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Pangasius silasi, a fish species endemic to Krishna River in India, reveals a healthy PUFA and nutritional profile: Could be a promising species as human food

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Abstract

In recent years Pangasiidae fishes are gaining increased attention, as there is good consumer demand. *Pangasius pangasius* was the only known species in south Asia, until the recent discovery of *Pangasius silasi* from India. The bassa fillets of *Pangasius boucarti* are globally traded due to its white meat. Having similar characteristic of white meat, *P. silasi* also appears to be a promising species. Analysing nutritional composition of *P. silasi* is important for strategy formulation aimed at sustainable utilisation of the species. Hence, a comprehensive nutritional profile assessment of *P. silasi* was undertaken and the results were compared with those of other two Pangasids, which are widely traded. Study also evaluated the potential of this species for mechanised filleting and yield, which is an important parameter in acceptability of fish meat as a marketable product. The results revealed that, *P. silasi* have fairly high content of protein, n-3 and n-6 fatty acids especially eicosapentaenoic acid (EPA) and docosahexaenoic acid (DHA) and high n-3 to n-6 fatty acid ratio. The high levels of essential amino acids will position it as superior food source particularly in complementing cereals. Considering its high protein content and healthy PUFA profile, *P. silasi* emerges as a candidate species for inclusion in human diet at affordable price.

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Introduction

Over the past two decades catfishes belonging to the family Pangasiidae have captured attention among the researchers and food specialists, primarily owing to their importance in table consumption and their value-added products which are globally traded. The family Pangasiidae has four distinct genera *viz., Pangasianodon, Helicophagus, Pangasius* and *Pseudolais* with 29 species. Among these, *Pangasius* is the dominant genus with 22 species and interestingly, most of these are found in South-east Asia (Karinthanyakit and Jondeung, 2012). Until the recent discovery of the new species *Pangasius silasi* from India (Dwivedi *et al.,* 2017), South Asia was known to have only one species, *Pangasius pangasius,* which is widely distributed in India, Bangladesh and Nepal (Talwar and Jhingran, 1991; Jayaram, 2010). In India, *P. pangasius* was reported from Ganga, Brahmaputra and east-flowing rivers, Mahanadi, Godavari, Krishna and Cauvery (Silas, 1952; Jayaram, 2010), whereas, as per the knowledge available, till now, *P. silasi* is an endemic fish to Krishna River region in India.

This pangasid group of fishes supports the livelihood of local communities in South and South-east Asia through capture fisheries as well as aquaculture. Vietnamese species, *Pangasianodon hypothalamus* (tra) are now widely cultivated for food in many countries of South-east and South Asia; however, the flesh is low priced due to discolouration concerns and is mostly sold within the countries. Bassa fillet from *Pangasius* *boucarti*, which is white in colour, is a globally traded commodity during the last decade from Vietnam. During 2018, global, Pangasius production was close to 3.0 million t, with 1.3 million t from Vietnam and the rest 55% from other countries such as India, Bangladesh Indonesia and China for their domestic consumption (FAO, 2020). Most of the exports originate from Vietnam, Italy alone imported over 12,000 t during 2012 forming approximately 9% of the total European import (Dambrosio *et al.,* 2016) and India import nearly 15,000 t per year (Bhutia, 2016).

Evaluation of a species is important prior to making research investment on establishing its production and value chain. The present work formed part of a consortium program on Agrobiodiversity, which focused on the evaluation of new fish species, for their mainstreaming into utilisation. Data on nutritional composition of fish play a crucial role in developing strategies for domestication and culture for sustainable utilisation of wild fish resources as well as in promoting a new species for production and consumption (Asha *et al.* 2014; ICAR-NBFGR, 2016; Kriton, 2017). In this study, *P. silasi* was analysed to understand its nutritional profile including protein, amino acids and n-3 and n-6 fatty acids to determine, if this species can offer an advantage over the other two *Pangasius* species which are widely traded and consumed.

