

VALUATION OF ARTISAN FISH: NUTRITIONAL AND CONSERVATION ASPECTS

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Abstract: Artisanal fishing has a social, economic and cultural character, subsidizing the food and income of thousands of people, boosting the micro and macroeconomy on a global scale. It has the potential to promote environmental conservation, as it is one of the food systems with the lowest environmental impact when compared to other animal production systems and combats food insecurity. However, it has been facing challenges and the provision of information to fish consumers with a view to valuing this activity and, consequently, improving the quality of life of fishing communities will promote the continuity of the activity. Promoting fish through the transfer of knowledge regarding its nutritional, ecological and social aspects can stimulate its consumption and adequate valuation by buyers, in addition to promoting more conscious consumption. This work evaluated the nutritional composition of two species of fish commonly traded by fishing communities in the estuarine region of Baixada Santista, São Paulo, Brazil, the parati (*Mugil curema*) and the snook (*Centropomus undecimalis*), the latter being of high value market and demanded by consumers, given its sensorial characteristics. Determinations of moisture, ash, protein, lipid, carbohydrate, sodium and fatty acid and essential amino acid profiles were carried out using official and recognized methods, as well as consultation of the conservation status of stocks through consultation with ICMBIO and the Union International for Nature Conservation (IUCN). It is concluded that the species studied present similarity in their nutritional values, with the exception of lipid, caloric and histidine contents, which were higher in Parati. The information collected must be passed on to consumers and fishermen with a view to promoting consumption through nutritional appeal and also to enhance the value of parati, boosting

its trade as it is a more accessible species to the general population.

Keywords: Sustainability, Artisanal fishing, Nutritional quality, Proximate composition, Fishing resources.

INTRODUCTION

Artisanal fishing is an activity with low environmental impact when compared to other animal protein production chains (Silva, 2022), providing subsistence for thousands of people; essential nutrition to consumers, contributing to the economy of many families, locally and globally and therefore, to economic growth (FAO, 2020).

In this context, the adequate management of aquatic agri-food systems is important in meeting SDG 2 – zero hunger and sustainable agriculture. Added to this, the food and Agriculture Organization of the United Nations (FAO) projects an increase in fish consumption by 89% by 2030, given the trend towards healthier and more nutritious diets (FAO, 2020).

It is important that fishermen and consumers have access to information regarding the exploitation of this resource, since artisanal fishing is relevant in the conservation of biodiversity and must be better managed, as its dependence on ecological balance can contribute to the conservation of fishing stocks. and the perpetuation of the economy generated by the activity (Silva, 2014). To this end, the appropriate valuation of wild fish captured plays a fundamental role in valuing artisanal fishing and, consequently, in promoting more sustainable management of water resources.

Furthermore, according to the document Voluntary Guidelines to Ensure Sustainable Small-Scale Fisheries in the Context of Food Security and the Eradication of Poverty in FAO, conscious consumption can contribute to global and national efforts to eradicate

hunger and poverty and promote more sustainable development (FAO, 2017).

With this, the dissemination of nutritional and conservation data on species can provide appreciation and encourage more conscious consumption. In this sense, the values of protein, lipids, carbohydrates, moisture, sodium and the amino acid and fatty acid profiles of fish species offered by artisanal estuarine fishing in Baixada Santista were investigated., São Paulo, Brazil, and the conservation status with ICMBio (Brazil, 2022) It is international union for Conservation of Nature (Mendonça, 2019; Castro, 2019).

METHODOLOGY

Representative samples of commercial-sized parati (*Mugil curema*) and sea bass (*Centropomus undecimalis*) were obtained from artisanal fishing communities in Baixada Santista, São Paulo Brazil and transported in isothermal boxes with ice to the Fish Technology Reference Laboratory Unit - Fisheries Institute/APTA/SAA-SP, in Santos, SP, Brazil. The species were processed in an air-conditioned environment (15°C), homogenized and stored under freezing (-20°C) until analytical tests were carried out, in triplicate.

Moisture, protein and ash determinations were carried out using official methods from the Ministry of Agriculture, Livestock and Supply – MAPA. Lipid content by Bligh & Dyer cold extraction method. Carbohydrates were obtained by calculating the Nifext fraction. The sodium content and research on the profiles of amino acids and essential fatty acids were carried out at the Laboratory of the Meat Technology Center - Institute of Food Technology/APTA/SAA-SP, using methods from the Association of Official Analytical Chemists (AOAC).

To obtain information on the commercial size of the species studied, the MMA

Normative Instruction No. 53/2005 was consulted. (Brazil, 2005) and the conservation status of the species to ICMBio (Brazil, 2022) and the International Union for Conservation of Nature (IUCN)(Mendonça, 2019; Castro, 2019).

