

Attitudes as basis for segmenting Croatian fresh fish consumers

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Jel code: M310, Q22

1. Introduction

During the last decades healthy eating habits have received increased attention, and it is widely recognised that regular fish consumption is one possible health improving practice (Sidhu, 2003). Fish is the source of n-3 fatty acids, which are well known by their anti-inflammatory effect (Wall *et al.*, 2010) and their protective role against chronic disease (Cole *et al.*, 2010).

World Health Organization recommended eating fish at least twice a week. European average consumption of fish is 20 kg per capita per year (FAO, 2011) but there are great differences among countries i.e. Portugal 61.6 kg/per capita, Spain 44.8 kg/per capita and France 34.2 kg/per capita (FAO, 2008). Due to its location complexity, Croatia is composed of two large natural, geographic regions, Continental and Coastal. The Adriatic coastal belt is part of the Mediterranean, but compared to some other Mediterranean countries fish consumption in Croatia is very low (estimating 8-10 kg per capita per year; CBS, 2012). By joining the European Union in 2013, the Republic of Croatia has become a part of a single market of 500 million customers who require higher productivity, more competitive products and prices as well as

Abstract

This paper identifies and describes consumer segments based on attitudes about fresh fish. The Data was collected on a sample of 1151 fresh fish consumers in Croatia. Three consumer segments were identified: Fresh Fish Lovers (49.3%), Supporters of Eating Fresh Fish (24.5%), and Occasional Consumers of Fresh Fish (26.2%). The segments differ significantly with respect to behaviour and barriers to fresh fish consumption, attitudes towards fresh fish, role of media and food industry and socio-demographic characteristics. The identification of different attitudes and barriers towards fresh fish consumption and socio-demographic features may provide an opportunity for the fish producers to develop marketing strategies that will meet demands of different consumers.

Keywords: consumer segments, fresh fish, attitudes.

Résumé

L'objectif de ce travail est d'identifier et de décrire les segments de consommateurs sur la base de leurs attitudes à l'égard du poisson frais. Les données ont été collectées à partir d'un échantillon de 1151 consommateurs de poisson frais en Croatie. Trois segments de consommateurs ont été identifiés : les amateurs du poisson frais (49.3%), les partisans de la consommation de poisson frais (24.5%) et les consommateurs occasionnels de poisson frais (26.2%). Les trois segments diffèrent significativement en raison du comportement et des barrières vis-à-vis de la consommation de poisson frais, des attitudes envers le poisson frais, du rôle des médias et de l'industrie alimentaire et des caractéristiques sociodémographiques. L'identification des différentes attitudes et barrières à l'égard de la consommation de poisson frais et les caractéristiques sociodémographiques peuvent fournir aux producteurs de poisson des indications utiles pour développer des stratégies de marketing en mesure de satisfaire les besoins des différents consommateurs.

Mots-clés: segments de consommateurs, poisson frais, attitudes.

the implementation of EU legislation. The single internal market of the European Union has no customs and non-customs barriers, the cross-border operating costs have been reduced on the one hand, and competition has increased on the other hand. Croatian entrepreneurs now have free access to the market of all EU Member States, as well as market countries with which the EU has concluded trade agreements (MARC, 2011).

Markets of fisheries products in the Republic of Croatia are based on the first registered customers since the first sale is done exclusively through them. First registered customers are the fishing cooperatives, buy-

ing centres, retailers and wholesalers. About 1500 of first registered customers are registered in the relevant register of the Ministry of Agriculture. Sale channels are different for white and small pelagic fish. The largest share of the catch of white fish (trawl fishing, etc.), after the first sale, is intended for export, while the catch of small pelagic fish is also a raw material for canning, salting industry and the food in the process of tuna aquaculture. Fisheries play an important role in the export of Croatian food products. The most important markets are Japan, Italy and Spain. Due to the export of tuna, the value of imported fishery products is lower than the value of exports. The most significant products in imports are frozen herring and squid (MARC, 2011). Considering export and import, Croatia has a positive trade balance in fishery products. In 2014 and 2013 export of fishery products exceeds import five times (CBS, 2015).

Attitudes are the strongest positive predictor of the inten-

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tion to consume fresh fish in the Republic of Croatia. Generally, Croatian consumers have positive attitudes about fresh fish (Tomić *et al.*, 2016).

As with any complex human behaviour, variation in fresh fish consumption is influenced by many interrelating factors, such as attitudes towards choosing fish for a meal (Brunsø, 2003), convenience (Olsen, 2003), knowledge about preparing and cooking fish (Vanhonacker *et al.*, 2010), impact of media and food industry (Scholderer and Grunert, 2001) and socio-demographic characteristics (Myrland *et al.*, 2000; Olsen, 2003; Trondsen *et al.*, 2003; Verbeke and Vackier, 2005).

