



Research Article

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# FOOD SAFETY PERCEPTION AND WILLING TO PAY FOR LABELLED FISH IN TURKEY: CASE OF MIDDLE MEDITERRANEAN REGION

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## Abstract

Recently, food safety is discussed strictly. In this study, consumers' food safety perceptions and willing to pay fish labelled food safety in the Middle Mediterranean Region was investigated. The primary data was gathered from interview with 768 consumers. The collected data on consumers' demographic characteristics and food safety perception was presented by frequencies, ratios and averages. Most of the consumers (86,2%) heard this term before and defined it as "foods are checked and certified by certain institutions". For consumer the most reliable food group were fish and other seafood. However almost half of them supposed that fish was less reliable than in previous years. Consumer expressed mostly that fish selling units should be improved; consumers should be informed about importance of fish consumption, fishes should be sold at more reasonable prices.

**Keywords:** Fish, Food safety, Willing to pay, Middle Mediterranean Region

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## 1. Introduction

Food safety is one of the most critical issues in food sector recently. Foods may be contaminated with microbiological, chemical or physical hazards during harvesting, processing, storing and distributing processes. Food-borne diseases can cause the long-term health problems and lead even death, especially for small children, the older people, pregnant women and people with weak immune system. The emergence of many new

diseases in the world in recent years presents the significance of food safety. Food safety provides quality nutrition and reliable products to consumers. Quality nutrition and ensuring wellness, which is the most basic needs of the people, is possible with food safety. According to the Food Law No. 5179, food safety is defined as; "whole physical, chemical, and biological measures taken for the elimination of any kind of damage".

Animal products are necessary for human health and nutrition. Fish is one of the most important foods rich in high quality protein, w-3 fatty acids, minerals such as selenium, calcium and iodine. However, the fish flesh is more easily perishable foodstuffs compared to red meat. If fish is kept in improper conditions, the freshness and quality of fish are lost rapidly. Fish has the potential to cause poisoning and disease in humans due to viral, bacterial and parasitic microorganism. The large majority of cases associated with the consumption of fish and fish products have been caused from toxin produced by the bacteria and viruses. There are a variety of bacterial pathogens present in seafood products that cause foodborne illness such as *Vibrio cholera*, *Vibrio parahaemolyticus*, *Vibrio vulnificus*, *Clostridium botulinum*, *Aeromonas hydrophila*, *Salmonella* spp., patojen *E. coli*, *Shigella* spp., *Campylobacter* spp., *Yersinia enterocolitica*, *Bacillus cereus*, *Listeria monocytogenes* and *Staphylococcus aureus* (Lunestad, 2008; Toldra and Reig, 2016).

In worldwide, seafood-associated outbreaks were due to a bacterial (76.1%); viral (21.3%), and parasitic cause (2.6%) (Iwamoto et al., 2010). Seafood-related poisoning or illness is caused by the improper handling and storage conditions of seafood. Besides the presence of the food-borne pathogen in seafood, health risks associated with histamine poisoning ciguatera fish poisoning, shellfish poisoning, heavy metals, pesticides, PCB, dioxin / furan also may occur. Many researches were conducted regarding fish consumption habits and purchasing behavior in Turkey (Istanbul , Izmir, Elazig , Tunceli, Trabzon, Giresun, Isparta and Mersin) (Aydın and Karadurmuş, 2013; Sivri et al., 2011; Yüksel et al., 2011; Şen et al., 2008; Saygı et al., 2006; Hatırlı et al., 2004; Erdoğan et al., 2011; Azabagaoglu et al., 2016; Yücel and Baki, 2017; Sen and Sahin, 2017). However, there are only little knowledge relating to the identification of the level of consumer awareness and perception of food safety in fish (Türk and Incel, 2005; Kılıç, 2008; Sanlier and Konaklioglu, 2012; Ergönül, 2013; Onurlubaş and Gürler, 2015). According to literature review, there have been only few studies regarding consumer knowledge about seafood safety in Turkey. In this study, consumers' food safety perceptions and willing to pay fish labelled food safety in the Middle Mediterranean Region including Adana and Mersin was investigated.

