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Nutritional Composition and Consumer Acceptability of Different Processed *Pangasius hypophthalmus*

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ABSTRACT

Pangasius hypophthalmus is a species of catfish native to Southeast Asia, an exotic fish commonly known as 'Pangasius' or 'Obokun' in Yoruba dialect. Historically, it is one of the rare imported fish predominantly accessible to the elites in Nigeria. Recent developments in its aquaculture within Nigeria has increased its market availability, although it remains relatively unfamiliar to the general populace. This study aim to explore the species by examining its nutritional and sensory values, with a focus on consumer acceptance. The proximate analysis showed a high moisture content of 69.41%, moderate amount of crude protein (18.80%), high level of fat (12.62%) and minimal ash content (1.86%). A nutritional profile identical to that of catfish, but with a slight increase in fat. The sensory qualities like appearance, taste, texture, aroma, and overall acceptability were assessed for three different processing methods—grilling, smoking, and preparation as pepper soup. The pepper soup preparation garnered top rating across most adjudged characteristics, particularly in appearance (8.57) and overall acceptability (8.40), suggesting strong consumer preference. In contrast, the smoked sample scored the lowest in taste (7.31) and overall acceptability (7.63). These findings supports the significance of processing methods in enhancing sensory qualities, which are crucial for consumer satisfaction and market success in the fish food industry.

Keywords: Pangasius, nutritional profile, acceptability, consumers' preference

INTRODUCTION

Pangasius hypophthalmus, a member of the Pangasiidae family, is a species of catfish that is native to the Mekong basin in South-East Asia. Other names for this species of fish are *Pangasianodon hypophthalmus*, Sutchi catfish, striped catfish and Tra fish (Guimarães et al., 2016). One of the freshwater species with the quickest rate of growth in aquaculture worldwide is the pangasius catfish (Jeyakumari et al., 2016). According to Thi et al. (2015), pangasius is currently traded to more than 100 countries globally as skinless and boneless fillets, as well as portions, steaks, and other products with additional value. The industry has grown in terms of both production and commerce. Pangasius can reach body weights of 1.2 to 1.3 kg in as little as 6 months, but are often harvested after 8 months, depending on marketability (Gurung et al., 2016). Its soft and white meat, lack of fishy odor, firm cooked texture, and high nutritional content, combined with great sensory qualities, have increased customer acceptance for the fish (Rao et al., 2013).

It is an eye-catching fish with its silver and polished black coloration (Ofa, 2013). Pangasius belongs to the catfish family that lives in Vietnam's Mekong River and its estuaries. *Pangasius hypophthalmus* (Tra) and *Pangasius bocourti* (Basa) are two members of this

family who contributed to the development of aquaculture. In 2006, 60,000 metric tons were produced in Mekong Delta fish farms, and by 2010, more than one million tons had been produced. The fish is already marketed in 65 markets throughout the world and is one of the most successful white fish species of all time. Historically in Nigeria, it is one of the rare imported fish predominantly accessible to the elites in Nigeria and it is usually imported as fingerlings for further rearing. Recent advancements in its aquaculture within Nigeria has increased its market availability. It is either being reared locally or imported as whole frozen fish from Asia and the market women refer to it as 'Obokun' (Ofa, 2013), although it still remains relatively unfamiliar to the general public.

Pangasianodon hypophthalmus has great economic importance as a food fish because of its good flesh. Being affordable for lower income people, this nutritious species has become important for national food security and been dubbed as "protein for poorer" (CABI, 2024). Farming of *P. hypophthalmus* has huge opportunities throughout the world because of the easy adaptability of the species to a completely new environment, responses to external feeding, rapid growth rates, ability to grow at high stocking densities,



low disease and mortality rates and huge export potential in the international whitefish market (Islam et al., 2020; Haque et al., 2021). This study was therefore undertaken to highlight the species as a relatively new product in Nigeria, by examining its proximate and sensory attributes, with a focus on its nutritional value and consumer acceptance.

