards consumption of local fish as major sources of protein. The study shows that the brackish water fish Tank Goby is nutritionally very rich source and recommended for human consumption.

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