Various research indicated that the fish is perceived as healthy food (Pieniak *et al.*, 2010; Clonan *et al.*, 2011), and that today's consumers are aware of the health benefits of consuming fish (Burger and Gochfeld, 2009). Major barriers to seafood consumption are perceptions of unpleasant sensory qualities of seafood such as unpleasant smell, not liking the taste of seafood, the presence of bones in fish and feeling in the stomach after eating fish (Bredahl and Grunert, 1995, Verbeke and Vackier, 2005). Other significant barriers to fish consumption are lack of familiarity with preparing fish, lack of knowledge and confidence in evaluating freshness, selecting and preparing fish (Juhl and Poulsen, 2000; Verbeke and Vackier, 2005).

Total consumption of seafood increases with increasing size of the household, increasing age and higher education (Myrland *et al.*, 2000). Fish consumption frequency in compliance with health recommendations is higher among women, consumers with higher income and those living in coastal regions. Presence of children in the household leads to lower fish consumption (Verbeke and Vackier, 2005).

Great variation in fish consumption among European countries occurs due to differences in the quantity and frequency of consumed fish among regions and countries, which reflects differences in the availability of fish and other foods, and the heterogeneity of consumer preferences (Welch *et al.*, 2002). The lack of available fresh fish was one of the perceived barriers for increased fish consumption in a random sample of Norwegian women (Trondsen *et al.*, 2003).

Based on cross-sectional data collected in Belgium, the influences from government, food industry, and advertising are much less prominent in consumers' fish consumption decisions (Verbeke and Vackier, 2005). Same authors also indicated that promoting fish consumption could possibly even fail because of the reluctance of consumers to comply with the opinion expressed in industry advertising or public health campaigns. Experts like doctors and nutritionists could possibly contribute to fish promotion effectiveness, since consumers have a stronger intention to comply with these referents (Verbeke and Vackier, 2005).

The relevance of grouping consumers into segments originates from the fact that the average consumer does not exist. Instead, markets consist of rather distinct consumer or

market segments with similar characteristics within the segment, e.g., in terms of preferences, attitudinal, and behavioural patterns. Marketing research increasingly focuses on identifying market segments which appear to be promising targets for promotional efforts (Senauer and Kivey, 1991).

In consumer behaviour research, grouping consumers into segments with similar characteristics has provided a better understanding of consumption patterns (Brunsø, 2003; Pieniak *et al.*, 2007). Large majority of consumers in some of the Mediterranean countries prefer consumption of fresh (chilled) fish than frozen (or processed fish) and fish products (Arvanitoyannis *et al.* 2004; Monfort, 2007). Fresh fish is determined as whole fish that has never been frozen, from catch to market to consumer. It has only been kept chilled until it comes to market (Avery, 2009).

To confirm the above statement, seafood, particularly fresh fish, is a widely available and nutrient rich food source (IOM, 2007) that is recommended due to multiple nutritional benefits (AHO, 2014).

Several consumer segmentation analyses, with respect to fish or fish consumption, are performed on: wild fish versus farmed fish consumption (Verbeke *et al.*, 2007a; Jayampathi, 2010), consumers' use of and trust in information sources about fish (Pieniak *et al.*, 2007b), consumers' fish quality perception (Verbeke *et al.*, 2007b), fish purchasing and consumption involvement, fish safety and nutritional value, factors determining fish consumption and fish packaging (Arvanitoyannis *et al.*, 2004), attitudinal differences toward fish consumption (Juhl and Poulsen, 2000), pricing, and sensory characteristics, the difficulty of preparation and the belief of fish being nutritious and healthy (Hanson *et al.*, 1994).

To our knowledge, no research has segmented Croatian fresh fish consumers. The objective of this paper is to identify distinct market segments in Croatia based on attitudes about fresh fish consumption.

2. Materials and methods

2.1. The survey

The survey was conducted in the period from April 1st to April 30th, 2014 using on-line survey (90% of respondents) and face-to-face survey (10% of respondents). Web address of the questionnaire was distributed through Facebook and LinkedIn and sent via e-mail to the appropriate subjects. For on-line survey, snowball sampling was used. For face-to-face survey we used a convenience sample. The time needed for filling the questionnaire was 5-7 minutes.

The survey consisted of 18 questions, grouped in the following areas: behaviour in fresh fish consumption, attitudes towards fresh fish, barriers to fresh fish consumption, role of media and the food industry in fresh fish consumption, importance of type of fish farming (wild fish versus farmed fish) and socio-demographic variables (gender, age, education, number of household members, number of children up to 15 years old in household, income, growing up place, place of living, residence).

