



CONSUMERS' PERSPECTIVES ON PIRACUÍ PROCESSED BY INDIVIDUALS WITH TOTAL BILATERAL BLINDNESS

PERSPECTIVAS DOS CONSUMIDORES SOBRE O PIRACUÍ CATADO POR PESSOAS COM CEGUEIRA BILATERAL TOTAL

Valdiney Vasconcelos Feitosa¹, Maurício Dumont Ferreira Sousa¹, Hérlon Mota Atayde¹

¹ Instituto de Ciências e Tecnologia das Águas (ICTA), Universidade Federal do Oeste do Pará
(UFOPA).

*e-mail: lmpp.icta@ufopa.edu.br

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Resumo

O piracuí é um derivado artesanal e farináceo do pescado amplamente consumido na Amazônia, cuja produção envolve a remoção manual de estruturas não comestíveis, como exemplo ossos, processo conhecido como catação. Este estudo avaliou a percepção de consumidores sobre a possibilidade de pessoas com deficiência visual bilateral total (PcDV) realizarem essa etapa produtiva. Foram entrevistados 100 indivíduos em Santarém, Pará, dos quais 96 respostas válidas foram submetidas à análise descritiva e inferencial. A maioria dos entrevistados (75%) considerou que PcDV poderiam desempenhar essa atividade de forma igual ou superior a pessoas videntes. Não foram observadas associações relevantes entre sexo, idade ou cor dos participantes e as respostas obtidas. Embora os resultados indiquem percepção social favorável à inclusão produtiva dessas pessoas na cadeia do pescado, potenciais vieses metodológicos e a diferença entre atitudes declaradas e comportamento real exigem interpretação cautelosa dos achados.

Palavras-chaves/Keywords: Inclusão, Visão, Peixe.

Abstract

Piracuí is a traditional artisanal and farinaceous fish product widely consumed in the Amazon region, whose production involves the manual removal of non-edible structures, as example bones, a process known as sorting. This study evaluated consumer perceptions regarding the possibility of individuals with total bilateral visual impairment performing this production stage. A total of 100 individuals were interviewed in Santarém, Brazil, of which 96 valid responses

were subjected to descriptive and inferential statistical analyses. Most respondents (75%) considered that visually impaired individuals could perform this activity with efficiency equal to or greater than sighted individuals. No relevant associations were observed between participants' sex, age, or ethnicity and their responses. Although the findings indicate a socially favorable perception toward the productive inclusion of these individuals in the fish production chain, potential methodological biases and the discrepancy between declared attitudes and actual consumer behavior require cautious interpretation of the results.

Keywords: Inclusion, Vision, Fish.



Introduction

In the Amazon, although fresh fish predominates in the regional market, several characteristically regional and traditional fish products are also available. One of the most notable is piracuí (Figure 1), a fish protein concentrate of Indigenous origin traditionally produced by several riverine communities using artisanal methods and marketed in two forms: “catado” (hand-picked) and “não catado” (unpicked) (Braga et al., 2020, Carvalho et al., 2025).

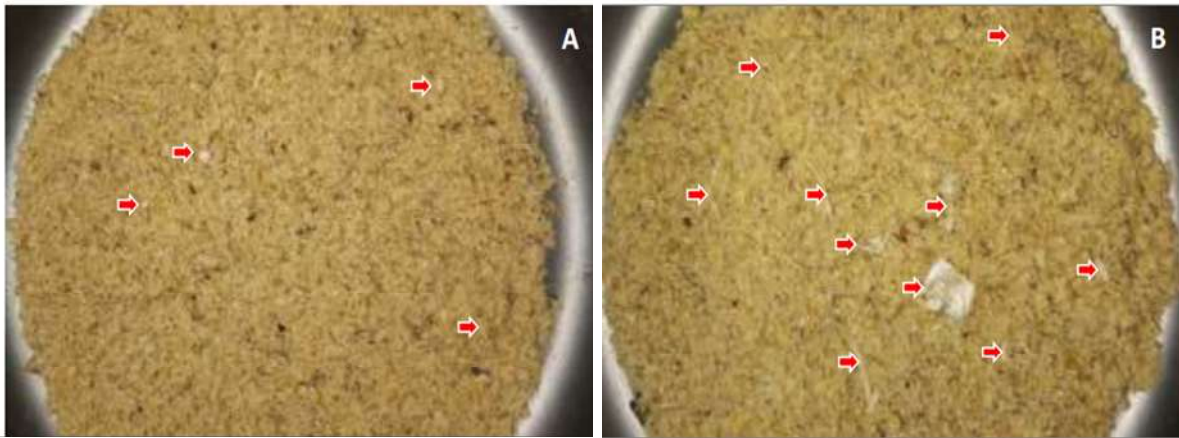


Figure 1. “Catado” (hand-picked, A) and “não catado” (unpicked, B) piracuí.