## 2. Material and Method

### 2.1. Material

The material of the study was primary data gathered from survey with consumers in Adana and Mersin provinces. A standard questionnaire form was used in the interviews. The previous literature relating to study was reviewed and adapted to develop the questionnaire (Kreider et al., 1993; Hatırlı et al., 2004; Türk and Incel,

2005; Saygı et al., 2006; Angulo and Gil, 2007; Sen et al., 2008; Sivri et al., 2011; Yüksel et al., 2011; Aydın and Karadurmuş, 2013; Meas and Hu, 2014). After pre-test survey (with 40 persons), the final version of the questionnaire was composed. The survey was done between February and March; in 2016 the questionnaire was compromised into 3 parts. Questions were asked to define consumers' demographic characteristics (age, gender, education, occupation etc.) in the first part, consumers' food safety perception towards fish in the second part and willing to pay for fish labelled food safety in the third part.

### 2.2. Methods

Study area was Adana and Mersin provinces. These provinces were selected by using "Purposive Sampling Method". Mediterrean Region, which includes these provinces, met 8.4% of Turkey's fish production (including hunting and inland) in 2015.

The sample size was calculated by "One Stage Simple Random Sampling Learning against Population Rates" method (Malhotra 2004). Number of samples is obtained as follows:

$$n = \frac{(z^2)(p*q)}{d}$$

*n*: Sample size (384 persons)

*z*: Standardized value corresponding to the confidence level (%96; *z*: 2,58)

*p*: Estimating observed attribute variable in the community (it is accepted as 50% to get highest sample size)

*q*: Estimation of different objects that are not observed

*d*: Allowable error in the measurement range of observations (5%).

It was calculated that 384 people could represent at 95% confidence level and 5% allowable error in the measurement range in the urban area of each province. The number of people surveyed was defined as 768 people, including 384 people in each province.

The collected data on consumers' demographic characteristics and food safety perception was presented by descriptive statistics.

## 3. Results and Discussion

### 3.1. Demographic Characteristics

In the research area, 41.9% of the respondents were between 21-30 ages and 56.4% of them were female. 40.9% of the consumers was high school graduate, while 26.6% of them were university graduate. The number of employees in the total respondents was 338 people. In this group, 32.5% of them were private sector employees 26.3% of the consumers were public staff and 21.3% of them were self-employed. Consumers' average income and food products expenditure were 2.590,1 TL and 671.9 TL, respectively (Table 1).

**Table 1.** Consumers' Demographic Characteristics

Characteristics	Adana		Mersin		Total	
	F	(%)	F	(%)	F	(%)
<b>Age Groups</b>						
-20	56	14.6	63	16.4	119	15.5
21-30	164	42.7	158	41.1	322	41.9
31-40	56	14.6	69	18.0	125	16.3
41-50	60	15.6	40	10.4	100	13.0
51-	48	12.5	54	14.1	102	13.3
Total	384	100.0	384	100.0	768	100.0
<b>Gender</b>						
Female	259	67.4	174	45.3	433	56.4
Male	125	32.6	210	54.7	335	43.6
Total	384	100.0	384	100.0	768	100.0
<b>Marital Status</b>						
Married	174	45.3	155	40.4	329	42.8
Single	205	53.4	213	55.5	418	54.4
Divorced	5	1.3	16	4.2	21	2.7
Total	384	100.0	384	100.0	768	100.0
<b>Education Level</b>						
Illiterate	11	2.9	11	2.9	22	2.9
Literate	11	2.9	21	5.5	32	4.2
Primary School	52	13.5	42	10.9	94	12.2
Secondary School	16	4.1	46	12.0	62	8.1
High School	155	40.4	159	41.4	314	40.9
University	122	31.8	82	21.4	204	26.6
MsD	11	2.8	16	4.1	27	3.4
PhD	6	1.6	7	1.8	13	1.7
Total	384	100.0	384	100.0	768	100.0
<b>Professions</b>						
Public Staff	68	42.8	21	11.7	89	26.3
Self-employed	14	8.7	58	32.4	72	21.3
Private sector employees	57	35.8	53	29.6	110	32.5
Retired	16	10.1	30	16.8	46	13.6
Academisian	4	2.4	17	9.4	21	6.1
Total	159	100.0	179	100.0	338	100.0
Average Household size (ave: people)	4.6		4.7		4.6	
Income (ave.; TL <sup>1</sup> )	2.261.9		2.918.3		2.590.1	
Food Products Expenditure (ave.)	656.5		687.3		671.9	

Not: Unemployed people, housewives and students were not included in the calculation

<sup>1</sup> \$ = 2.90 TL (price on june in 2016)

### 3.2. Consumers' Food Safety Perception

To measure consumers' food safety perception, firstly they were asked whether this term is heard. It is expressed that 86.2% (662 persons) of the consumers heart this term while rest of them (13.8%) did not hear before. This ratio was calculated as 83.1% in Adana and 89,3% in Mersin. In other words, this number was slightly lower in Adana than Mersin.

