

Original Research Article

Title Study of Physical and Chemical Composition and Quality of *Hoplias malabaricus* and *Leporinus friderici* (Bloch, 1794) Fillet Collected in the River Pirativa-Santana-AP

ABSTRACT

Aims: The objective of this research was perform the physical-chemical study of the composition and the quality of the fillet of *Hoplias malabaricus* (Traíra) and *Leporinus friderici* (Bloch, 1794) collected in Rio Pirativa-Santana-AP.

Study design: This study was chosen in the areas on the banks of river Pirativa in disturbed areas and not disturbed in the town of São Raimundo at coordinates N 00 02'08,9 "W 051 15 '32.3" in Santana-AP municipality.

Place and Duration of Study: Pharmacognosy and Phytochemical Laboratory of Pharmacy Course from January to September 2014. Fish Processing Laboratory of the Federal University of Amapá, July September 2014.

Methodology: The physical and chemical parameters adopted in this research were: pH, humidity, Waste Incineration by (Ash), Lipids and Bases Total Volatile. Being that they were carried out according to standards in the Adolfo Lutz Institute.

Results: The yield values were 48.30 and 46,632% respectively for *Hoplias malabaricus* (Traíra) and *Leporinus friderici* (Aracu). Regarding the physical and chemical parameters of the species had pH 6.80 and 7, moisture 70 004 $\pm$ 4:57 and 2:44 $\pm$ 65.55%, ash 2.88 $\pm$ 0.74 and $\pm$ 3:50 1:51% 10:50 lipid value and 11.90% indicating high weight of lipids molecular, and volatile bases $\pm$ 0.01 1.76 $\pm$ 1.69 and 0:03, respectively, for the *Hoplias malabaricus* (Traíra) and *Leporinus friderici* (Aracu).

Conclusion: Attention should be paid to the proper packaging and tramento fillet because external factors from catching the marketing of fish by-products influence the quality and nutritional value.

Keywords: Physical Chemistry. Fish. *Hoplias malabaricus*. *Leporinus friderici*.

1. INTRODUCTION

The importance of fish in the diet is due to its high content of protein and essential amino acids, and good protein digestibility of his flesh (90-98%), value above the beef and pork. Fish is a highly perishable food for their complex chemical composition, pH close to neutrality, high water activity, high content of nutrients easy for the microorganisms, the unsaturated lipid content, the enzymatic action and the high metabolic activity of the microbiota (ASHIE, et al, 1996).

In fact do not disagree with the visible qualities of fish as raw material, however, as occurs with other foods, can act as a carrier of disease-causing pathogens (APHA, 2001). Because they have raw or chilled intrinsic characteristics essential to the development and survival of many pathogens, as pH close to neutrality, high water activity in the tissues (Not

less than 0.98) and high in nutrients available (FRAIZER; WESTHOFF, 1993; MARTINS et al., 2002).

Mostly by poor handling, storage and transportation of fresh fish greatly contribute to the quality loss and even deterioration of the fish landed. The Brazil, where the situation is precarious in almost all discharge fish locations. Traditional practices of passage of fresh fish through one or more intermediaries, on your trip fisherman to the final consumer, also contributes decisively to the loss of quality and deterioration of fresh fish available to consumers in street markets, markets, bakeries and supermarkets in the country. Changes that most characterizes the deterioration of fish are those related to odor and flavor, determining the improper state for consumption, they affect the condition edibility (ORDÓÑEZ, 2005).

Data related to the chemical composition of fish flesh are important in the conservation process and preparation of the product, while the data relating to yield identifies the amount of edible part and nutrients that make up the fillet. From yield the producer can plan the amount of fish will be needed to deliver the slaughter.

