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Similarities and distinctions of fish consumption in Brazil and Portugal measured through electronic survey

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Abstract

Volunteers from Brazil and Portugal responded a questionnaire about their habits of fish consumption. In terms of amount of fish consumed monthly in Brazil, the intake was between 200 and 500 g, while the Portuguese (66.1%) reported a monthly consumption of more than 500g of fish. Salmon is the most commonly consumed species and was mentioned in both countries, but the hake is the favorite in Portugal. The preservation method adopted in both countries is freezing. In Brazil, the common fish cut was the filet and in Portugal, it was the fish flitch or "clean fish". The guarantee of origin proved to be an important factor for volunteers. Consumers also reported the importance of the identification of sustainable production of fish on the package. The eating habits of fish in both countries were related to consumers' perceptions and preferences of preparation, preservation and marketing conditions. The results show unsatisfaction of the Brazilian consumers about the diversity and quality of fish products available on the market.

Introduction

Fish consumption is recognized as a healthy food choice worldwide. A European-funded survey, SEAFOODplus, collected data from randomly selected households in Denmark, Poland, Belgium, Spain and The Netherlands, totaling 4,786 respondents. The survey showed an average fish consumption of 1.49 times a week and Spain showed the highest consumption followed by Denmark. European consumers generally have a positive attitude towards fish consumption and believe that eating fish is healthy (Brunsø, 2009; Pieniak *et al*., 2010).

Fish consumption in Brazil has grown considerably in recent years (Brasil, 2012). Research shows that in between 2001-2011, fish consumption increased 64.5%, reaching 11.17 kg per capita in 2011 (Brasil, 2013). However, there is little research on the behavior of Brazilian consumers during the decision making process to buy fish. Among the issues are fish origin, processing type, product price and sales outlets, for example, which could be explored in national surveys, similar to other countries (Verbeke and Vackier, 2005; Cardoso *et al*., 2010; Sayin *et al*., 2010; Claret *et al*., 2012; Wang *et al*., 2013).

Portugal has a coastline of 942 km for an area of approximately 92,000 km². Consumption of aquatic organisms has a significant importance for the Portuguese population, with one of the highest annual fish consumption rates (around 50 kg/year per capita) among countries in the European Union (EU) (FAO, 2009). However, despite high consumption, Portuguese production meets only part of the domestic demand, and importing fish is necessary, especially from Spain and Nordic countries (Cardoso *et al*., 2013).

Fish production in Portugal can supply a consumption of circa 23 kg/year per capita, similar to the average in the EU. However, it is insufficient given the high consumption levels that place Portugal in 3rd place of fish consumption worldwide, after Japan and Iceland (Portugal, 2007), a fact that boosts fish import into the country. Fish consumption is estimated to

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account for about 25% of the animal protein intake in the diet of the Portuguese. Consumption habits of fish products are directed to frozen fish and dried-salted cod, as well as raw fish or "fresh" fish. Codfish consumption is estimated at approximately 30 kg/ year per capita (Noronha Vaz, 2008).

Fish is an important source of animal protein for populations and its nutritional characteristics are favorable for the development of a healthy eating habit. Currently, the benefits of rational fish consumption are highly emphasized, namely the presence of polyunsaturated fat acids, high levels of vitamins and minerals and small amounts of cholesterol and saturated fats (Inmetro, 2011). Studies show a strong link between regular consumption of fatty acids of omega-3 series in some fish species with a healthy lifestyle (Simopoulos, 2002; Crowe *et al*., 2007). This fact highlights the importance of this kind of food for good health, since this nutrient has been associated with the prevention of heart diseases, inflammatory disorders and some autoimmune diseases (Zampelas *et al*., 2005; Shiepers *et al.*, 2010).

This data could help the agribusiness sector to establish lines and guidelines in order to identify regional marketing characteristics and increase uniformly fish protein consumption, given that socioeconomic and cultural differences among consumers in a city, state and country, determine distinct eating habits.

To be able to innovate and develop new products, we must start from the premise that consumers are willing to invest in product quality associated to quality of life or health benefits or, even attributes related to gastronomy, taste and comfort. Another fact regarding innovation is that the globalized world should be considered, therefore, innovation must meet different desires and preferences of the modern consumer. In this sense, this research investigated the main characteristics of fish consumption and socio-demographic profile of Brazilian and Portuguese consumers.