The fish in the form of products, which are convenient to use, are in-demand and traded. The fish fillet is one such high-value product, which is a strip of flesh cut from a whole fish parallel to the line of the backbone (Clucas and Sutcliffe, 1981) and filleting can be mechanical or manual. Filleting of salmon, rainbow trout, tilapia, and catfish is well-practiced in many countries, which reduces bulky transportation of fresh fish from the point of production to the final destination and saves time in cleaning and dressing of raw fish before cooking. The present study describes the attributes of nutritional value and filleting yield of *P. silasi*, to promote this fish as a potential new species for human consumption.

Materials and methods

Sample collection and preparation

Fresh specimens of *Pangasius silasi* (PS) were procured from the landing centres and boats of fish companies operating in the Nagarjuna Sagar dam region, Telangana. The fishes were caught in commercial fishery by using drift net operated with coracle boats and immediately iced in the boat. A total of 88 specimens (290 - 590 mm total length, TL) were obtained and length-weight estimation recorded. Weight of the fishes was measured after draining water from the buccal cavity and wiping the moisture content on the body of fish (King, 1996). All analyses (n=6) were carried out in triplicate for each species. The specimens of *P. hypothalamus* (PH) were obtained from Bessant Nagar Fish market, Chennai, (South India) originated from local aquaculture farms. The basa fish fillets used in the study were produced by MEKONGFISH CO., Vietnam (factory code DL 183), imported in India and available in local retail markets in Chennai. The basa fillets are produced from *P. boucarti* (PB) and Basa is the name used in trade for the catfish, *P. boucarti* (VASEP, 2015; West, 2019).

Biochemical analysis

The moisture of the fish samples (10 g) was determined according to AOAC (2000) method, by drying them in an oven at 105°C (n = 6). Results are expressed as the percentage of wet weight. Ash content was determined by heating the sample (5 g) for 12 h in a silica crucible in a furnace at 525°C (n = 6) (AOAC 2000) and results are expressed as the percentage of wet weight. The total protein content of the homogenised samples (5 g) was determined, adopting the Kjeldahl method (Kirk, 1950). Results are expressed as the percentage of wet weight (n = 6) basis.

The total amino acid composition was determined by the method proposed by Ishida *et al.* (1981), using Shimadzu chromatograph LC-10AT vp, high-performance liquid chromatography (HPLC) equipped with an ion-exchange column, quaternary pump, 20 µl injection valve, and a fluorescence detector. The results were expressed in terms of amino acid per 16g N_2, equivalent to 100 g of crude protein (Mariotti *et al.,* 2008).

The estimation of crude fat content was done by continuous extraction of fat with petroleum ether (AOAC, 2000). Total lipids were extracted adopting the protocol of Folch *et al.* (1957), using chloroform/methanol (2:1). Aliquots of the chloroform layer extract were evaporated to dryness under nitrogen and the lipids were quantified gravimetrically.

Fatty acids methyl esters (FAMEs) were obtained by the method described by Metcalfe *et al.* (1966). A fraction of the lipid extract was saponified with 0.5N NaOH in methanol, followed by methylation in 14% boron trifluoride in methanol (BF3 /MeOH). The methylated sample was then extracted with 8 ml n-hexane. All of these reactions were performed in quadruplet for each sample. The resulting methyl esters were analysed using an Agilent Gas chromatograph system (6890 N) equipped with a flame ionisation detector (FID), a splitless injector and a polar fused silica capillary column (30m* 0.25 mm i.d.* 0.25 µm film thickness). The quantity of fatty acids was determined by using the formula:

Quantity of fatty acids = Peak area of fatty acid methyl ester in sample/ Peak area of fatty acid methyl ester in standard conc. of standard fatty acid methyl ester.

