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## AN ANALYSIS OF CONSUMERS' SEAFOOD PURCHASING PREFERENCES IN POLAND

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**Abstract.** Seafood consumption in Poland is regularly increasing, although it still remains at a relatively low level compared to the consumption of fish and their products. The aim of the study was to obtain information on the frequency of seafood consumption and purchasing preferences among consumer groups in both a large and a small urban center, taking into account not only the place of residence, but also respondents' age and gender. The study was attended by 204 people (50 men and 154 women). A survey questionnaire verified in a pilot survey was used as a research tool. The research was carried out in a small (approx. 4,000 inhabitants) and a large (approx. 400,000 inhabitants) urban center on consumers going in and out of shops. A factor that significantly influenced all the studied characteristics and purchasing preferences was the respondents' age. The respondents' gender significantly influenced the recognition of different seafood types, the place of consumption and the motivation for purchase. The size of the place of residence was the least influential factor in the study. There is a strong need to inform Polish consumers about seafood and the possibility of its consumption.

**Key words:** questionnaire survey, purchasing preferences, seafood, *frutti di mare*

### INTRODUCTION

Seafood is a rich source of nutrients such as B vitamins, selenium, fluorine, iodine and calcium, as well as of moderate amounts of magnesium, zinc and iron (Borresen, 2008). Edible crustaceans and shellfish, known

as seafood or *frutti di mare*, are also a source of high-value protein, as well as unsaturated fatty acids from the omega-3 group, showing among others neuroprotective, cardioprotective, and anti-carcinogenic effects (Laye, 2013; Avella-Garcia and Julvez, 2014). Despite its valuable nutritional composition, the seafood consumption is controversial. The concerns stem from the health risks primarily associated with biotoxin accumulation in seafood tissues, which in human body may have paralyzing and neurotoxic effect, as well as cause gastroenteritis (Campbell et al., 2013). Today, around 65% of seafood on the global market comes from aquaculture. Aquaculture, which guarantees controllable farming conditions and, consequently, high nutritional quality of *frutti di mare* and its safe consumption by minimizing potential risks, including biotoxins. The European Union is the eighth aquaculture producer in the world in terms of its volume – 1.25 million tonnes of which 50% are molluscs and crustaceans. The most important EU aquaculture species are bivalve molluscs of which nine out of ten come from farming (Morley, 2015). A tradition of seafood consumption dates back to the 3rd century BC (Woolgar, 2010). In Poland, the oldest records of *frutti di mare* import come from the middle of the 18th century (Wróblewska, 2015). In the past 10 years, we have observed an increase in the consumption of seafood in Polish population, although the consumption is still low compared to that in the countries with traditional seafood cuisine as well as an easy access to seafood resources (Pieniak et al., 2011; Seafood Study, 2015).

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The aim of the study was to obtain information on the consumption and seafood purchasing preferences in consumer groups of a small and large urban center, taking into account the age and gender of the potential consumers. It was assessed whether the above mentioned characteristics significantly affected seafood type recognition, motivation for purchase and the choice of the place to eat in the surveyed respondent groups.

## MATERIALS AND METHODS

The survey was conducted in the first quarter of 2015 for the two urban centers. According to the demographic data for Poland, the first urban area with a population of approximately 400,000 could be assigned to a group of large urban centers. The second one being a town inhabited by about 4,000 residents could be qualified as a small urban center. The research tool was an original interview questionnaire validated in a preliminary trial. The survey consisted of two parts; the first part included the personal details (age, gender) and the second part contained a set of standard closed-type questions. Based on the personal data, the group was split into four age categories; 20–35 (28 participants), 36–50 (58 participants), 51–65 (71 participants) and over 65 (47 participants) years of age. Among the total of 204 respondents there were 154 women and 50 men. The questions to the respondents related to:

- Frequency of seafood consumption; answers on a 5-point scale (At all, Very rarely, Occasionally, Quite often, Often),
- Place of seafood consumption; the dichotomous answer (At home, Outside),
- Purchase motivation, i.e. good price, advertising, information, willingness to try, travel abroad; 5 answers on a 7-point Bolger scale (from 1 – Irrelevant to 7 – Most important),
- Purchase format (an intermediate product, ready meal, frozen, fresh).

In addition, respondents were examined in terms of the ability to identify seafood species (clams, shrimps, oysters, crawfish, lobster, squid) by indicating photos of selected seafood to give a dichotomous answer of “Yes/No”. The sampling method took into account the convenience of conducting the survey using random selection of individuals at locations where seafood purchase was possible. The statistical analysis of data obtained from the questionnaire consisted in calculating

the correlation between the independent variables (place of residence, age and gender) and dependent variables (qualitative), i.e. recognition of seafood types, motivation to buy, the choice of the place to eat and the purchase format. Determination of the degree of statistical significance of relationships between variables was performed on the basis of contingency tables and a chi-square test, each time indicating the number of degrees of freedom (*df*) and the significance level (*p*). Furthermore, to calculate strength of the relationships the Cramer's *V* coefficient was used, always assuming values in the range [0; 1] and for strong dependencies reaching a value of >0.5.