Materials and Methods

This study had descriptive and correlational nature of cross-sectional and retro-analytic with non-probabilistic convenience sampling. The research was conducted over the Internet from June to August, 2012, in Brazil and Portugal. The research involved volunteers from both countries who answered a survey about their habits of fish consumption.

Subjects

Due to the voluntary nature of the research, there is a considerable difference in the participation of countries. In Brazil, 1,295 volunteers participated and from Portugal, 174 volunteers. All participants signed the Term of Free and Informed Consent – IC, available on the homepage of the survey. The study had the approval of ESALQ-USP Committee of Ethics in Research with Human Beings (CEP) under the number 87.

Data collection

The data was collected on the Internet using Survey Monkey System to structure the questionnaires and was released in Brazil in social media (Facebook, twitter). The survey received support from the University of São Paulo (USP), which also disseminated it among its students and workers, and from the Brazilian Agricultural Research Corporation (EMBRAPA), which released in on its website and social media. In Portugal, the research was released at the University of Porto (UP) and through voluntary participation after acceptance of electronic invitation.

Perception of fish/seafood consumption

The instrument used was adapted from Maciel *et al.* (2014) and consisted of items that determine the consumer's profile, fish eating habit, desirable characteristics or attributes of the product, factors affecting purchase decisions, expectation when buying tracked fish, relation between fish consumption, quality of life and health.

Data analysis

We performed the descriptive analysis of selected variables and test of normality and linearity between groups using the statistical package SPSS 15.0. Although the number of subjects is rather heterogeneous, we considered the data collected in both countries, since there is no significant interest in statistical comparisons in this study, such as an initial test, the focus is on characterizing fish consumption in both countries.

Results

The results show a distinct demographic profile between respondents from Brazil and Portugal. The average age observed in Portugal (27.16 ± 9.78) was almost twofold the average age of Brazilians (16.31 ± 11.34). In Brazil, there was predominance of single subjects (53.7%) as opposed to the married status reported by most Portuguese participants (68.2%).

On the other hand, similarities between countries were identified. In both countries, most respondents

were women, in Brazil 56% and in Portugal 53%. In Brazil, country with most participants (87.73%), the data distribution showed two unique features of most respondents: level of education and monthly income declared. Participants in the survey showed a high degree of technical and scientific knowledge (53.2% with post-graduate education) as well as high social and financial condition (28.5% with an income greater than 10 minimum wages). In Portugal, of the total number of respondents (12.27%), there was also a predominance of university (10.6%) and post-graduation education (75.8%). Similarly, income distribution showed greater purchasing power of participants. The average income in the minimum wage, converted to the currency of both countries amounts to 5.80 (± 2.01) and 4.96 reais in Brazil (± 1.65) Euros in Portugal. The stratified analysis of income in Brazil indicated that 20.8% earn more than 10 Minimum Monthly Wages (MMW), 12.4% earn 4-6 MMW and 10.3% earn between 8-10 MMW. In Portugal, 24.2% earn 4-6 MMW, 16.7% earn from 6-8 MMW and 12.1% from 8-10 MMW.

A divergent situation was observed in the frequency of fish consumption (Table 1). In Portugal, over 90% of the participants ate fish in their meals at least once a week. In Brazil, however, the consumers' behavior showed a greater distribution in the frequency of fish consumption with a high frequency of responses "rarely" or "once a month" in the questionnaires.

Brazilians who reported never consuming fish (1.8%) argued that they do not enjoy the taste (1.2%), do not have the habit of consuming (0.5%), find fish smell unpleasant (0.2%), consider the price high (0.1%), and do not enjoy fish bones in the product (0.1%).

Concerning the estimated amount of fish consumed monthly, the study showed divergence between the profiles of participants. Most Portuguese participants (66.1%) reported monthly consumption of more than 500g, corroborating the tradition of the country in fish consumption in Europe (DGPA, 2010). In Brazil, fish consumption ranged between 200 and 500 g, but there was a higher frequency of responses regarding the consumption lower than 100 g (11.6%), compared to Portugal (1.1%).

Another point mentioned in the survey was the preference for the fish species available on the market. The salmon was mentioned in both countries. Brazilians considered salmon as the first option and in Brazil, salmon is an imported product. Portuguese, in turn, reported to prefer hake to the traditional salmon. Fish that had a higher frequency of citation in Brazil were salmon (21.59%), tilapia (20.18%) and whiting (12.98%). In Portugal, the most frequently cited were hake (35.34%), salmon (14.29%) and sea bass (12.78%).