After this determination, some definitions for "safety food" were presented to consumers and posed which they agreed with. The most preferred definition (63.3% of consumers who heart before) was "foods are checked and certified by certain institutions". The ratio of respondents, who agreed this definition, were 67.4% in Adana while 59.5% in Mersin. Other definitions were foods are certified of HACCP or ISO 22000 (18.6%), halal foods (13.7%) and packed foods (4.4%) (Table 2).

Consumers also defined perception of food products' safety level. The most reliable food group by consumers

were fish and other seafood (ave: 3.5). This tendency was the same in Adana and Mersin. Consumers expressed that other reliable food groups were red meat (ave: 3.0), chicken meat (ave: 2.8), all food products except animal products (ave: 2.7). Proceed meat products (ave: 1.9) was the least reliable products for consumer and there was an important difference with other groups in terms of average scores (Table 3).

Respondents evaluated also each step of fish consuming from production to consumption. These persons expressed that the most reliable step was fish's storage and preparation in home (ave: 3.4). It is followed by sale of fish (ave: 2.9), places/regions of aquaculture and hunting (ave: 2.9) and breeding of fish (ave: 2.8). Cleanliness of fish production plants (ave: 2.6) and storage conditions of fish in the sale unit (ave: 2.6) were the least reliable steps by consumers. Average scores for all steps were similar in Adana and Mersin (Table 4).

**Table 2.** Consumers' "Safety Food" Definitions

Definitions	Adana		Mersin		Total	
	F	% (n/384)	F	% (n/384)	F	% (n/768)
Foods are checked and certified by certain	215	67.4	204	59.5	419	63.3
Foods are certified of HACCP or ISO 22000	63	19.7	60	17.5	123	18.6
Halal foods	34	10.7	57	16.6	91	13.7
Packed foods	7	2.2	22	6.4	29	4.4
Total	319	100.0	343	100.0	662	100.0

**Table 3.** Consumers' food safety perception towards food groups

Food Products	Adana	Mersin	Average
Fish and other seafood	3.5	3.5	3.5
Red Meat	2.9	3.0	3.0
Chicken meat	2.8	2.9	2.8
All food products except animal products	2.6	2.8	2.7
Processed meat products (sausages etc.)	1.7	2.2	1.9

**Table 4.** Consumers' evaluations about food safety for fish from production to consumption\*

Steps	Adana	Mersin	Average
Storage and preparation in home	3.4	3.4	3.4
Sale of fish	2.8	3.1	2.9
Places/regions of aquaculture and hunting	2.8	3.0	2.9
Breeding of fish	2.7	2.9	2.8
Cleanliness of fish production plants	2.4	2.8	2.6
Storage conditions of fish in the sale unit	2.4	2.8	2.6

\*Average scores of 5 Likert Scale.

**Table 5.** Consumers' perception about food safety for fish compared to 10 years ago

Definitions	Adana		Mersin		Total	
	n	%	n	%	n	%
Less reliable than in previous years	157	40.9	164	42.7	321	41.8
Reliable at the same level compared to previous	83	21.6	100	26.0	183	23.8
More reliable than in previous years	64	16.7	55	14.3	119	15.5
No idea	80	20.8	65	16.9	145	18.9
Total	384	100.0	384	100.0	768	100.0

**Table 6.** Consumers' Idea on Fisheries Sector\*

Statements	Adana	Mersin	Average
Fish selling units should be improved	4.3	4.1	4.2
Consumers should be informed about importance of fish consumption	4.2	4.0	4.1
High fish prices effect consumption negatively	4.1	3.8	4.0
Aquaculture and hunting should be expanded to increase consumption	3.3	3.2	3.3
Food safety controls are enough	2.4	2.9	2.7
Products sold are healthy	2.8	3.2	3.0

\*Average scores of 5 Likert Scale.

Consumers were posed to compare between today and 10 years ago about food safety for fish. 41.8% of them supposed that fish was less reliable than in previous years. While 23.8% of them thought that fish was reliable at the same level. On the other hand, 15.5% of the consumers claimed this food was more reliable and rest of them (18.9%) said that they were not able to make any comparison. It showed that they had some conscious about the subject even they claimed this food group was the most reliable in all (Table 5).