Table 1 - Description of the sample.

| Sociodemographics | | N=1151 | % |
|--|-----------------------------|--------|------|
| Gender | Female | 800 | 69.5 |
| | Male | 351 | 30.5 |
| Age | 18-29 | 530 | 46.0 |
| | 30-45 | 449 | 39.0 |
| | 46-60 | 140 | 12.2 |
| | + 60 | 32 | 2.8 |
| Education | Elementary school | 11 | 1.0 |
| | High school | 259 | 22.5 |
| | University | 558 | 48.5 |
| | Master and/or PhD | 323 | 28.1 |
| Number of household members | 1 | 49 | 4.3 |
| | 2 | 226 | 19.6 |
| | 3-5 | 794 | 69.0 |
| | >5 | 82 | 7.1 |
| Number of children up to 15 years old in household | 0 | 763 | 66.3 |
| | 1 | 203 | 17.6 |
| | 2 | 141 | 12.3 |
| | ≥ 3 | 44 | 3.8 |
| Income | Very low | 22 | 1.9 |
| | Low/ | 101 | 8.8 |
| | Medium/ | 819 | 71.2 |
| | High | 182 | 15.8 |
| | Really high | 27 | 2.3 |
| Growing up place | Continental Croatia | 725 | 63.0 |
| | Coastal Croatia | 369 | 32.1 |
| | I didn't grow up in Croatia | 57 | 5.0 |
| Place of living | Continental Croatia | 820 | 71.2 |
| | Coastal Croatia | 316 | 27.5 |
| | I don't live in Croatia | 15 | 1.3 |
| Residence | City | 937 | 81.4 |
| | Village | 214 | 18.6 |

Source: Survey.

Respondents' attitudes towards fresh fish were collected by means of 9 items taken from Verbeke and Vackier (2005) and Bredahl and Grunert (1995). Respondents had to express their agreement on statements on a five-point Likert scale that ranged from (1) – completely disagree to (5) – completely agree. Role of media and the food industry in fresh fish consumption were collected by means of 2 items taken from the research Verbeke and Vackier (2005) while barriers to fresh fish consumption were collected by means of 6 items taken from Birch and Lawley (2012) and Verbeke *et al.* (2007).

2.2. Sample characteristics

The study included 1986 respondents. However, 483 respondents were excluded from further analysis because of incomplete questionnaires, while 352 respondents do not consume fresh fish. Respondents who did not consume fresh fish were excluded from further survey (first question was a filter question – “Do you consume fresh fish?”). Only fresh fish consumers were included in the survey. Final data analysis was conducted on a sample of 1151 fresh fish

consumers. The sample characteristics are presented in Table 1. From the total number of respondents, 69.5% are female. Although the sample was heterogeneous according to sociodemographic characteristics, female respondents younger than 45 years, well educated, with middle income and residence in urban and Continental Croatia predominate in the sample.

2.3. Data analyses

The gathered data was coded and entered in the program package SPSS (Statistical Package for Social Science, version 17.0). For the analysis of the respondents' response frequency, we used the univariate analysis (frequencies). To measure the attitudes of the respondents we calculated the mean value of nine items (see Tomić *et al.*, 2016).

Respondents' attitudes towards fresh fish were used as a base for market segmentation. Segmentation was made by use of factor and cluster analyses. Principal component method was performed on chosen 9 variables. The Varimax rotation procedure was performed to ease the interpretation of each factor.

Factor scores of attitude variables were used to cluster respondents into market segments. Obtained consumer segments were further described using socio-demographic characteristics of respondents and consumers behaviour in the consumption of fresh food, attitudes towards fresh fish, role of media and food industry in fresh fish consumption so as

barriers to fresh fish consumption and importance of type of fish farming (wild fish versus farmed fish). The differences between segments were examined using comparative analyses (Chi-square test, analysis of variance - ANOVA).

3. Results

3.1. Behaviour in the consumption of fresh fish

At the beginning of the survey, behaviour in the consumption of fresh fish was determined. About one third (37.8%) of respondents have consumed fresh fish 2-3 times in the last month. Only 10.5% of respondents have consumed fresh fish more than 6 times during that period. Although the survey included only respondents who consume fresh fish (that was first, filter question) as much as 8.5% of them did not consume fresh fish in the last one month (Table 2).

In the last month respondents have consumed more often fresh marine fish (64%) compared to fresh freshwater fish (12%). About one-fourth of respondents (24%) have consumed in the last month both types of fresh fish, fresh marine fish and fresh freshwater fish.