## RESULTS AND DISCUSSION

Respondents in varying degrees were able to identify the different seafood types. Clams and shrimps were the most identifiable, respectively by 18.6% and 21.6% of all the respondents (Table 1). In terms of the respondents' age, this relationship proved to be highly significant. Consumers between the age of 36–50 years to a much greater extent (7.35% and 9.31%) than older or the youngest were able to identify the seafood species. Other types of seafood were so unknown that no association with the respondents' age was demonstrated (Table 1). Poor recognition by Polish consumers of the popular around the world seafood types may be due to their low consumption in Poland and a poor tradition of *frutti di mare* cuisine. Annually, the Poles consume about 12 kg of fish and seafood per person, from which the *frutti di mare* amounts to only about ¼ kg (approx. 2%) in the daily consumption structure (Seafood Study, 2015). The highest recognition of shrimps may be related to their being the most popular seafood on the Polish market, with the 90% share in the sales structure of all the commercially available *frutti di mare* (Seafood Study, 2015). In the study conducted in Norway (Myrland et al., 2000) and Taiwan (Li et al., 2000), the opposite results of seafood type recognition were obtained, where it increased with the age of respondents. The highest recognition of the seafood types demonstrated here in the group of 36–50 years old may be associated with their fairly frequent consumption in this group. Almeida et al. (2015) demonstrates a positive relationship between the level of knowledge of seafood and the level of seafood diet diversification.

Among men and women an equal proportion of individuals declaring awareness of the various seafood types

**Table 1.** Relationship between the respondent's age and seafood type recognition

**Tabela 1.** Zależność pomiędzy wiekiem respondenta a rozpoznawalnością rodzaju owocu morza

Type Rodzaj	Recognition Rozpoznawalność	Age – Wiek				Chi <sup>2</sup> df = 3	Total Razem
		20–35	36–50	51–65	>65		
Małża Clams	Tak – Yes	9 (4.41) <sup>#</sup>	15 (7.35)	10 (4.90)	4 (1.96)	9.5 *	38 (18.6)
	Nie – No	19 (9.31)	43 (21.1)	61 (29.9)	43 (21.1)		
Krewetki Shrimps	Tak – Yes	11 (5.39)	19 (9.31)	9 (4.41)	5 (2.45)	16.1 ***	44 (21.6)
	Nie – No	17 (8.33)	39 (19.1)	62 (30.4)	42 (20.6)		
Ostrygi Oysters	Tak – Yes	2 (0.98)	1 (0.49)	0 (0.00)	0 (0.00)	4.2 <sup>ns</sup>	3 (1.47)
	Nie – No	26 (12.8)	57 (27.9)	71 (34.8)	47 (23.0)		
Kalmary Squid	Tak – Yes	4 (1.96)	2 (0.98)	1 (0.49)	0 (0.00)	5.5 <sup>ns</sup>	7 (3.43)
	Nie – No	24 (11.8)	56 (27.5)	70 (34.3)	47 (23.0)		
Langusta Crawfish	Tak – Yes	1 (0.49)	1 (0.49)	0 (0.00)	0 (0.00)	3.2 <sup>ns</sup>	2 (0.98)
	Nie – No	27 (13.2)	57 (27.9)	71 (34.8)	47 (23.0)		
Homar Lobster	Tak – Yes	2 (0.98)	2 (0.98)	0 (0.00)	0 (0.00)	4.5 <sup>ns</sup>	4 (1.96)
	Nie – No	26 (12.8)	56 (27.5)	71 (34.8)	47 (23.0)		
Chi <sup>2</sup> ; df = 5		21.7 ***	55.8 ***	36.3 ***	18.9 ***	–	123 ***
Total – Razem		28	58	71	47	–	204

Explanations: # number (%); \* significant at  $p = 0.05$ ; \*\*  $p = 0.01$ ; \*\*\*  $p = 0.001$ ; ns – insignificant  
 objaśnienia: # liczebność (%); \* istotne dla  $p = 0,05$ ; \*\*  $p = 0,01$ ; \*\*\*  $p = 0,001$ ; ns – nieistotne

was found (Table 2). However, taking into account all the seafood types, women were characterized by higher awareness of species such as clams (14.2%), shrimps (17.2%), squid (2.94%) and lobster (1.96%), while the percentage of men who were able to recognize mussels and shrimps amounted to only 4.41% (Table 2). Birch and Lawley (2012) indicate a significant effect of gender on the seafood recognition level, related to women more frequently being involved in the shopping and the culinary process, which could also explain the results of our research. The size of the urban center as the place of the respondents' residence did not affect the seafood type recognition. In both a city and a small town the proportion of consumers identifying the individual species was similar (Table 3).