Source: Carvalho et al. (2025).

Regarding its production, Silva and Costa (2024)) reported that most producers prefer to first cook the fish over embers and then separate the cooked flesh from the main skeletal structure (the head and the vertebral column attached to it, together with a large number of bony plates), thereby obtaining a moist mass. This mass is subsequently dried on a metal plate heated over a wood fire until it acquires a flour-like consistency.

Despite this preliminary separation, the roasted mass, referred to as “não catado” piracuí, still contains numerous non-edible structures, particularly the bony plates of acari-bodó and/or the scales of other fish species. These structures are manually removed in part, thereby reducing their abundance and producing “catado” piracuí (Carvalho et al., 2025).

In Brazil, the inclusion of people with disabilities (PwDs) has been promoted through the incorporation of these principles into national legislation, most notably the Social Security Law (Brazil, 1991) and the Quota Law (Brazil, 2012), which have strengthened the recognition of these individuals as rights holders (Bomfim et al., 2021)).

According to Brazil (2004), people with disabilities include individuals with irreversible impairment affecting one or both eyes, whether present at birth or acquired later in life, resulting in partial or complete loss of visual acuity despite the best optical correction. These individuals are classified as people with visual impairment (PwVI).

Several initiatives have sought to include PwVI in a wide range of activities, some of which have achieved positive outcomes. For example, Siñani et al. (2020)



demonstrated that PwVI were able to engage successfully in visual artistic expression, a field traditionally dominated by vision, through canvas painting. This achievement was made possible by a carefully designed instructional approach implemented prior to the painting activities.

To date, no scientific evidence has documented the participation of people with total bilateral blindness (PwTBB) as producers or collaborators in the manual removal of non-edible structures from piracuí. Furthermore, the effects of performing this activity by PwTBB on consumer acceptance in the retail market remain unknown. In addition, Rodrigues et al. (2017) highlighted the need for further studies to address existing knowledge gaps regarding the various aspects of piracuí.

Therefore, this study aimed to evaluate consumer perceptions of piracuí under a realistic, yet previously uninvestigated, scenario in which PwTBB manually removed the non-edible structures from the product.

Material and Methods

This study received prior approval from the Human Research Ethics Committee of the Federal University of Western Pará under Certificate of Presentation for Ethical Consideration (CAAE) No. 80874924.0.0000.0171 and Approval Opinion No. 7702692.

Throughout this study, sighted individuals were defined as those with normal vision in at least one eye, with or without the use of corrective lenses or other optical devices to compensate for temporary or permanent visual impairment. PwTBB were defined, according to CBO/SBVSN (2019), as those with no light perception in both eyes, corresponding to complete absence of vision.

A convenience sample of 100 individuals of both sexes was recruited through in-person interviews conducted at Praça das Flores, Parque da Cidade (City Park), Orla Municipal (the Municipal Waterfront), and Mercado 2000, all of which are public recreational and commercial areas in Santarém, Pará, Brazil. These locations were selected because of their high pedestrian traffic, increasing the likelihood of recruiting a diverse sample of consumers.

Interviewers circulated in these locations and invited passersby to participate. Individuals who agreed to participate were enrolled in the study and completed a questionnaire designed to characterize their sociodemographic profile, including age group, sex (both self-reported), and race/color (multiple-choice question). Participants were then asked the following question: "Do you think that a PwTBB could remove the non-edible structures from piracuí better than a person with normal vision?" Response options were limited to "Yes" and "No."

Questionnaire responses were entered into an electronic spreadsheet and analyzed using Past version 4.03 (Hammer et al., 2001) and Minitab version 19.1 (evaluation version).