Fillet processing

The dressing yield and filleting yield of *P. silasi* were also assessed. Measurements (length and weight) of the individual fishes were documented and fish was beheaded and gut contents and fins were removed and cleaned with potable water. The dressing yield from its total weight was computed in percentage. Filleting was carried out by cutting through the opercular region down to the caudal end on both sides of the fish sample. The skin was separated from the fillet to obtain filleting yield in percentage.

Statistical analysis

Statistical analysis was performed using SPSS software, version 10.0. Values for each parameter are analysed in means of triplicate determinations.

Results

The total length of the fishes used in dressing and filleting assessment are given in Table 1, which shows dressing yield of 61.3 and filleting yield of 31.2%. The biochemical composition such as moisture, protein, crude fat, ash and amino and fatty acids contents of *P. hypothalamus* (PH), *P. silasi* (PS), and the fillet of imported fish Basa, *P. bocourti* (PB) are presented in Table 2. Moisture, fat and protein contents varied significantly among the three species. Moisture ranged from 71 to 80% with the lowest content in PH and the highest in PS. Fat showed significant variation among the three samples with the lowest content in PS (1.01%), followed, higher in PH (5.3%) and the highest of 8.11% in PB. PS, has the highest moisture and lowest fat content, while PH has high fat and lowest moisture content among the three species.

Among the three *Pangasius* fish species analysed, the protein content varied from 12.7 to 19% with the highest content in PH and the lowest in PB. Concerning ash content, no significant variations were noticed between the three species, which ranged from 0.9% to 2.1%. Amino acid content was comparable and no significant variations were observed (Table 3). Total essential amino acids were comparable in PH and PS, but comparatively lower in PB.

The fatty acid composition is presented in Table 4, revealed significant differences among the three species. Total n-3 fatty acids content was found to be 41.63 mg per 100 g and 33.95 mg per 100 g in PH and PB respectively, which is significantly less compared to that found in PS (101.63 mg per 100 g). Index of quality of oils, the n-6/n-3 ratio was 2.81 in PS in comparison to PH and PB, where high values obtained are 30.08 and 22.06 respectively, favouring n-6 oils (Table 5).

Table 1. Morphometric details, dressing and filleting yield for *P. silasi*

Length range (cm)	Weight range (kg)	Average weight (kg)	Dressing yield (%)	Filleting yield (%)
29 - 59	0.16 - 0.75	0.35±0.11	57.8±1.12	31.17±0.54

Values are expressed as average of three determinations ± standard deviation; n=6.

Table 2. Nutritional composition of three species of *Pangasius* fish

	Nutritional composition (%)			
	Moisture	Crude fat	Protein	Ash
PH	71.26±0.01	5.33±0.05	19.02±0.04	1.16±0.02
PS	80.01±0.04	1.08±0.04	16.85±0.06	0.90±0.02
PB	76.48±0.06	8.11±0.02	12.73±0.05	2.07±0.02

PH - *Pangasius hypophthalmus*, PS- *Pangasius silasi,* PB- Basa fillet/*Pangasius bocourti.*
Values are expressed as average of three determinations ± standard deviation; n=6.

Discussion

The present study describes the nutritional profile of the recently discovered fish species *P. silasi* with an aim to pre-evaluate this indigenous species for use in the food production system. The nutritional composition of *P. silasi* was found to be more or less in the same range, as described for finfish (Nusrat *et al.,* 2010; Bogard *et al.,* 2015). Nutritional composition of different fish species are studied as part of research in physiology, growth and nutrition of aquaculture species (Timoty *et al*. 1999). Nutritional composition data, especially lipid qualities, influence the commercial value of fish as a table fish and as value-added products (Kriton, 2017). The low value of *P. hypothalamus* (PH) is attributed to high-fat accumulation in its body and muscles and thus associated with poor fillet quality (Hassan *et al.,* 2017). Hassan *et al.* (2017) observed that after three washes, the lipid content in *P. hypothalamus* were at optimum levels for making surimi.

Table 3. Total amino acid composition (g $100g^{-1}$protein) of the three fish species.