METHODOLOGY

Fish Sample Preparation

Eleven (11) pieces of *Pangasius hypophthalmus* were obtained from the Florieman Agro Research Limited at Gudugba Ogun State and transported to the Agricultural Technology Department Students' Research Center, The Federal Polytechnic Ilaro. Fish samples weighted 7.13kg and were transported to the processing hall under ice. They were then completely washed with water, beheaded, gutted, washed, and filleted. The processing evaluation was carried out through cooking, smoking and grilling procedures.



Fig. 1: Picture of Pangasius Hypophthalmus

Fish Peppersoup (Cooking) Procedure

The fish was cooked for 10 minutes, and the meat was manually separated from the bones. The cooked fillets produced 40% of meat depending on the overall weight of the fish. Using the standard of Rathod et al. (2012), the Pangasius pepper soup contain 573g cooked Pangasius fish fillet, 11g of salt, 22g of oil, 11g of green chillies, 1g of saint leaves, 13g of ginger, 11g of garlic, 50g of onions, 120g of cooked potatoes, 2g of pepper powder, 2g of clove powder, 1g of cinnamon powder, 1g of turmeric powder and 10g of bread powder. All these were added together in a pot and set on fire for 10 minutes to cook properly.

Smoked Fish Procedure

Pangasius hypophthalmus fillets (774g each) were soaked in brine (4% w/v) or at a 1/5 ratio (w/v). After brining, each fillet was rinsed for about 20 seconds in distilled water. 7g of salt, 30g of oil, 15g of green

chillies, 1g of saint leaves, 18g of ginger, 18g of garlic, 120g cooked potatoes, 1g of pepper powder, 1g of clove powder, 1g of cinnamon powder, 1g of turmeric powder, 61g of bread powder were added to the fillet. The brined fish fillets were then placed on racks, and the smoking process began with pre-drying in the smoking oven for 30 minutes at 30°C with no smoke, followed by 100°C until the fish was completely dried. The smoked fish fillets were subsequently cooled.

Grilled Fish Procedure

673g of the filleted fish was brushed with 26g of oil, 6.73g of salt, 13g of green chillies, 16g of ginger, 13g of garlic, 8g of onions, 188g of cooked potatoes, 1g of pepper powder, 1g of clove powder, 1g of cinnamon powder, 1g of turmeric powder, 53g of bread powder, and wrapped in a foil paper, The fish wrappings were grilled over/on a medium heat (approx. 200°C) for approx. 30 minutes on each side.

Proximate Analysis



A small sample of the Fresh Pangasius fish was taken for nutritional composition analysis. Proximate composition viz., moisture, crude protein, fats, carbohydrate and ash of raw fish and fish cutlet was analyzed according to AOAC (2005).

Sensory Evaluation

The sensory quality of three differently processed Pangasius fish cutlets was directly evaluated by 30 panelists using a nine-point hedonic scale (2-dislike extremely to 10-like extremely) for product acceptance. Panelists rated the appearance, colour, taste, texture, odour and overall acceptability. During the evaluation sessions, the samples were assigned a letter and presented in random order.

Statistical Analysis

The recorded data were examined to test for significant differences using the analysis of variances (ANOVA) tool in MS-Excel 2007. Significant changes were assessed at the 5% level of significance.

RESULT AND DISCUSSION

Proximate analysis is a method used to determine the composition of materials, particularly in food and feed. It typically breaks down a sample into its main components: moisture, ash (mineral content), crude protein, crude fat, and crude fiber. This analysis helps evaluate the nutritional value and quality of the food or feed material.