Table 2 - The frequency of consumption of fresh fish in the last month (N= 1151).

| How many times did you eat fresh fish in the last month? | N | % |
|--|-----|------|
| 1 time | 239 | 20.8 |
| 2-3 times | 435 | 37.8 |
| 4-5 times | 258 | 22.4 |
| 6-7 times | 51 | 4.4 |
| >7 times | 70 | 6.1 |
| I didn't eat fresh fish in the last month. | 98 | 8.5 |

The most frequently consumed species of fresh fish were (in order), for marine fish: gilthead sea bream (*Sparus aurata*) (n=289), sardines (*Sardina pilchardus*) (n=280), European hake (*Merluccius merluccius*) (n=232), European sea bass (*Dicentrarchus labrax*) (n=218) and Atlantic bluefin tuna (*Thunnus thynnus*) (n=48) and for freshwater fish: rainbow trout (*Oncorhynchus mykiss*) (n=205), common carp (*Cyprinus carpio*) (n=106), European catfish (*Silurus glanis*) (n=56), pike (*Esox lucius*) (n=19) and pike-perch (*Sander lucioperca*) (n=14).

Table 3 - Factor 1 results.

| Factor 1 - Positive attitudes towards fresh fish | Factor loading | Variance explained/ |
|--|----------------|---------------------|
| I like to eat fresh fish. | 0.799 | 44.54% |
| Eating fresh fish is healthy. | 0.723 | |
| I feel good after eating fresh fish. | 0.835 | |
| Fresh fish has a good taste. | 0.774 | |
| I am looking forward when fresh fish is on the menu / for the lunch. | 0.773 | |

Source: Survey.

Table 4 - Factor 2 results.

| Factor 2 - Barriers to fresh fish consumption | Factor loading | Variance explained |
|---|----------------|--------------------|
| Fresh fish has a complicated process of preparation for eating. | 0.633 | 16.78% |
| Searching for fish bones bothers me when eating fresh fish. | 0.815 | |
| Fresh fish smells unpleasant. | 0.663 | |
| I don't like to clean fish during meal. | 0.742 | |

Source: Survey.

Table 5 - Respondents attitudes towards fresh fish by segments.

| Item | Mean | | | | P-ANOVA |
|--|-------|-------------------|-------------------|-------------------|---------|
| | Total | Cluster 1 | Cluster 2 | Cluster 3 | |
| Eating fresh fish is healthy. | 4.78 | 4.90 ^b | 5.00 ^a | 4.35 ^c | 0.000 |
| I like to eat fresh fish. | 4.57 | 4.87 ^a | 4.89 ^a | 3.72 ^b | 0.000 |
| Fresh fish has good taste. | 4.54 | 4.80 ^a | 4.81 ^a | 3.78 ^b | 0.000 |
| I feel good after eating fresh fish. | 4.40 | 4.64 ^b | 4.84 ^a | 3.53 ^c | 0.000 |
| I am looking forward when the fresh fish is on the menu / for the lunch. | 4.28 | 4.66 ^a | 4.62 ^a | 3.24 ^b | 0.000 |
| Searching for fish bones bothers me when eating fresh fish. | 2.97 | 2.06 ^b | 3.77 ^a | 3.91 ^a | 0.000 |
| Fresh fish has a complicated process of preparation for eating. | 2.42 | 1.86 ^c | 3.12 ^a | 2.81 ^b | 0.000 |
| Fresh fish smells unpleasant. | 2.38 | 1.80 ^b | 2.98 ^a | 2.92 ^a | 0.000 |
| I don't like to clean fish during meal. | 2.37 | 1.58 ^c | 2.87 ^b | 3.38 ^a | 0.000 |

^{a,b,c} – LSD test, Values in the same row with different superscript are significantly different (p<0.05)

*1 – completely disagree...5 – completely agree

Source: Survey.

3.2. Consumer segmentation

3.2.1. Factor analysis

The factor analysis using principal components with the 9 items resulted in two factors, which explain 61.32% of the variation in the data. The first factor summarizes five variables related to the *positive attitudes towards fresh fish* and explains 44.54% of the variance. This factor corresponds with taste and healthiness of the fish, good feeling after fish consumption and positive emotions about fish consumption.

The second factor “*Barriers to fresh fish consumption*” describes perceived barriers to greater consumption of fresh fish. It explains 16.78% of the variance. The second factor includes the items that refer to the fish bones, unpleasant smell of the fish, complicated process of fish preparation and unwillingness of fish cleaning.