Descriptive statistics included absolute and relative frequencies, mean, mode, and standard deviation. Inferential analyses included Pearson's (R) and Spearman's (ρ) correlation coefficients, as well as Goodman and Kruskal's



proportional reduction in error (PRE) measures (Lambda and Tau) for categorical data. Pearson's and Spearman's coefficients were used to assess the strength and direction of the association between each sociodemographic variable (age, sex, or race/color, analyzed separately) and participants' responses ("Yes" or "No"). Goodman and Kruskal's Lambda and Tau were used to estimate the proportional reduction in prediction error achieved by using each sociodemographic variable to predict the participants' response.

Results and Discussion

Among the 100 individuals who completed the questionnaire, a subsequent review revealed that three had submitted incomplete questionnaires and one did not meet the minimum age requirement for participation and were excluded. Consequently, the final sample consisted of 96 participants. The sociodemographic characteristics of these participants are presented in Table 1.

Table 1. Sociodemographic characteristics of participants interviewed regarding the performance of individuals with total bilateral visual impairment in the manual removal of non-edible structures from piracuí.

Variable	Category	Description	Frequency	
			n	%
Age	Young adults	18 – 29 years	32	33.3
	Adults	30 – 44 years	39	40.6
	Middle-age adults	45 – 59 years	20	20.8
	Older adults	>60 years	5	5.2
Sex	Female		56	58.3
	Male		40	41.7
Color	Asian		1	1.0
	White		17	17.7
	Indigenous		2	2.1
	Brown		64	66.7
	Black		10	10.4
	Not reported		2	2.1

Most participants were adults and female. Based on the age classification proposed by Lachman (2001), participants ranged in age from 18 to 75 years, with a mean age of 36.8 ± 13.1 years and a mode of 40 years ($n = 7$). Color was classified according to the 2022 Brazilian Demographic Census conducted by the Brazilian Institute of Geography and Statistics (Instituto Brasileiro de Geografia e Estatística, IBGE, 2023), with brown (mixed-race) individuals representing the largest group.

The main finding of this study was the predominance of positive responses among participants. Most respondents ($n = 72$; 75.0%) believed that PwTBB could perform the manual removal of non-edible structures from piracuí as well as or better than sighted individuals. These findings suggest that, at least at the perceptual and social levels, consumers may be receptive to the participation of PwTBB in the artisanal production of piracuí.



The predominance of positive responses among participants may be explained by the widespread recognition that PwVI often develop compensatory sensory abilities, particularly enhanced tactile perception, which plays an important role in recognizing objects, shapes, textures, and surface irregularities, as well as identifying the physical characteristics of foods and utensils (Bilyk, 2002; Li et al., 2021; Radziun et al., 2023). In the context of piracuí processing, these tactile abilities may facilitate the identification of fish bones, scales, and other undesirable fragments present in the product.

The positive perceptions observed among participants in the present study are consistent with findings reported in previous research. For example, Li et al. (2021) conducted a documentary review of culinary practices performed by individuals with different types of visual impairment. Their synthesis identified a wide range of strategies that promote independence in food preparation. Although certain challenges remain, the authors concluded that cooking can be performed successfully by PwVI when appropriate adaptive strategies are implemented. From this perspective, although this possibility was not directly evaluated in the present study, the use of assistive devices and adapted tools may also facilitate the autonomous production of “catado” piracuí by PwTBB.

During participant recruitment, the first author, who is PwTBB, was present throughout the interview process. Several forms of refusal were observed during data collection. Some individuals immediately declined the invitation without allowing the interviewers to explain the study, whereas others assumed that the interview was associated with government inspection or the collection of information that could be used by regulatory authorities. Conversely, some individuals agreed to participate despite showing initial hesitation. In all cases, participation was entirely voluntary, and no pressure or coercion was exerted by the interviewers.

In one post-interview interaction conducted via an instant messaging application, a participant initially requested withdrawal from the study but deleted the message shortly after the first author had read it. To clarify the participant's intention, the first author contacted the individual by telephone. The participant explained that the withdrawal request had been suggested by family members, who were concerned that the participant's responses could somehow be linked to their identity. After the first author reaffirmed that both the participant's identity and responses would remain anonymous, the participant confirmed the decision to remain in the study and authorized the continued use of the previously collected data.

The situations described above suggest that the positive perceptions identified in the present study should be interpreted with caution, as stated attitudes do not always translate into actual purchasing behavior. This discrepancy is consistent with the attitude-behavior gap theory described by Untarini (2020).