Amino acid (g 100 g^{-1} protein)	PH	PS	PB
Essential amino acids (EAA)			
His	4.16±0.2	3.77±0.3	3.31±0.2
Iso	4.20±0.2	4.20±0.3	3.68±0.1
Leu	10.48±0.5	10.37±0.5	9.25±0.4
Lys	5.24±1.1	5.33±0.1	4.41±0.1
Met	1.40±0.1	2.07±0.1	2.04±0.1
Phe	3.91±0.1	3.80±0.1	3.26±0.1
Thr	4.22±0.4	3.90±0.2	3.65±0.1
Val	5.51±0.3	5.35±0.3	4.88±0.2
Trp	1.13±0.1	1.21±0.1	1.19±0.1
Non-essential amino acids (EAA)			
Arg	5.12±0.9	5.58±0.4	5.28±0.3
Tyr	4.72±0.3	4.07±0.2	4.57±0.2
Cys	0.34±0.0	0.51±0.0	0.00±0.0
Glu	25.31±1.2	23.72±1.6	23.22±2.6
Gly	5.91±0.3	4.51±0.3	6.05±±0.2
Pro	2.73±0.1	2.07±0.2	2.76±±0.1
Ala	9.13±0.5	8.47±0.6	8.68±0.4
Asp	12.34±0.6	13.83±0.6	11.27±1.2
Ser	4.78±0.3	4.58±0.3	4.32±0.2

Values are expressed as average of three determinations ± standard deviation; n=6. Values in the three columns do not show significant variance between groups. PH - *Pangasius hypophthalmus*, PS- *Pangasius silasi,* PB- Basa fillet / *Pangasius bocourti.*

Table 4. Fatty acid composition (mg 100 g^{-1}) of three Pangasid fish species

Type	Chemical name	Fatty acid (mg 100 g^{-1})		
		PH	PS	PB
SFA	$C_{14:0}$	53.56^{a}±2.5	67.66^{a}±2.8	420.73^{b}±13.5
SFA	$C_{15:0}$	9.27^{a}±0.4	6.97^{a}±0.3	8.12^{a}±0.4
SFA	$C_{16:0}$	1165^{a}±30.2	540.96^{b}±14.6	1695^{c}±42.6
SFA	$C_{18:0}$	993.24^{a}±24.2	377.74^{b}±16.2	1550.0^{c}±38.1
SFA	$C_{20:0}$	9.23^{a}±0.4	3.39^{b}±0.1	9.83^{a}±0.6
SFA	$C_{22:0}$	0.97^{a}±0.0	0.00^{b}±0.0	4.61^{c}±0.2
MUFA	$C_{16:1}$	234.87^{a}±11.3	75.95^{b}±2.8	60.19^{b}±3.1
MUFA	$C_{18:1}$	1182^{a}±28.6	259.96^{b}±11.5	797.37^{c}±16.7
MUFA	$C_{20:1}$	37.60^{a}±2.1	11.91^{b}±0.5	94.04^{c}±4.3
MUFA	$C_{22:1}$	1.49^{a}±0.1	0.00^{b}±0.0	2.05^{a}±0.1
PUFA n-6	$C_{18:2}$	1143^{a}±26.1	246.10^{b}±12.2	682.14^{c}±15.2
PUFA n-3	$C_{18:3}$ (LNA)	36.68^{a}±2.5	49.13^{b}±2.8	30.12^{a}±2.1
PUFA n-6	$C_{20:2}$	2.79^{a}±0.1	5.69^{b}±0.2	19.33^{c}±1.6
PUFA n-3	$C_{20:3}$	29.65^{a}±1.9	18.37^{b}±1.4	17.62^{b}±1.1
PUFA n-6	$C_{20:4}$ (ARA)	75.81^{a}±5.2	38.69^{b}±6.4	30.15^{b}±4.5
PUFA n-6	$C_{20:3}$	0.82^{a}±0.0	2.99^{b}±0.1	0.00^{c}±0.0
PUFA n-3	$C_{20:5}$ (EPA)	2.93^{a}±0.1	18.36^{b}±0.5	2.11^{a}±0.1
PUFA n-3	$C_{22:6}$ (DHA)	2.02^{a}±0.2	18.85^{b}±0.6	1.72^{a}±0.1