Table 1. Frequency of fish consumption and estimated amount of monthly consumption reported by participants from Brazil and Portugal 2012.

Frequency	Brazil		Portugal	
	n	%	n	%
2 or more times a week	156	12.0	134	77.0
Once a week	372	28.7	23	13.2
2 to 3 times a week	316	24.4	8	4.6
Once a month	178	13.7	3	1.7
Rarely	170	13.1	0	0
Never	23	1.8	2	1.1
Total	1215	93.8	170	97.7
Missing*	80	6.2	4	2.3
Total	1295	100	174	100
Estimated amount monthly				
Up to 100g	150	11.6	2	1.1
Between 100 and 200g	214	16.5	9	5.2
Between 200 and 300g	234	18.1	14	8.0
Between 300 and 500g	239	18.5	21	12.1
More than 500g	253	19.5	115	66.1
Missing*	205	15.8	13	7.5
Total	1295	100	174	100

* incomplete data= not considered in the analysis of this variable

Regarding the cooking methods of fish, baked or broiled was highlighted as a preference of volunteers in both countries, 46% in Brazil and 61.5% in Portugal. Moreover, the habit of consuming fish is related to family habits for Brazilians (33.2%) and the Portuguese (36.2%). In Brazil and Portugal, most participants 58.8% and 59.2%, respectively, agree that fish consumption can bring health benefits, and similarly in both countries, 35% of the participants were not able to assess whether there was an increase in the amount of fish consumed in the last two years.

Some purchase features were also surveyed among participants in both countries (Tables 2, 3, 4 and 5) and the results showed certain differences among consumers, especially those related to the variety and quality of fish sold, origin and conservation of products on the market.

When asked about the diversity of fish products in local traditional markets, most Brazilians participants (29.2%) were unsatisfied about this condition. The quality of fish products was also identified as worrisome (31.3%), because it directly affects the safety of food available for consumption. The opposite situation was identified in Portugal, where most respondents (54.3%) reported as satisfactory the quality and conservation of fish. These data provide support to the claim that quality conditions influence purchase and consumption of fish.

In the case of preference for products based on their origin, again, significant differences were observed between the two countries. While in Brazil demand for products from aquaculture grows among consumers, Portugal still relies on high consumption

Table 2. Frequency of scale items related to fish purchase agreement featured by research participants from Brazil

Items	Completely disagree		Disagree		Indifferent /Don´t know		Agree		Completely Agree		Total	
	in	%	in	%	in	%	in	%	in	%	in	%
Consider satisfactory												
The variety of fish in the market	104	8.0	378	29.2	214	16.5	304	23.5	74	5.7	1074	82.9
The quality of fish in the market	107	8.3	405	31.3	226	17.5	285	22.0	51	3.9	1074	82.9
The most important feature to purchase is												
Size	93	7.2	255	19.7	276	21.3	281	21.7	46	3.6	951	73.4
Tinge	8	0.6	25	1.9	67	5.2	477	36.8	374	28.9	951	73.4
Packaging	29	2.2	76	5.9	173	13.4	462	35.7	211	16.3	951	73.4
Price	12	0.9	55	4.2	106	8.2	552	42.6	226	17.5	951	73.4
Nutritional value	20	1.5	74	5.7	278	21.5	377	29.1	202	15.6	951	73.4
Brand	63	4.9	152	11.7	393	30.3	272	21.0	71	5.5	951	73.4
Origin	13	1.0	50	3.9	180	13.9	406	31.4	302	23.3	951	73.4
It's important to find the fish												
In bulk "fresh"	63	4.9	123	9.5	137	10.6	311	24.0	317	24.5	951	73.4
Refrigerated	33	2.5	98	7.6	129	10.0	471	36.4	220	17.0	951	73.4
Frozen	33	2.5	119	9.2	122	9.4	429	33.1	248	19.2	951	73.4
I would rather buy fish from												
Extractive fishing	62	4.8	111	8.6	371	28.6	258	19.9	134	10.3	936	72.3
Fresh water or sea aquaculture	15	1.2	36	2.8	317	24.5	297	22.9	280	21.6	945	73.0
I would like that the package displayed the seal of sustainable production - green seal												
	10	0.8	18	1.4	102	7.9	354	27.3	465	35.9	949	73.3

Table 3. Frequency of scale items related to fish purchase agreement featured by research participants from Portugal