3.2.2. Cluster analysis and description of obtained segments

Hierarchical Cluster analysis using Ward's aggregation method and Euclidian distance was created to verify the existence of homogeneous groups of fresh fish consumers with different attitudes toward fresh fish. Three clusters were identified based on two previously described factors.

The F-values showed that first and second clusters are completely homogenous while values of first factor is more scattered in the third cluster compared to the whole sample. Discriminant analyses showed that factors significantly influence cluster membership.

Obtained market segments were named and interpreted using original variables (attitudes towards fresh fish) entered into factor analyses (Table 3 and Table 4), behaviour in fresh fish consumption, barriers to fresh fish consumption, role of the media and the food industry in fresh fish consumption, importance of type of fish farming (wild fish versus farmed fish) and socio-demographics (gender, age, number of household members, number of children up to 15 years old, growing up place, place of living, residence).

Attitudes about fresh fish, barriers to fresh fish consumption, role of the food industry in fresh fish consumption as well as individual socio-demographic characteristics have shown to vary considerably among Croatian fresh fish consumers. Using attitudes about fresh fish for market segmentation purposes through cluster analysis reveals three clusters, which

Table 6 - Role of media and food industry in fresh fish consumption by segments.

| Item | Mean | | | P-ANOVA | |
|--|-------|-------------------|-------------------|-------------------|-------|
| | Total | Cluster 1 | Cluster 2 | | |
| The media encourage me to eat fresh fish. | 2.99 | 2.90 ^b | 3.04 ^a | 3.09 ^a | >0.05 |
| Food industry encourages me to eat fresh fish. | 2.45 | 2.30 ^b | 2.55 ^a | 2.65 ^a | 0.000 |

^{a,b,c} – LSD test, Values in the same row with different superscript are significantly different (p<0.05)
*1 – completely disagree...5 – completely agree
Source: Survey.

Table 7 - Barriers to fresh fish consumption.

| Item | Mean | | | P-ANOVA | |
|---|-------|-------------------|-------------------|-------------------|-------|
| | Total | Cluster 1 | Cluster 2 | | |
| I find it hard to evaluate the quality and freshness of the fish. | 2.91 | 2.56 ^a | 3.24 ^b | 3.26 ^b | 0.000 |
| Lack of time to prepare fresh fish disables me to eat fish as much as I want. | 2.89 | 2.63 ^c | 3.26 ^a | 3.04 ^b | 0.000 |
| When buying fresh fish there is a strong possibility of wrong selection. | 3.30 | 3.14 ^b | 3.47 ^a | 3.46 ^a | 0.000 |
| When I am buying fresh fish I never know if I made a good choice. | 2.78 | 2.46 ^b | 3.02 ^a | 3.16 ^a | 0.000 |
| I know how to clean the fresh fish. | 3.36 | 3.64 ^a | 3.20 ^b | 2.96 ^c | 0.000 |
| I know how to prepare various dishes with fresh fish. | 3.21 | 3.54 ^a | 3.04 ^b | 2.74 ^c | 0.000 |

^{a,b,c} – LSD test Values in the same row with different superscript are significantly different (p<0.05)
*1 – completely disagree...5 – completely agree
Source: Survey.

Table 8 - Differences between segments regarding type of fish farming ("wildfish" versus farmed fish).

| Item | Mean | | | P-ANOVA | |
|--|-------|-------------------|-------------------|-------------------|-------|
| | Total | Cluster 1 | Cluster 2 | | |
| When buying fresh fish I consider the purchase of species that are not farmed. | 3,02 | 3,09 ^a | 2,97 ^a | 2,93 ^b | 0.000 |
| When consuming fish I don't realize the taste difference between caught and farmed fish. | 2,95 | 2,78 ^a | 3,04 ^b | 3,21 ^b | 0.000 |

^{a,b,c} – LSD test Values in the same row with different superscript are significantly different (p<0.05)
*1 – completely disagree...5 – completely agree
Source: Survey.

gives us a more complete picture about fresh fish consumers in Croatia.

The three identified market segments were named and characterized as:

Cluster 1: The 'Fresh Fish Lovers'

Almost half of the research respondents are Fresh Fish Lovers and most of them are 30 – 45 years old. Also, this segment has the highest proportion of older respondents (>45 years) and respondents from Coastal Croatia (32.7%) that have grown up in that part of the country. Also, this consumer segment stated city as their resident place at the highest proportion.

Fresh Fish Lovers have consumed fresh fish in the last month more often compared to other segments. During the last month, they mostly choose fresh marine water fish (64.3%).

They consider eating fresh fish is healthy (mean 4.90) and they like to eat fresh fish (mean 4.87). Also they expressed that fresh fish has a good taste (mean 4.80).