Values are expressed as average of three determinations ± standard deviation; n=6. Different letters in the same row indicate significant differences (p<0.05) according to Tukey's test. PH - *Pangasius hypophthalmus*, PS- *Pangasius silasi*, PB- Basa fillet / *Pangasius bocourti*. LNA: α-Linolenic acid; ARA: Arachidonic acid; EPAL Eicosapentaenoic acid; DHA: Docosahexaenoic acid; SFA: Saturated fatty acid; MUFA: Monounsaturated fatty acid; PUFA: Polyunsaturated fatty acid.

Table 5. Content (mg 100 g^{-1}) of different categories of fatty acids in three *Pangasius* species

Fatty acid	PH	PS	PB
SFA	2231.3^{a}±54.1	996.7^{b}±19.6	3688.3^{c}±68.2
UFA	2749.7^{a}±65.4	746.2^{b}±18.3	1736.8^{c}±41.6
MFA	1455.9^{a}±35.4	347.8^{b}±14.6	953.6^{c}±17.3
PFA	1293.7^{a}±32.4	398.2^{b}±16.2	783.2^{c}±20.7
n-3	71.28^{a}±7.51	104.71^{b}±9.42	51.57^{a}±4.93
n-6	1222.4^{a}±61.2	293.47^{b}±11.4	731.6^{c}±23.1
n-3/n-6	0.06^{a}±0.00	0.35^{b}±0.02	0.07^{a}±0.00
n-6/n-3	17.1^{a}±0.22	2.80^{b}±0.02	14.2^{a}±0.15

Values are expressed as average of three determinations ± standard deviation; n=6. Different superscript letters in the same row indicate significant differences (p<0.05) according to Tukey's test. PH - *Pangasius hypophthalmus*, PS- *Pangasius silasi*, PB- Basa fillet / *Pangasius bocourti*. SFA: Saturated fatty acid; MUFA: Mononsaturated fatty acid; PUFA: Polyunsaturated fatty acid; n-6; Omega-6 fatty acid; n-3: Omega-3 fatty acid; n-6/n-3: Omega-6/omega-3 ratio

The protein content of a fish is reported to range from 10-22%, however, 12-16% is more common (Murray and Burt, 2001). *P. hypothalamus* (PH) showed significantly high protein content than *P. silasi* (PS) and imported fillets of *P. bocourti* (PB). Fishes are rich in essential amino acids, which are required by a human for optimal growth, repair and maintenance (NRC-US, 1989). Mohanty *et al.* (2014) conducted a detailed analysis of amino acids profile in 27 fishes found in the Indian subcontinent and reviewed from the point of view of essential types and functional role in human health. Fishes show wide variation in abundance of amino acids that are important for consumer health and different species can be recommended for specific amino acid deficiencies. In comparison with reports from other fish species (Mohanty *et al.,* 2014), *P. silasi* appears to have several of the essential and non-essential amino acids available in good quantities to support human nutrition. It is interesting to note that the new species is rich in some important amino acids such as glutamic acid, which is not essential but is a functionally important amino acid, at levels above the highest level recorded in *Cirrhinus mrigala* (14.8). Besides, the leucine contents are also equivalent to the high levels reported in some of the marine fish species. Further, *P. silasi* has also high levels of alanine and aspartate. Consumption of such fish can be a natural way to supplement the functional amino acid deficiencies (Mohanty *et al.,* 2014). The non-essential amino acids, though mammalian body can synthesise, the role of diet supplementation cannot be undermined. From the comparison of *P. silasi* with two pangasid fishes analysed in this study, it is evident that all three species show a similar range of amino acid profile. It is possible that the higher levels of amino acids such as glutamic acid, leucine and others could be characteristics of the group and outcome of endogenous metabolism.