Items	Completely disagree		Disagree		Indifferent /Don´t know		Agree		Completely Agree		Total	
	in	%	in	%	in	%	in	%	in	%	in	%
Consider satisfactory												
The variety of fish in the market	1	0.6	10	5.7	8	4.6	93	53.4	49	28.2	161	92.5
The quality of fish in the market	1	0.6	11	6.3	13	7.5	93	53.4	42	24.1	160	92.0
The most important feature to purchase is												
Size	16	9.2	39	22.4	40	23.0	45	25.9	5	2.9	145	83.3
Tinge	5	2.9	8	4.6	13	7.5	79	45.4	40	23.0	145	83.3
Packaging	8	4.6	27	15.5	46	26.4	58	33.3	6	3.4	145	83.3
Price	1	0.6	4	2.3	11	6.3	109	62.6	20	11.5	145	83.3
Nutritional value	1	0.6	12	6.9	34	19.5	70	40.2	28	16.1	145	83.3
Brand	8	4.6	33	19.0	66	37.9	36	20.7	2	1.1	145	83.3
Origin	3	1.7	5	2.9	24	13.8	81	46.6	32	18.4	145	83.3
It's important to find the fish												
In bulk "fresh"	4	2.3	9	5.2	11	6.3	60	34.5	61	35.1	145	83.3
Refrigerated	6	3.4	18	10.3	36	20.7	68	39.1	17	9.8	145	83.3
Frozen	5	2.9	11	6.3	12	6.9	85	48.9	32	18.4	145	83.3
I would rather buy fish from												
Extractive fishing	2	1.1	2	1.1	13	7.5	50	28.7	77	44.3	144	82.8
Fresh water or sea aquaculture	7	4.0	39	22.4	50	28.7	43	24.7	4	2.3	143	82.2
I would like that the package displayed the seal of sustainable production - green seal												
	1	0.6	0	0	20	11.5	78	44.8	44	25.3	143	82.2

of fish from extractive fishing, reported by 73% of respondents in terms of product origin investigated in this research.

When asked about the importance of certain attributes for the product, and the possibility of fixing a green stamp of sustainability on the package, making this product preferable when deciding to purchase, participants had similar responses in both countries, where 73% and 82% of consumers in Brazil and Portugal, respectively, agree that this initiative is extremely important. This statement is a valuable indicator for processing companies to operate as a clean, sustainable and efficient eco-company.

The scale items concerning the importance assigned to the purchase decision (Tables 4 and 5) show that in Brazil and Portugal, the supermarket is the most cited place to purchase fish, and 35.4% of Brazilians believe that is important for fish package to have the SIF (Seal of the Federal Inspection Service).

The most important conservation method in both countries is freezing. In Brazil, the preferred fish cut was the filet and in Portugal, it was the fish flitch or "clean fish". Although participants indicated that they have little knowledge about traceability of products, consumers from both countries felt that indicators of traceability of national fish are very important, as well as information provided on the product label.

In Brazil, 32.2% of participants indicated they would be willing to pay more for a product with a guarantee of origin and in Portugal 40.2% would do the same. Of those, 23.4% and 29.9%, Brazil and Portugal respectively, would pay up to 10% more.

Table 4. Frequency of scale items related to fish purchase agreement featured by research participants from Brazil

Items	No		Rarely		Sometimes		Frequently		Always		Total	
	in	%	in	%	in	%	in	%	in	%	in	%
Buy fish												
Supermarket	55	4.2	151	11.7	211	16.3	279	21.5	240	18.5	936	72.3
Local fishmongers	430	33.2	205	15.8	170	13.1	89	6.9	31	2.4	925	71.4
City market	440	34.0	219	16.9	157	12.1	67	5.2	37	2.9	920	71.0
Open street markets	571	44.1	177	13.7	110	8.5	50	3.9	19	1.5	927	71.6
Directly from the producer/fisherman	490	37.8	188	14.5	119	9.2	78	6.0	53	4.1	928	71.7
I consider important that the fish hold the SIF seal												
	95	7.3	69	5.3	134	10.3	194	15.0	459	35.4	951	73.4
I consider the best way to preserve the fish												
Frozen	22	1.7	65	5.0	183	14.1	318	24.6	363	28.0	951	73.4
Refrigerated	61	4.7	85	6.6	268	20.7	323	24.9	214	16.5	951	73.4
Canned	172	13.3	243	18.8	310	23.9	164	12.7	62	4.8	951	73.4
In natura	198	15.3	176	13.6	181	14.0	173	13.4	223	17.2	951	73.4
At the time of purchase I will give preference to:	Nothing		A little		Somewhat		A lot		Extremely		Total	
Filet	22	1.7	38	2.9	126	9.7	469	36.2	296	22.9	951	73.4
Fish flitch	43	3.3	132	10.2	303	23.4	351	27.1	122	9.4	951	73.4
Gutted fish	35	2.7	82	6.3	144	11.1	345	26.6	345	26.6	951	73.4
Whole fish	293	22.6	281	21.7	198	15.3	110	8.5	69	5.3	951	73.4
Having information about the fish (place of origin, when it was caught, when it was processed, due date, culture) might favor the purchase												
	7	0.5	25	1.9	84	6.5	344	26.6	491	37.9	951	73.4
I have knowledge that this product is tracked												
	120	9.3	116	9.0	178	13.7	230	17.8	307	23.7	951	73.4
I consider the tracking of national product important												
	33	2.5	37	2.9	107	8.3	360	27.8	414	32.0	951	73.4