Fresh fish Lovers have no barriers in the consumption of fresh fish. They consider that media and food industry doesn't encourage them to eat fresh fish. They don't agree with the statement "When consuming fish I don't realize the taste difference between caught and farmed fish", so we can conclude that they matter about type of fish farming because it has influence on taste. Respondents from this segment have the highest level of knowledge about cleaning fresh fish and preparing dishes with fresh fish.

Cluster 2: The 'Supporters of eating fresh fish'

Supporters of eating fresh fish are the smallest segment comprising 24.5% of all respondents. More than half of the respondents from this segment are in the age group 18-29 years (52.2%), have middle income, live in Continental Croatia (70.1%) and have grown up in Continental area (63.1%). Most respondents from this segment live in the urban part of Croatia.

Although they have consumed fresh fish often during the last month it is less compared to fresh fish lovers. They also consumed mostly fresh marine fish (63%).

Supporters of eating fresh fish have very positive attitudes about fresh fish consumption. They consider eating fresh fish as healthy (mean 5.00) and they like to eat fresh fish (mean 4.89). For them fresh fish has good taste (mean 4.81) but bones in fresh fish bothers them.

Respondents from this segment find it hard to evaluate the quality and freshness of the fish (mean 3.24) and they consider there is a strong possibility of wrong selection when buying fresh fish (mean 3.47). They have a neutral opinion about the role of media in promoting consumption of fresh fish (mean 3.10).

Respondents from this segment have medium level of knowledge about cleaning fresh fish and preparing dishes with fresh fish.

Cluster 3: The 'Occasional consumers of fresh fish'

This segment comprises 26.2% of all respondents. Almost 60% of the respondents from this cluster are below 30 years old (58.8%). Compared to other two segments, consumers in this segment have the highest proportion of re-

Table 9 - Differences between segments regarding socio-demographics and frequency of fresh fish consumption.

| Item | | Mean | | | | P-Chi square test |
|---|---|-------|-----------|-----------|-----------|-------------------|
| | | Total | Cluster 1 | Cluster 2 | Cluster 3 | |
| Gender | Male | 29.8% | 29.9% | 26.3% | 33.5% | >0.05 |
| | Female | 70.2% | 70.1% | 73.7% | 66.5% | |
| Age (Years) | 18-29 | 46.0% | 39.5% | 52.2% | 58.8% | <0.05 |
| | 30-45 | 39.0% | 43.9% | 35.3% | 33.5% | |
| | 46-60 | 12.2% | 14.3% | 10.6% | 6.6% | |
| | 60+ | 2.8% | 2.3% | 2.0% | 1.1% | |
| Income | Very low | 1.9% | 1.8% | 1.6% | 1.1% | <0.01 |
| | Low | 8.8% | 6.4% | 7.5% | 12.9% | |
| | Medium | 71.2% | 71.7% | 69.8% | 72.4% | |
| | High | 15.8% | 17.4% | 18.4% | 11.4% | |
| | Really high | 2.3% | 2.7% | 2.7% | 2.2% | |
| Number of household members | 1 | 4.3% | 4.5% | 5.1% | 2.6% | >0.05 |
| | 2 | 19.6% | 23.0% | 16.9% | 18.0% | |
| | 3-5 | 69.0% | 66.2% | 71.0% | 71.7% | |
| | >5 | 7.1% | 5.9% | 7.1% | 7.7% | |
| Number of children younger than 15 years in household | 0 | 66.6% | 66.4% | 65.9% | 66.9% | >0.05 |
| | 1 | 16.4% | 18.4% | 18.8% | 16.5% | |
| | 2 | 10.9% | 12.5% | 11.8% | 11.8% | |
| | 3 | 2.6% | 2.3% | 2.7% | 4.0% | |
| | >3 | 0.5% | 0.4% | 0.8% | 0.7% | |
| Education | Elementary school | 1% | 0.6% | 0.4% | 0.7% | >0.05 |
| | High school | 22.5% | 17.8% | 20.8% | 22.8% | |
| | University | 48.5% | 48.4% | 51.0% | 49.3% | |
| | Master and/or PhD/ | 28.1% | 33.2% | 27.8% | 27.2% | |
| Place of living | Continental Croatia | 71.2% | 67.3% | 70.1% | 75.8% | <0.05 |
| | Coastal Croatia | 28.8% | 32.7% | 29.9% | 24.2% | |
| Growing up place | Continental Croatia | 63.0% | 56.3% | 63.1% | 68.0% | <0.05 |
| | Coastal Croatia | 32.0% | 38.7% | 32.5% | 27.2% | |
| | I didn't grow up in Croatia | 5.0% | 5.1% | 4.3% | 4.8% | |
| Residence | City | | 84.4% | 75.7% | 79.8% | <0.01 |
| | Village | | 15.6% | 24.3% | 20.2% | |
| How often did you eat fresh fish in the last one month? | I didn't eat fresh fish in the last one month | 8.8% | 5.3% | 7.8% | 16.2% | <0.01 |
| | once | 21.2% | 15.8% | 23.9% | 28.7% | |
| | 2-3 times | 36.5% | 35.7% | 35.7% | 38.6% | |
| | 4-5 times | 22.6% | 26.2% | 25.9% | 12.9% | |
| | 6-7 times | 4.6% | 7.0% | 2.7% | 1.8% | |
| >7 times | 3.9% | 1.8% | 6.4% | 10.0% | | |
| What type of fish did you eat in last month? | Freshwater fish | 13.5% | 9.7% | 14.7% | 12.8% | >0.05 |
| | Marine fish | 64.8% | 64.3% | 63.0% | 67.8% | |
| | both | 22.3% | 27.3% | 17.5% | 22.4% | |