However, there was an important relationship between the size of the place of residence and the seafood type recognition. Respondents from a city and a small town were able to recognize (respectively): clams (11.30% and 7.35%), shrimps (12.20% and 9.30%) and

to a much lesser extent squid (2.45% and 0.98%) and lobster (0.98% and 0.98%), while the crawfish and oysters hardly identified in a city, were unknown to a small town residents (0.98% and 0.00% and 1.50% and 0.00%, respectively), see Table 3. The size of a city of residence is indicated as a predictive factor for better recognition of products and raw food materials, including seafood (Olsen, 2003). The higher recognition of the individual seafood types by residents of a city demonstrated here could be a result of an easier access to seafood related to hypermarket and discount store chain presence on the market, which in Poland are a bottom-up factor in promoting the *frutti di mare* consumption.

The vast majority of respondents, equally residents of a city and a small town, declared that they consumed seafood occasionally (30.4%), very rarely (27.9%) or at all (29.9%). Only 7.80% declared fairly often and 3.90% – often consumption (Table 4). There was no relationship between the respondent's gender and the frequency of eating seafood. In contrast, a significant association between

**Table 2.** Relationship between the respondent's gender and seafood type recognition  
**Tabela 2.** Zależność pomiędzy płcią respondenta a rozpoznawalnością rodzaju owocu morza

Type Rodzaj	Recognition Rozpoznawalność	Gender – Płeć		Chi <sup>2</sup> df = 1	Razem Total
		female kobieta	male mężczyzna		
Małża Clams	Tak – Yes	29 (14.2)	9 (4.41)	0.00 <sup>ns</sup>	38 (18.6)
	Nie – No	125 (61.3)	41 (20.1)		
Krewetki Shrimps	Tak – Yes	35 (17.2)	9 (4.41)	0.50 <sup>ns</sup>	44 (21.6)
	Nie – No	119 (58.2)	41 (20.1)		
Ostrygi Oysters	Tak – Yes	2 (0.98)	1 (0.49)	0.10 <sup>ns</sup>	3 (1.47)
	Nie – No	152 (74.5)	49 (24.0)		
Kalmary Squid	Tak – Yes	6 (2.94)	1 (0.49)	0.40 <sup>ns</sup>	7 (3.43)
	Nie – No	148 (72.6)	49 (24.0)		
Langusta Crawfish	Tak – Yes	2 (0.98)	0 (0.0)	0.70 <sup>ns</sup>	2 (0.98)
	Nie – No	152 (74.5)	50 (24.5)		
Homar Lobster	Tak – Yes	4 (1.96)	0 (0.00)	1.3 <sup>ns</sup>	4 (1.96)
	Nie – No	150 (73.5)	50 (24.5)		
Chi <sup>2</sup> p dla df = 5		93.4 <sup>***</sup>	31.3 <sup>***</sup>	–	–
Razem – Total		154	50	–	204

Explanations – see Table 1.  
 Objasnienia – patrz tabela 1.

the age of the respondents and the frequency of seafood consumption was demonstrated. Most people declaring occasional consumption were aged 36–50 years (40%), while 42% of respondents at the age >65 declared that they did not eat *frutti di mare* at all. The largest proportion of those declaring a fairly often consumption concerned people aged 20–35 and 36–50 years (Table 4).

Many empirical studies report a relationship between the age of respondents and fish and seafood consumption. Studies conducted in Japan, Norway, the US, Taiwan (Olsen, 2003) indicate an increase in the seafood consumption with age, which is not confirmed by our findings that demonstrated a decline in the consumption frequency among groups of older people (>51 years). According to Seafood Study (2015) however, there is an opposite tendency for Polish consumers of fish and seafood, who demonstrate similar seafood consumption frequency across all the age groups. The highest popularity of sushi among Polish consumers in the age groups

of 20–29 and 30–49 years (Seafood Study, 2015) may results in the increased frequency of seafood consumption in these age groups, especially of shrimps chosen by 14% of sushi consumers (Seafood Study, 2015).