Some statements were given to them and asked in which degree they attend to reveal consumers' general idea on fisheries sector. Respondents indicated that they mostly agreed with the idea of "Fish selling units should be improved" (ave: 4.2). Other important statements for them that consumers should be informed about importance of fish consumption (ave: 4.1) and high fish prices effect negatively to consumption (4.0). These

opinions were followed by the statement of "food safety controls are enough" with quite lower score compared to others. In other words, respondents did not trust in food safety controls. Average scores for all statements were quite similar between provinces (Table 6).

**3.3. Willingness to pay for labelled fish with food safety**

Table 7 shows the percentage of respondents who have selected one of the six premium alternatives offered to them for labelled fish with food safety. 61.5% of consumers are not willing to pay a premium for a labelled fish. This ratios was found slightly different between Adana (60.7) and Mersin (62.2). On the other hand, 15.8 of consumers were willing to pay between 1-10% more, 10.4 of them were willing to pay between 11-20% more and rest of them were would like to pay more than 21%.

**Table 7.** Consumers' Willingness to Pay Certified fish

Willing to pay level	Adana		Mersin		Total	
	F	%	F	%	F	%
I would not like to pay more	233	60.7	239	62.2	472	61.5
I would like to pay between 1-10% more	62	16.1	59	15.4	121	15.8
I would like to pay between 11-20% more	47	12.3	33	8.6	80	10.4
I would like to pay more than 21%	42	10.9	53	13.8	95	12.3
Total	384	100.0	384	100.0	768	100.0

**4. Conclusion**

Food safety is an important issue, which is received most attention and discussed strictly in recent years. Foods may be contaminated with different types of hazards from harvesting to storing and may cause serious food borne diseases. Food-borne diseases can cause the long-term health problems and lead even death, especially for small children, the older people, pregnant women and people with weak immune system. Seafood-related poisoning or illness is caused by the improper handling and storage conditions of seafood. In this study, consumers' food safety perceptions and willing to pay fish labelled food safety in the Middle Mediterranean Region (with Adana and Mersin samples) was investigated.

As the results, 86.2% of the consumers heart food safety term and defined was "foods are checked and certified by certain institutions". The respondents evaluated fish and other seafood as the most reliable food among food groups. Even though this result, consumer had some suspects about breeding of fishes, cleanliness of fish production plants and storage conditions of fish in the sale unit were the least reliable steps by consumers. Also it is stressed that fish was less reliable than in previous years by 41.8% of them. Sanitation of fish production plants and sale places as well as storage conditions of fish has heightened consumers' concerns. Consumer

demanded mostly that fish selling units should be improved; consumers should be informed about importance of fish consumption, fishes should be sold at more reasonable prices. Even though consumers are aware of food safety issues, 61.5% of were not willing to pay a premium for a labelled fish with food safety. It is normal when we think together reliability of the fish food safety of consumers were high and willingness to pay for the products with food safety.

Consumers have been faced with different food safety problems towards particular food products. The study showed that concerns about food safety have affected consumers' preferences. Research findings also suggest that most of the consumers had serious concerns on chicken meat in terms of food safety. Most of consumers preferred to decrease chicken consumption quantity in last 10 years. The lack of knowledge about nutritive value of fish is seen to be global concern. To provide global increases in demand for fish, this issue should be considered. The consumers have changed their consumption habits according to information gathering from media. To regain consumer confidence, food safety applications (HACCP, ISO 22000 etc.) have to be implemented strictly. Food safety issues become more important in consumer preferences. Worldwide implementation and certification of food safety management systems have reported to increase

significantly during the last decade, reflecting the importance of assuming these standards in different activity sectors (Gill et al., 2017). ISO 2000 with the development of food safety activities become increasingly integrated to the development and implementation of HACCP programs at several fish processing industry (Herdiana, 2015). Certifying of food safety and labeling of product characteristics are marketing strategies that can be a significant influence in informing the consumer correctly. Fish traders and processors should be alert and educated to ensure the safe and sanitary processing of fish to protect them against the biological, chemical and physical hazard from harvest to transport. Physical facilities and hygiene condition of retail fish market should also be improved to encourage the purchase of fish and make it attractive.

#### Conflict of interest

The authors declare that there is no conflict of interest.

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