Source: Survey.

spondents from Continental Croatia (75.8% of them lives in Continental Croatia while 68% have grown up in Continental area).

Respondents in this segment have rarely consumed fresh fish in the last month. Even 28.7% of them have consumed fresh fish in the last month only once, while 16.2% did not consume any fresh fish during that period. As in previous segments consumption of fresh marine fish was dominated (67.8%).

Despite the low frequency of fresh fish consumption Occasional consumers of fresh fish consider that consumption of fresh fish is healthy (mean 4.35). Generally, they have

positive attitudes about fresh fish but not as positive as respondents from first and second cluster ($p < 0,01$).

They interfere with barriers to fresh fish consumption (When buying fresh fish, there is a strong possibility of wrong selection – mean 3.46, I find it difficult to evaluate the quality and freshness of the fish – mean 3.26).

Occasional consumers of fresh fish have neutral attitudes about the role of media in promoting consumption of fresh fish. Respondents from this segment have the lowest level of knowledge about cleaning fresh fish and preparing dishes with fresh fish.

4. Conclusions

Like in most of the Mediterranean countries, in Croatia people tend towards fresh fish consumption. In comparison to Greek consumers, who mostly eat fish 4 times per month and more than one third (35.5%) of the respondents eat fish 8 times and more per month (Arvanitoyannis *et al.* 2004), consumption of Croatian consumers of fresh fish is relatively low.

Three segments were identified in this research. The segments of Fresh fish lovers and Supporters of eating fresh fish showed a very similar profile in terms of attitudinal variables toward eating fish but significant discrepancy for these two segments was found in fish preparation, sensory liking and cooking. This may reflect that 'Supporters' intend to eat even more fish but when it comes to the stage of preparing fish, their behaviour comes to the fore. These results are consistent with the studies conducted in Italy, Denmark, Norway, Iceland, Belgium and Spain which revealed that although participants wanted to consume fish more frequently most of them were concerned with the time and effort required in fish preparation (Altintzoglou *et al.*, 2010; Cosmina *et al.*, 2012). Furthermore, several studies agreed that the 'perceived inconvenience' of fresh fish is higher in younger rather than in older people (Myrland *et al.*, 2000; Olsen, 2003; Birch and Lawley, 2012; Neale *et al.*, 2012) which corresponds with youngest 'Occasional' segment of fresh fish consumers in the present study.

Birch and Lawley (2012) in their research of understanding barriers for purchasing seafood across consumption segments indicated that their segment of "Lighter" fish consumers were more likely to perceive functional risk associated with being less informed and less familiar with fish, experience more difficulties with selecting fish and recognising if fish is fresh.

These results correspond with the "Supporters" and Occasional fresh fish consumers at the present study and their

barrier to fresh fish consumption where higher possibility of wrong selection of fresh fish exists. Often, due to the lack of extrinsic cues and/or trust in the information provided on the product, many consumers can shift their choices towards other less risky forms of preserved fish (Pieniak *et al.*, 2007b; Verbeke *et al.*, 2007b).

The socio-demographic profile of Occasional consumers indicates that a substantial percentage are probably students or young graduates (based on their educational level), who cohabit or depend upon their parents, a social pattern that is common in the typical Croatian household. They are inexperienced with decision-making, fresh fish consumption and preparation. They may consume fish because it is a decision taken by their parents rather than themselves.