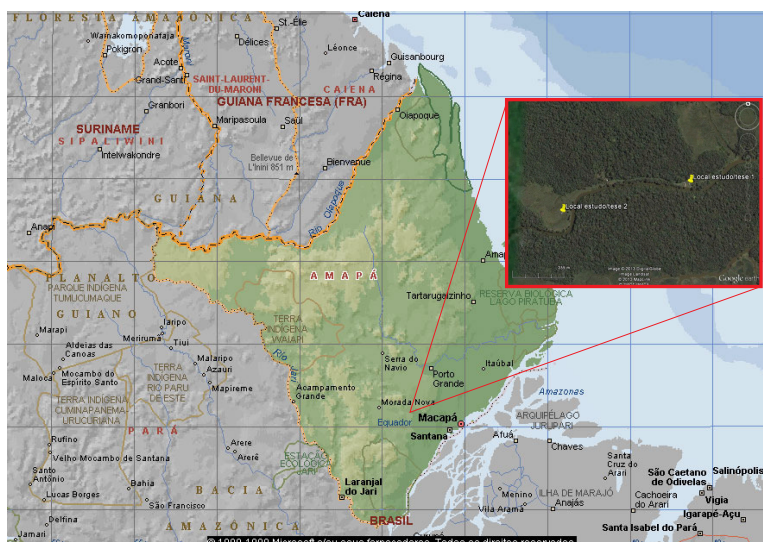
The *Leporinus friderici* species (Aracu-head-fat or three pints) belonging to Anostomidae and *Hoplias malabaricus* (Traíra) the family Erythrinidae, are considered migratory long distances of Brazilian river basins, and predominate in lotic environments, performing reproductive migration upward and downward trophic migration (RÊGO et al., 2008). Moreover, species were chosen, due to some peculiar characteristics, as great acceptance of these fish by the consumer market and to be found in abundance in the rivers, dams and lakes distributed throughout the state of Amapá. Therefore, the aim of this research was perform the physico-chemical study of the composition and the quality of the steak *Hoplias malabaricus* (Traíra) and *Leporinus friderici* (Bloch, 1794) collected in Rio Pirativa-Santana-AP.

2. MATERIAL AND METHODS / EXPERIMENTAL DETAILS / METHODOLOGY

2.1 Field of study

This study was conducted in the areas along the river Pirativa in disturbed areas and not disturbed in the town of São Raimundo the coordinates N 00 02'08.9"W 051 15' 32.3" in the city of Santana-AP. The area of study is shown in Figure 1.

Figure 1 - Location of the study area - collection points - Santana / AP.



Source: Google Maps. 2012.

2.2 Fish Procurement

The fisherman was obtained in the river Pirativa in disturbed areas and intact areas in the town of Pirativa-Santana-AP, duly informed to the competent bodies. The fish were used in young state, developing and adult. were captured in a traditional way with networks, beaters and fishing nets, have been identified, meter rated for cataloging them.

2.3 Study of yield

In the laboratory Processing and Fish Technology the Amapá State University after obtaining the specimens are weighed: total weight (TW) with the aid of electronic scale accurate to 0.001 g, eliminating the excess water, and measured the standard length (SL), between the end forward of the muzzle and the lower perimeter of the caudal peduncle, using a tape according to Crepaldi et al. (2008).

Then the fish filtration was performed, process which was removed the head, the viscera, skin, cervical, housing and then the fillet tambaqui and painted according as recommended Souza (2002), seeking the method which gives a higher yield of the same. After this procedure, were weighed separately to calculate the yield. This procedure will be performed in triplicate.

In order to avoid individual differences the yield of cuts, the processing were performed by a single person as proposed by Burkert (2008).

Then they were washed to remove any element that is not derived from the raw material and, that may, will be acquired during processing following the standards proposed by Brazil (1997). Subsequently, they will be stored in polypropylene stools. To prevent the formation of ice crystals on the surface of the fillets, the stools will be covered by plastic bags.

Thus, can get values of the Whole Fish Gutted (W.F.G), the Fillet Yield (F.Y.) and by-products. Were considered as by-products of fish parts as: fins, skin, head, bones and spine. The venrecha was considered as part of the fillet.