RESULTS

The nutritional composition of the fish species studied is presented in Table I, where it can be seen that the lipid content is higher in parati (0.53 g.100g⁻¹) when compared to sea bass (0.08g.100g⁻¹). Just as the energy value found is also higher in parati (101.01 Kcal in 100 g of parati and 88.67 Kcal in 100 g of sea bass).

The data obtained regarding the lipid profile indicate that on average 47,44% of the fat contained in the muscle portion of these species are saturated, 33,21% monounsaturated and 19,29,% polyunsaturated. Both species had a saturated fat content of less than 6g.100g⁻¹, that is, below the limit for declaration purposes on nutritional labeling. (Brazil, 2020). Regarding essential amino acids (Table II), histidine values were different between the two species, and were also higher in parati, which has a histidine content close to the FAO reference protein. The amounts of methionine and cystine were equal for both species (1 g.100g⁻¹), as well as tryptophan (0.2 g.100g⁻¹). The values of the other essential amino acids are presented in table II.

DISCUSSION

According to the IUCN, the species *M. curema* and *C. undecimalis* are in a state of little concern regarding extinction (Mendonça, 2019; Castro, 2019), and are not mentioned in the Official List of Brazilian Fauna Threatened with Extinction (Brazil, 2022), but on the south coast the arrow bass population is more vulnerable, while the parati has an increasing rate of abundance (Peralta, 2020).

Sample	Sodium (mg.100g-1)	Moisture (g.100g-1)	Ash (g.100g-1)	Lipids (g.100g-1)	Proteins (g.100g-1)	Carbohydrates (g.100g-1)
Arrow Sea Bass	69.00	78.60	0.05	0.08	22.01	0.00
Parati	60.00	75.36	0.05	0.53	23.36	0.70

Table I. Nutritional composition of the species *Mugil curema* (parati) and *Centropomus undecimalis* (Sea bass)

Sample	Valina (g.100g-1)	Isoleucine (g.100g-1)	Leucine (g.100g-1)	Histidine (g.100g-1)	Phenylalanine + Tyrosine(g.100g-1)	Trheonine (g.100g-1)	Lysine (g.100g-1)
Arrow Sea Bass	1.1	1	1.7	0.8	1.7	1	2.1
Parati	1	0.9	1.6	1.5	1.5	0.9	1.9

Table II. Amino acid profile of the species *Mugil curema* (parati) and *Centropomus undecimalis* (sea bass)

According to PMAP-SP, São Paulo's artisanal fleets captured 83,155.10 kg of parati, yielding R\$297,697.78 between August 2021 and August 2022. For arrow bass, 18,474.70 kg were caught, totaling R \$627,043.47 in the same period (IP/APTA/SAA/SP, 2023). Therefore, the parati had a fishing volume four times greater than the arrow bass, but yielded around twice less, resulting in a difference of more than 64 tons and R\$329,000.00 in catch volume and income raised for fish of similar nutritional value.

The analyzes carried out demonstrated nutritional similarity between the species, constituting important protein sources, with distinction only in the lipid content, polyunsaturated fatty acids and histidine, which are superior in parati when compared to arrow sea bass.

Fish is considered a complete protein source, due to its balance of essential amino acids and high digestibility, it is a food with high biological value. Marine fish are recognized as a source of omega-3 polyunsaturated fatty acids, with eicosapentaenoic acid and docosahexaenoic acid being the ones that provide the greatest health benefits.

Both histidine and polyunsaturated fatty acids are essential to health. As they are not synthesized by the human body, they must be acquired through food, highlighting the importance of including these products in the

population's diet.

Considering that some species, such as sea bass, are fishing resources with high commercial value and have high market demand, it is important to know and publicize the nutritional aspects of other species, in order to stimulate diversified consumption of species. less prestigious, seeking greater sustainability through guidance towards conscious consumption and greater nutrition by promoting more accessible species such as parati (*Mugil curema*).

CONCLUSION

The results demonstrate the relevance and nutritional similarity of the species *Mugil curema* (parati) and *Centropomus undecimalis* (arrow sea bass), despite the discrepant market value. Therefore, artisanal fishing offers quality nutrition for different market niches and this knowledge can be a tool for promoting more conscious consumption and appreciation of artisanal fishing products, ensuring the generation of income/jobs and at the same time the provision of nutritious food to consumers. However, it became clear that the conservation status of the species needs to be constantly researched and updated and also informed in trade to consumers with a view to education for consumption and the sustainability of artisanal fishing activities.

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