Table 5. Frequency of scale items related to fish purchase agreement featured by research participants from Portugal

Items	No		Rarely		Sometimes		Frequently		Always		Total	
	in	%	in	%	in	%	in	%	in	%	in	%
Buy fish												
Supermarket	1	0.6	3	1.7	14	8.0	84	48.3	42	24.1	144	82.8
Local fishmongers	45	25.9	35	20.1	32	18.4	25	14.4	1	0.6	138	79.3
City market	46	26.4	47	27.0	28	16.1	15	8.6	2	1.1	138	79.3
Open street markets	106	60.9	25	14.4	5	2.9	1	0.6	0	0	137	78.7
Directly from the producer/fisherman	85	48.9	37	21.3	9	5.2	7	4.0	0	0	138	79.3
I consider important that the fish have a quality or origin seal												
	0	0	5	2.9	24	13.8	58	33.3	58	33.3	145	83.3
I consider the best way to preserve the fish												
Frozen	2	1.1	5	2.9	23	13.2	75	43.1	40	23.0	145	83.3
Refrigerated	8	4.6	22	12.6	46	26.4	56	32.2	13	7.5	145	83.3
Canned	20	11.5	44	25.3	62	35.6	15	8.6	4	2.3	145	83.3
In natura	49	28.2	29	16.7	16	9.2	32	18.4	19	10.9	145	83.3
At the time of purchase I will give preference to:	None		A little		Somewhat		A lot		Extremely		Total	
Filet	10	5.7	24	13.8	47	27.0	49	28.2	15	8.6	145	83.3
Fish flitch	5	2.9	14	8.0	45	25.9	70	40.2	11	6.3	145	83.3
Gutted fish	1	0.6	8	4.6	28	16.1	52	29.9	56	32.2	145	83.3
Whole fish	12	6.9	28	16.1	49	28.2	36	20.7	20	11.5	145	83.3
Having information about the fish (place of origin, when it was caught, when it was processed, due date, culture) might favor the purchase												
	0	0	2	1.1	15	8.6	61	35.1	67	38.5	145	83.3
I have knowledge that this product is tracked												
	14	8.0	15	8.6	58	33.3	34	19.5	24	13.8	145	83.3
I consider the tracking of national product important												
	8	4.6	3	1.7	35	20.1	56	32.2	43	24.7	145	83.3

Discussion

The results show a relation of the socio-demographic profile of survey respondents to consumption characteristics and preferences of the main fish types reported. Consumers with information and significant purchasing power are conditioned to prefer products with higher value added and easy preparation procedures. This assumption is perfectly supported by the results obtained in this research.

However, nutrition knowledge and interest in healthy eating habits were weakly related to frequency of fish consumption. The best predictors of regular fish consumption were age and educational level, as older, better-educated adults tended to consume more fish (Brunsø, 2009; Pieniak *et al*., 2010). The consumer's interest for identification on fish package about sustainable production is one indicator that people are concerned with sustainable fish production in both countries (Whitmarsh and Wattage 2006; Whitmarsh and Palmieri, 2011).

In this research, fish consumption was associated with health, and among the attributes most commonly cited, the presence of polyunsaturated fatty acids was the most prominent. The emphasis on the issue of environmental sustainability was an interesting

aspect, certainly obtained from information in the media, especially in terms of overfishing and oil spills that have occurred over the years (Komukama, 2011).

Although the expansion of aquaculture has produced socio-economic benefits, it has also caused an environmental impact, thus the effect of sustainable production in the consumer's perception must be considered (Whitmarsh and Palmieri, 2011).