The yield calculations were performed as proposed by Burkert (2008), thus the assessed income were: yield of by-products and fillet yield. For this the formulas described below were used:

$$\% \text{ byproducts} = \frac{\text{Weight by-products}}{\text{Total weight of fish}} \times 100$$

$$\% \text{ fillet} = \frac{\text{Weight of fillets}}{\text{Total weight of fish}} \times 100$$

2.4 Physical and chemical analysis

The physical and chemical parameters adopted in this research were: pH, Humidity, Waste Incineration by (Ash), lipids and total volatile bases. Being that they were carried out according to standards of Adolf Lutz Institute (2008).

3. RESULTS AND DISCUSSION

From the analysis of data, the fillet average yields were 48.30 and 46.632 %, respectively, for *Hoplias malabaricus* (Traíra) and *Leporinus friderici* (Aracu). Fillet yield results similar to those found in this study, were determined by Santos et al. (2001) to traíra a value of 44.33 ± 9.51 .

The values determined in the physical and chemical analysis of fillet composition of *Hoplias malabaricus* (Traíra) and *Leporinus friderici* (Aracu) are shown in Table 1.

Table 1 Chemical composition of the file samples of *Hoplias malabaricus* (Traíra) and *Leporinus friderici* (Aracu).

Parameters	<i>Hoplias malabaricus</i>	<i>Leporinus friderici</i>
pH	6.80	7.00
humidity (% m/m)	70.004±4.57	65.55±2.44
ash (% m/m)	2.88±0.74	3.50±1.51
lipids (% m/m)	10.50	11.90
Total volatile bases (mg N/%)	1.76±0.01	1.69±0.03

The potential values hydrogenionic (pH) found for *Hoplias malabaricus* (traíra) is 6.8 and the *Leporinus friderici* (aracu-comum ou piau-três pintas) 7, samples showed value of pH greater than 6.5 on the inner flesh, being outside the limits recommended by RIISPOA (BRASIL, 1952). This Regulation proposes a pH limit for various species, but some species

112 of fish after “*rigor mortis*” already have high values pH, can even be equal to or greater than
 113 6.5, after the end of the experiment, a fact which suggests that the pH is not always an
 114 appropriate tool for quality control, may be associated with increased resistance to capture
 115 by using fishing nets, composition and oxidizing action of amino acids and urea, fish species,
 116 type of microbial load, handling, packaging and excessive use of polyphosphates after
 117 filleting.

118 The pH values measured exceeded the limit set by federal law to *Hoplias*
 119 *malabaricus* (traíra) and *Leporinus friderici* at 4.6% and 7.7% respectively, thereby good use
 120 of fishing techniques and reducing stress when the fish is caught, are suitable for
 121 maintaining the pH found in the fish flesh internal (BRASIL, 1997).

122 The moisture certain values were 70.004 ± 4.57 and $65.55 \pm 2.44\%$ to *Hoplias*
 123 *malabaricus* (traíra) and *Leporinus friderici* (piau-três pintas) not comply with the standards
 124 required by RIISPOA which states that the moisture content does not exceed more than
 125 35%. The high degree of moisture found in both species, influence directly on a lower shelf
 126 life, because high levels of water activity are a means conducive to proliferation of
 127 microorganisms and associated enzymatic actions that may modify its natural properties.
 128 These results obtained are similar to the survey by Santos et al., (2001) in the study of the
 129 chemical composition and fillet yield of Traíra, in which mean values found for moisture
 130 77.71. In the study Burket et al. (2008) the determiner average values of $64.83 \pm$ moisture
 131 2.35 the side fillet *Pseudo platystoma* sp (surubins) fed three commercial diets are close to
 132 certain fillet values of *Leporinus friderici* (piau-three pints) found for this search.