Another issue that should be considered is the possibility that some participants provided responses perceived as socially or morally desirable rather



than reflecting their actual behavior. Fisher (1993) and Bispo Júnior (2022) described this phenomenon as social desirability bias, a common source of response bias in studies involving historically marginalized groups, in which participants provide answers that conform to socially valued norms rather than their genuine beliefs or intentions.

In the present study, the potential influence of social desirability bias may have been related to the data collection procedure. Although the questionnaire was completed anonymously, participants signed the informed consent form (ICF) immediately before completing the questionnaire, and both documents were presented simultaneously, albeit on separate sheets. Under these circumstances, some participants may have perceived a reduced level of anonymity and, consequently, may have been more inclined to provide responses they considered socially acceptable.

Conversely, 25% of the participants did not believe that PwTBB could perform this activity better than sighted individuals. This perception may reflect, at least in part, the persistence of social stigma surrounding visual impairment, the tendency to equate visual impairment with functional incapacity, accessibility barriers that limit independent performance of everyday activities, and the need for environmental adaptations to enable these individuals to fully demonstrate their abilities (Bilyk, 2002; Li et al., 2021; Radziun et al., 2023; Schafhauzer & Silva, 2023).

Inferential statistical analyses were performed in this study, and the results are presented in Table 2. The table summarizes participants' responses regarding the ability of PwTBB to perform the manual removal of non-edible structures from piracuí, stratified according to three sociodemographic variables, as well as the statistical measures describing the association between these variables and participants' responses.

Both Pearson's and Spearman's correlation coefficients were close to zero, indicating very weak or not association between each sociodemographic variable (and its respective categories) and participants' responses. Likewise, all Goodman–Kruskal measures exhibited low magnitudes, indicating that the sociodemographic variables had limited predictive value for participants' responses. Therefore, there was no statistical evidence that participants' responses were associated with sex, age group, or race/color.

The absence of statistically meaningful associations in this sample suggests that favorable perceptions regarding the participation of PwTBB in the manual removal of non-edible structures from piracuí were not restricted to specific consumer groups. In other words, participants from different sociodemographic backgrounds showed broadly similar perceptions of this activity.



Table 2. Sociodemographic characteristics of the participants, response frequencies, and inferential statistics regarding the ability of individuals with total binocular visual impairment to perform the manual removal of non-edible structures from piracuí.

Variable	Category	Absolute Frequency of Each Response		Inferential Statistical Measures*	
		Yes	No		
Age	Young adults	20	12	Pearson's R:	0.045
	Adults	29	10	Spearman's ρ :	0.060
	Middle-age adults	18	2	Lambda:	0.035
	Older adults	5	0	Tau:	0.070
Sex	Female	41	15	Pearson's R:	0.049
	Male	31	9	Spearman's ρ :	0.049
				Lambda:	0.000
				Tau:	0.002
Color	Asian	1	0	Pearson's R:	0.079
	White	11	6	Spearman's ρ :	0.089
	Indigenous	2	0	Lambda:	0.000
	Brown	47	17	Tau:	0.041
	Black	9	1		
	Not reported	2	0		

*Pearson's R and Spearman's ρ are correlation coefficients, whereas Lambda and Tau are Goodman and Kruskal's proportional reduction in error (PRE) measures.

It should be emphasized that the present study was based on a hypothetical scenario presented to participants and did not involve a direct comparison between products processed by PwTBB and sighted individuals. Therefore, future studies should compare the manual removal of non-edible structures from piracuí performed by these individuals, as well as investigate consumers' purchase intentions regarding “catado” piracuí produced by PwTBB under commercial conditions that more closely resemble real purchasing environments, such as open-air markets.

Conclusion

Despite the potential influence of response biases, the predominantly favorable perceptions observed among participants regarding the ability of PwTBB to perform the manual removal of non-edible structures from piracuí suggest that the absence of vision is not widely perceived by consumers as an inherent barrier to this stage of piracuí processing. These findings indicate a potentially favorable social context for the participation of these individuals in activities related to the fish production chain in the Brazilian Amazon, although further studies under real production and commercial conditions are needed to confirm whether these perceptions translate into actual consumer behavior.

Note

This article presents the first findings of a scientific investigation derived from the undergraduate thesis of the first individual with total bilateral visual



impairment to earn a Bachelor's degree in Fisheries Engineering in Brazil. The research was inspired by the author's own lived experience.

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