The present data on *P. silasi* agrees that moisture and fat contents in fish are usually inversely related (Nusrat *et al.,* 2010; Oguz Tasbozan *et al.,* 2016) and the moisture in flesh is replaced by deposition of fat (Silva and Chamul, 2000). Fish with a fat content of 5 to 8% are commonly designated as fatty fish (Murray and Burt, 2001) and the stored fat might be responsible for flesh colour, appearing yellow or grey. The muscle of low-fat fish with a fat content of 1-2% has high moisture percentage that appears as white, which is evident in *P. silasi*. However, lipid contents in fish are subject to variations that depend upon the season, geographical location, feed, age and maturity stage (Boran and Karacam, 2011). The newly described fish, *P. silasi* showed an optimally high percentage of protein comparable to other fish species and significantly higher levels of eicosapentaenoic acid (EPA) and docosahexaenoic acid (DHA).

P. silasi exhibits healthier composition with lower omega 6 fatty acids and over two folds higher omega 3 fatty acids (ratio of omega 6 to 3 being 2.81) than the other two Pangasid catfish species, traded and consumed globally. Previous studies have reported this concern of very low omega 3 and high omega 6 in the nutritional profile of catfish fillets originating from *P. hypothalamus* and *P. bacouriti* (Orban *et al.,* 2008; Thammapat, 2010; West, 2019) imported to the European countries (Maria *et al.,* 2011). Such concerns arise as the recommended diet servings are expected to supply lower than the required omega 3 for which the consumption of fish is preferred and at the same time unknowingly, increase consumption of omega 6. To justify this, Savage (2009) stated that, the fish should be considered as a means of improving health based on both fat content and the PUFA composition. Omega 6 is also important for human health however, a balance of omega 6 to omega 3 is recommended for healthy nutrition. Diet with high omega 6 can increase the risk of cardiovascular diseases (Moreira *et al.,* 2001), obesity (Simopoulos, 2016) and inflammatory effects (DiNicolantonio and O´Keefe, 2018). Simopoulos (2016) stated that during evolution, early human diets had omega 6 to omega 3 in 1: 1 ratio and recommended a typical balance of omega 6/omega 3 in the ratio 1-2/1. UK Department of Health recommended the maximum limit of 4/1 for omega 6/omega 3 values for healthy nutrition and to avoid the risk of cardiovascular diseases (HMSO, 1994).

The relatively higher eicosapentaenoic acid (EPA) and docosahexaenoic acid (DHA) contents in the newly described indigenous species, *P. silasi* (37.21 mg per 100 g) indicate a relatively healthy fatty acid profile than the other two exotic pangasid catfish species (4.95 and 3.83 mg per 100 g). Fish and shellfish are recommended as a health food for their omega 3 contents primarily for EPA and DHA, which are not synthesised by the human body and are derived through diet. These are associated with enhanced cardiovascular function, lowering the risk of hypertension (Balk and Lichtenstein, 2017; Limbu *et al.,* 2018). A minimum of 250 mg per day of EPA and DHA combined and 1 g per day of α-linoleic acid are recommended for the human diet (Kris-Etherton *et al.* 2002). Two servings of *P. silasi* meat, 100 g each, can be sufficient to fulfill 20 to 30% of the daily requirement for omega 3 fatty acids. Besides, omega 6 is available in balanced proportions. These dietary recommendations of servings are mostly for fatty fishes and the majority of these are marine fishes, having high market price, for example, hilsa, salmon and sardines (Hossain, 2011; Reksten *et al.* 2020). Freshwater fishes and many low trophic fishes also have been known to be good sources of omega 3 including EPA and DHA (Steffens and Wirth, 2005).