133 The fixed mineral residue determined for the species were 2.88 ± 0.74 and $3.50 \pm$
 134 1.51 to *Hoplias malabaricus* (traíra) and *Leporinus friderici* (piau-três pintas), respectively.
 135 Second, Contreras-Guzmán (1994), Machado and Lin (2009). report that the fraction of ash
 136 in freshwater fish shows variations in amounts ranging from 0.90 to 3.39%. These values are
 137 consistent with those found in the betrayed and the Piau-three pints. In the nutritional sense,
 138 the flesh of fish is a rich and valuable source of nutrients, such as calcium (Ca) and
 139 phosphorus (P), and also provides reasonable quantities of sodium (Na), potassium (K),
 140 manganese (Mn), copper (Cu), iron (Fe) and iodine (I) (SIMÕES et al., 2007).

141 The values found in the extraction of lipids to *Hoplias malabaricus* (betrayed) and
 142 *Leporinus friderici* (piau-três pintas) were 10.5 and 11.9%, respectively. But the waste
 143 obtained in the extraction are not formed only of lipids, but for all compounds under the
 144 conditions of the determination, can be extracted by the solvent, therefore becomes
 145 necessary a more rigorous analysis for qualitative determination in identifying and hence its
 146 quantification. For Cecchi (2003), the lipid content can vary greatly depending on the type of
 147 food, and fish have values of 0.1% to 20%. Lipids are highly energetic organic compounds.

148 According Jacquot (1961) cited Torres et al., (2012) fish of the same species,
149 depending on the capture site, can get different ratings based on their fat, classifies the fish
150 as thin when certain maximum fat content is 2.5% and semigordo when these levels are in
151 the range of 2.5% to 10%. Thus, the species fall within the semigordo rating.

152 The fat of fish is important nutritionally, it is a natural source of unsaturated fatty
153 acids; however, may have an inverse relationship with the shelf-life is packaged in
154 inadequate conditions (COSTA et al., 2008). According to some authors, the fish generally
155 are more palatable before spawning, this period in which the fish deposit more fat and
156 glycogen to be used as energy sources (COSTA, 2005; MENDONÇA, 2007; POLESE,
157 2009).

158 The Volatile Tertiary Nitrogen Bases (N-BVT) and Trimethylamine (TMA) is a
159 parameter recommended by national law for assessing the degree of freshness of fish and
160 fish products, but the limit for this parameter does not seem to be suitable for all kinds of
161 fish. Assume the limits below 30 mg N-BVT/100g meat to BVT and 4 mg N-TMA/100g meat
162 to tertiary volatile bases as the Industrial Inspection Technical Regulation and Health of
163 Animal Products – RIISPOA (BRASIL, 1952). The results are in accordance with the
164 standard set, as the values are lower, allowing a long term storage and preservation of
165 nutritional value, slowing the actions of antioxidants, enzyme activities and microorganisms.

166 Several countries, such as Brazil, Germany, Argentina and Australia, Several
167 countries, such as Brazil, Germany, Argentina and Australia, have adopted this parameter to
168 freshness criteria. However, the use of this parameter for freshwater fish is questioned,
169 because they have minimal amounts of trimethylamine oxide, which yields by microbial
170 action trimethylamine. Assim, diferente dos peixes de água salgada, os peixes de água doce
171 geralmente apresentam baixos valores de BVT (GOMES, 2006).

172

173 **4. CONCLUSION**

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175 The determined values of pH exceeding the limit established by federal law, thus good use
176 of fishing techniques and stress reduction when the fish is caught, are suitable for
177 maintaining the pH found in the inner flesh of the fish. The high degree of moisture found in
178 both species, influence directly on a lower shelf life, because high levels of water activity is a
179 means conducive to proliferation of microorganisms and associated enzymatic actions that
180 may modify its natural properties. The certain fixed mineral residues are consistent with
181 those found in the betrayed and the Piau-three pints. Therefore, this study shows that it must
182 have better treatment in freshwater fish processing.

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