Compared with other two segments, Fresh fish lovers segment is consisting of older consumers with no barriers regarding sensory characteristics of fresh fish. Olsen (2003) found a significant positive direct relationship between age and seafood consumption frequency in Norway. Age also had a significant indirect impact on seafood consumption frequency through attitude. Based on other samples of Norwegian consumers, Myrland *et al.* (2000) reported that seafood consumption increased with increasing age. Myrland *et al.* (2000) also reported that older individuals were more experienced and thus had less difficulty in preparing seafood. Furthermore, older people apparently found the smell of seafood to be less of a barrier to seafood consumption which corresponds with the present study.

Although Fresh Fish Lovers consist of highest proportion consumers situated in coastal part of the country and, also, Croatian fish industry is mainly situated in coastal regions, food industry, in general, does not encourage Fresh Fish Lovers to eat fresh fish. This is in accordance with Verbeke and Vackier (2005) who indicated that influences from the external environment (government, food industry, and advertising) are much less prominent in consumers' fish consumption decisions. According to results, Supporters and Occasional Consumers are influenced by food industry advertisement which may encourage them to eat more fresh fish.

Efforts to increase fish consumption of a whole population have resulted in some success. Increased emphasis on fish consumption in dietary recommendations in the United States resulted in increased consumption for 15% in 5 years (thereafter) (Simopoulos, 1991). However, it may be more effective to approach different groups of people using means adjusted to each group (Buttriss *et al.*, 2004). A 'one size fits all' approach does not seem to be particularly effective; tailored approaches have been more successful, and different approaches seem to suit different population groups and different aspects of diet, for example fruit intake vs. fat consumption. Covert approaches (e.g. a gradual unannounced stepwise reduction in the salt or fat content of a product or dish) or interventions in primary care may be more effective at tackling the more complex issues (e.g. fat and salt reduction).

Novel approaches such as computer-delivered (Internet and multimedia) information has (have) been successful in other countries and may be a way of reaching children and young adults in the UK, whereas supermarket-based interventions may be more effective at reaching women than men; restaurant-based interventions are more likely to reach higher income groups who eat out frequently; and peer-led interventions may be successful for school children or for disadvantaged or 'hard-to-reach' groups (Buttriss *et al.*, 2004).

Fresh fish market segmentation is especially valuable with regard to identifying market opportunities and formulating marketing strategies. Considering the results of market segmentation of Croatian fresh fish consumers, conduction of promotional activities regarding raising awareness about the importance of eating fresh fish is advisable. Education of consumers on fresh fish preparation is necessary (i.e. wide variety of cooking shows, cooking schools and quick and delicious fish recipes). In addition to this, consumers could learn about the existence and handling of tools for cleaning and preparing fish. To encourage consumption of fresh fish with Supporters and Occasional consumers it's considered necessary to increase the role of food industry in the promotion of fresh fish. As for the commercial production sector, increased supply of filleted fish would be recommended.

Whereas Fresh Fish Lovers indicated the highest frequency of fresh fish consumption in last month, Occasional Consumers have the lowest frequency of fresh fish consumption. Consumers from all three segments have eaten mostly fresh marine fish during last month.

General fresh fish consumers from all segments showed positive attitudes toward fresh fish although results showed statistical differences among segments. Consumers from all segments like to eat fresh fish but the results of Occasional Consumers segment indicate that they prefer it less, compared to other. Occasional consumers interfere with bones when they are eating fresh fish and they don't like to clean fish during meal. While Fresh Fish Lovers do not consider that food industry encourage them to eat fresh fish, Supporters and Occasional Consumers have neutral opinion. According to Occasional Consumers and Supporters of Eating of Fresh Fish there is a strong possibility of wrong selection in the purchase of fresh fish.

On the basis of significant differences between segments regarding socio-demographics variables age, income, place of living, growing up place, and residence can be used as criteria to differentiate between groups of respondents. On the other hand, gender, education, number of household members and number of children younger than 15 years in household are the least efficient segmentation variables.

The limitations of the research are the contact technique (on-line survey) and sampling procedure (convenience sample). Another limitation is that only fresh fish consumers were included in the survey. We explored differences among fresh fish consumers in attitudes about fresh

fish. It would be interesting to determine attitudes about fresh fish among non-consumers so as to make their segmentation. Also, the sample was biased in terms of younger respondents with higher education. However, younger consumers represent a powerful engine for behaviour change. In this paper we put emphasis on intrinsic attributes of fish (smell, taste, bones). Future studies should investigate influence of extrinsic fish attributes on fish consumer segmentation (price, label, origin, etc.).

Despite these facts, the results of this study offer useful information for further marketing activities, such as marketing communication strategies and product development.

Acknowledgements

The authors wish to express their acknowledgement to the Croatian Chamber of Economy and Cromaris d.d. for the financial support provided to carry out this research.

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