Regarding acquisition-related attributes of fish, the price paid for the product was highlighted in both countries, since price has been mentioned as one of the barriers to fish consumption in studies conducted in Brazil (Maciel *et al*., 2013) and in Norway (Myrland *et al*., 2000).

Still in terms of barriers to consumption, lack of habit seems to be the most discouraging factor for participants from Brazil, which was not observed among the Portuguese respondents. Portugal has has a diet characterized by a high consumption of fish, which places the country with the highest fish consumption per capita in the EU and the habit of consuming fish in Portugal are not restricted to coastal areas or holiday seasons like in Brazil, (Noronha Vaz, 2008).

The almost absolute preference for salmon in Brazil may be an indicator for the lack of habit of consuming domestic species. This habit seems to have been influenced by the income level of the participants, because salmon prices are high in Brazil, making the high price a limiting factor for consumption.

A study was conducted with 482 consumers in 49 open street markets in the city of Santo André, São Paulo State, Brazil, to identify the socio-economic factors that may facilitate or hinder the purchase decision of the fish marketed. The study showed that a major aspect for the purchase decision is a firmer texture of fish at sale, fresh or frozen product, and level of education and monthly income of respondents. The most preferred species whiting, sardine and dogfish, considered more affordable and without intramuscular "bonefish". (Vasconcelos *et al*., 2013)

In order to determine the profile of fish consumers in three Brazilian cities, tilapia was considered the lakeside most remarkable species and among marine species, tuna, salmon and dogfish were the main fish mentioned by interviewees. Moreover, similarly to the previously mentioned studies, the price of the products was also considered as the main limiting factor for fish purchase (Minozzo *et al*., 2008).

The volunteers of this study did not identify whether fish consumption increases with advancing age, however, a study in Norway among women 30-44 years old showed that fish consumption tends to increase as age advances (Myrland *et al*., 2000). This fact often is associated with greater health concern.

Over 70% of consumers in both countries believe that eating fish is healthy, which represents an important concept that has been encouraged and practiced by the industry, with the interest of consumers for products that promote health, a trend also identified in other countries. Studies conducted in Belgium, the Netherlands, Denmark, Poland and Spain, aiming to identify potential differences in fish consumption, showed that the education level and age influence frequency of fish consumption, and that consumers believe that eating fish is healthy. However, when these variables were correlated with consumption data, the results show a relationship of low association, indicating that consumption is also influenced by other factors. The authors suggest that the isolated communication seems to be insufficient to achieve a higher level of compliance with recommendations for fish consumption; however, it is recommend that associating information on perceived benefits related to health may be a more efficient way (Pieniak *et al*., 2010).

Better knowledge of the consumer profile of a country is fundamental to understand the dynamics of product distribution. According to the literature, the Portuguese, especially those living on coastal regions, prefer to eat fish caught than fish from captivity. Fatty fish are also the most desired and chilled fish is preferred over frozen, salted, smoked and canned foods. Cod, whiting and canned tuna were the major species preferred in the survey (Cardoso *et al*., 2013).

Some studies in Poland, especially among university students, have shown the importance of factors such as taste, nutritional value, and visual appearance for the choice of food (Babicz-Zielinska *et al*., 1998). In countries with high or rising incomes, there is often a change in lifestyle that usually results in increased demand for convenience foods and, more currently, it has been found that consumers are not willing to give up health to the detriment of the practicality of convenience foods (Anita, 2011).

In Portugal, elderly consumers who live alone want, among other options, high availability of fish and seafood products on the market. A fact that may reflect the habits prevailing in the country, with one of the highest fish consumption rates in Europe (Morais *et al*., 2010). Because of the use of Internet resources as a tool to collect data in this study, possibly some people with higher consumption were excluded, such as riverside communities located in northern Brazil that have fish as a regular part of their diet and a

major protein source in the region.

Conclusions

Eating habits of fish in both countries were related to consumers' perceptions and preparation preferences, preservation and marketing conditions. Aspects related to the fish price and its products seem to be limiting factors for consumption in both countries. The social desire for sustainable products was also identified, which leads to an even greater concern to meet consumers' demands for healthiness, convenience and sustainability regarding fish consumption, in a context of the complex productive chain, in many cases, still incipient. The results reveal unsatisfaction of the Brazilian consumers about the diversity and quality of fish products; however, it is important to consider that fish consumption in Brazil, although lower than in Portugal, is very heterogeneous.

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