Fillets from *P. silasi* were found to have acceptable flavour and light pink to slight red in colour. A dressing and filleting yield of 61.7 (Lazur, 1997) and 42.74% (Eyo, 2001) respectively was reported for catfishes. Rario (2015) reported an average filleting yield of 31.75% in *Pangasius* catfish (<500 g size), which is comparable to that obtained in *P. silasi*. *P. silasi* used in the study ranged between 29 to 59 cm with a weight range of 160 to 750 g. The average weight of the fish studied was 350 g, indicating the table size of fish, which is expected to find a good market. Dressing yield is an important aspect for the processing industries, which was around 58%, lower than the reported values for *P. pangasius* (Sahu *et al.,* 2013). A filleting yield of 31.2% was observed for *P silasi*, which is on par with the values reported for river catfish (*P. hypophthalmus*) (Sang *et al.,* 2009). In view of the definition of nutritional security (Ingram, 2020), *Pangasius* production and trade, which originated in Vietnam, can be considered useful for contributing significantly to regional and global nutritional security and need to be produced in quantity and quality for affordable accessibility for consumption to masses. Several reports from Europe have highlighted concern that the traded Pangasius species have not been found to have a good fatty acid profile, for which seafood consumption is recommended for human health. In this work, we evaluated *P. silasi*, for its nutritional profile and compared with other globally traded *Pangasius* species. This evaluation was aimed to suggest prioritise the research investment on the domestication of the new discovered species as a potential candidate for the production-consumption system. Evaluation of new species is important for enhancing diversification through the domestication of new species, which has been seen as a bottleneck in meeting the growing demand for food (FAO, 2019). Fish consumption is encouraged as healthy food and useful for food-deficit countries to meet the minimum recommended daily protein requirement and the world is looking forward to increased aquaculture production to meet the challenge of nutritional security (FAO, 2019). Kriton (2017) reviewed the nutritional composition of fish and emphasised that diversification of new species has the potential to bring more diversified value-added fish products to improve trade and human consumption. The present study is not aimed at comparing the wild type of *P. silasi* with other pangasid from culture, rather it is an attempt to find utility of this species to make a case for developing its culture. The present study is not aimed at comparing the wild type of *P. silasi* with other pangasid from culture, rather it is an attempt to find utility of this species to make a case for developing its culture. Though, there are divergent views on the lipid profile of wild and cultured fish (Hossain, 2011) experimental evidence indicates that cultured fish has a similar profile to wild counterparts (Oguz *et al.,* 2016) or even the nutritional profile can be improved in captivity as these can be raised under appropriate conditions and dietary regime (Strobel *et al.* 2012). Therefore, aquaculture can support to meet the need for superior lipid profiles as fishes adjust their PUFA according to their total lipid status and by taxa and their respective lipid metabolism (Kainz *et al.* 2017). World Bank (2014) has projected a requirement of additional 30 million t of fish per year to meet the rising demand for food and the role of low-priced species such as carps and catfishes is considered significant which can support nutrition for masses. To meet compliance with the dietary recommendations, Lee *et al.* (2013) identified two key factors, which are affordability and availability. This possibly made the *Pangasius* catfishes popular table fishes and favourite for mass production and consumption in addition to value added by-products through recycling of dressing wastes (Rathod *et al.,* 2018). Encouraged by the healthy nutritional profile of *P. silasi* and filleting attributes, the present study suggests to utilise *P. silasi* in the food production system, which is promising to occupy the market space in *Pangasius* production system in Asia.

The nutritional profile of *P. silasi* is comparable to some of the nutritionally rich freshwater species, showing a fairly high content of protein, n-3 fatty acids especially EPA and DHA, and a higher n-3 to n-6 fatty acid ratio. The high levels of essential amino acids will make it a superior food source in complementing cereals for weaning foods. Thus, it might be considered as an aquatic food with high protein and a healthy PUFA profile that is available for human consumption at an affordable price.

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