Table 1: Proximate analysis of fresh *Pangasius hypophthalmus*

Sample	Moisture %	Dry matter %	Crude fat %	Total ash (%)	Crude protein %	Vit. C (mg/kg)	Sodium
<i>P. hypophthalmus</i>	69.41±0.03	30.59±0.03	12.62±0.04	1.86±0.03	18.80±0.03	0.13±0.01	38.97±0.04
<i>C. gariepinus</i>	70-80	20-30	5-10	1-2	16-20	0-0.8	--

Fish have high moisture content, typical of freshwater species, contributing to their tenderness and juiciness when cooked (Adeyeye, 2016). The dry matter content is consistent between *Pangasius hypophthalmus* and cat fish, indicating similar water retention characteristics (Chakma et al., 2022). The findings of this study negates that of FAO (2020) and Naylor et al. (2009) who reported that fresh catfish typically has a higher fat content compared to *Pangasius hypophthalmus*, which can influence flavor, texture, and cooking properties, with catfish often being richer and more flavorful .

The ash content of *Pangasius hypophthalmus* is high, suggesting richer mineral profile. There is no difference in protein content of fresh catfish and fresh Pangasius, both occupying same range. This result also contradicts the outcome of Giaccone et al. (2020) who opined that African catfish is a better option compared to Pangasius for those seeking higher protein sources. These disparities could result due to differences in diet or environmental factors influencing minerals and nutrient accumulation

(Kumar et al., 2016). Both types of fish generally contain low levels of vitamin C, which is common across many fish species (Fitaudit, 2025). Sodium content in both types is comparable, but this can vary based on environmental factors and specific diet (Kumar et al., 2016).

From the data shown in Table 2 [A (grilled), B (smoked) and C (pepper soup)], significant information about consumers’ preference were revealed regarding processed Pangasius. The highest ratings were given to Sample C in most categories, especially for appearance (8.57) and general acceptability (8.40), so the product appealed strongly to consumers (Köster, 2003). In contrast, Sample B had low ratings for taste (7.31) and overall acceptability (7.63), pointing to potential ways to improve both flavor and consumers’ satisfaction (Sullivan et al., 2019). The scores indicated that sensory features like color and texture matter much in seafood, since they influence consumers’ perception of freshness and quality when buying these products (Gouin et al., 2010).



Table 2: Sensory evaluation of differently processed *Pangasius hypophthalmus*

Sample	Apperance	Colour	Taste	Texture	Aroma	Overall Acceptability
A	8.42±1.31	7.89±1.30	8.14±1.50	7.83±1.65	7.86±1.29	8.17±1.04 ^{ab}
B	8.11±1.68	7.60±1.59	7.31±2.17	7.66±1.85	7.60±1.67	7.63±1.69 ^b
C	8.57±1.36	8.31±1.92	8.23±1.94	8.26±1.70	7.91±1.85	8.40±1.58 ^a

These findings underscore the need for producers to focus on enhancing sensory qualities to meet consumer expectations. The high score for texture in Sample C (8.26) shows that cooking method or ingredient composition could be very important for making a product appealing (Matz, 2004). Sensory analysis shows us how various sensory attributes influence the general acceptance of a product which can be used to improve both its development and marketing strategies (Tuorila, 2015). Ultimately, improved taste and appearance aligns with higher consumer enjoyment and greater results for seafood businesses.

Conclusion

Pangasius hypophthalmus shows appealing nutritional profile in its proximate analysis that makes it popular as aquatic food. It has a similar proximate profile to fresh catfish, only with a little more fat content (3.86%). *Pangasius hypophthalmus* has such a high moisture content (69.41%), making its texture tender and a popular option for people who enjoy light, juicy fish. It may offer a milder taste to those who like less intense fish flavors, due to its moderate ash content (0.57%), as opined by Sudirman et al. (2018). Besides, *Pangasius hypophthalmus* costs less and can be found in several markets, making it accessible protein for many people. Its ease of cooking—using methods such as grilling, steaming or frying—makes it even more attractive as a nutritious and convenient food.

Recommendation

In order to ascertain its richness in essential and poly unsaturated fatty acids, as well as essential amino acids, an amino acid and fatty acid profile is suggested.

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