The majority of respondents reporting seafood consumption outside the home live in a city (24%), while small town residents in 95% prefer to eat at home (Fig. 1A). Men more often eat outside the home (24%) than women (12%), (Fig. 1B). However, the biggest role in choosing the place to eat seafood plays the consumers' age in relation to the size of agglomeration they live in. The percentage of people who would prefer to eat seafood outside the home is significantly higher in a city compared to a small town: in the age group 20–35 years it is 24% vs. 8%, in the age group 36–50 years – 35% vs. to 13%, and in the group 51–65 years – 19% vs. 3% (Fig. 2). The Poles relatively rarely eat meals outside the home; 1 in 3 Poles does not eat outside at all, though in 2014 the catering industry has grown by 2–3% and

**Table 3.** Relationship between the respondent's place of residence and seafood type recognition  
**Tabela 3.** Zależność pomiędzy wielkością ośrodka zamieszkania respondenta a rozpoznawalnością rodzaju owocu morza

Type Rodzaj	Recognition Rozpoznawalność	Urban center Miasto		Chi <sup>2</sup> df = 1	Total Razem
		city duże	small town małe		
Małża Clams	Tak – Yes	23 (11.3)	15 (7.35)	1.54 <sup>ns</sup>	38 (18.6)
	Nie – No	82 (40.2)	84 (41.2)		
Krewetki Shrimps	Tak – Yes	25 (12.2)	19 (9.30)	0.60 <sup>ns</sup>	44 (21.6)
	Nie – No	80 (39.2)	80 (39.2)		
Ostrygi Oysters	Tak – Yes	3 (1.50)	0 (0.00)	2.90 <sup>ns</sup>	3 (1.47)
	Nie – No	102 (50.0)	99 (48.5)		
Kalmary Squid	Tak – Yes	5 (2.45)	2 (0.98)	1.20 <sup>ns</sup>	7 (3.43)
	Nie – No	100 (49.0)	97 (47.5)		
Langusta Crawfish	Tak – Yes	2 (0.98)	0 (0.0)	1.90 <sup>ns</sup>	2 (0.98)
	Nie – No	103 (50.5)	99 (48.5)		
Homar Lobster	Tak – Yes	2 (0.98)	2 (0.98)	0.00 <sup>ns</sup>	4 (1.96)
	Nie/No	103 (50.5)	97 (47.5)		
Chi <sup>2</sup> ; df = 5		65.9 ***	59.6 ***	–	–
Razem – Total		105	99	–	204

Explanations – see Table 1.  
 Objasnienia – patrz tabela 1.

there is a prediction of further progress (Seafood Study, 2015). The report shows the high ratio of fish and seafood consumption outside the home by young Poles (20–29 years) living in a city, which our results confirm too. People over 50 years old are those to most rarely consume fish or seafood outside their homes. Myrland et al. (2000) indicates that the convenience of away-from-home seafood consumption determines young consumers to use professional catering services, which would stand in agreement with our studies.

The respondents answered the question about motivation for buying seafood. A significant effect of gender and age of the respondents was demonstrated, while the place of their residence (city/small town) had no influence. The highest motivation was found in women, for whom the product price scored 6 and information about seafood scored 5 on the 7-point scale (Fig. 3A).

In contrast, it was a travel abroad and a willingness to try that motivated men (both scores of 4 out of 7). The smallest impact for both genders had advertising (score of 1). People over 50 years old declared that price played a decisive role when buying, while younger respondents believed that both a willingness to try and travel abroad were an important motivation (score of 4), see Fig. 3B.

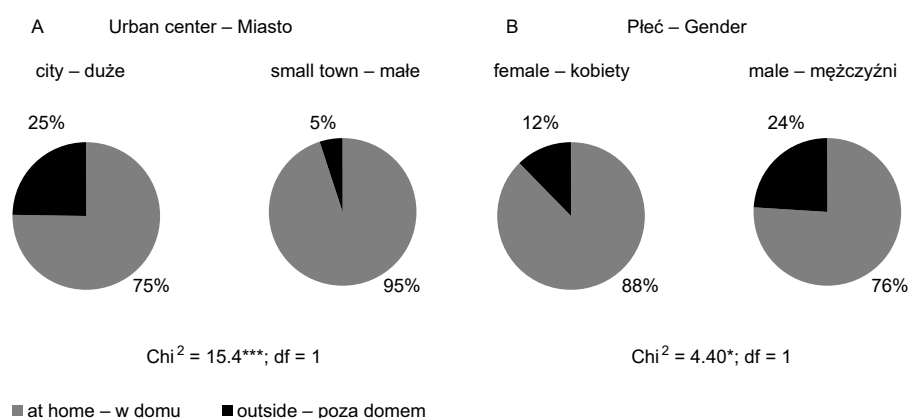
Both Birch and Lawley (2012) and Fabinyi (2016) report that economic factor is one of the key factors affecting the volume of seafood consumption, especially among women who most often plan a home budget, which also corresponds with our results. Report (Seafood Study, 2015) indicates travels abroad as a factor possibly contributing to a steady increase in the *frutti di mare* consumption in Poland. The report highlights the importance of advertising in promoting the *frutti di mare* consumption, which is not in agreement with our

**Table 4.** Frequency of seafood consumption as a function of the selected respondents' characteristics  
**Tabela 4.** Częstotliwość spożycia owoców morza w zależności od wybranych cech respondentów

Characteristics Cecha	Variant Wariant	Response – Odpowiedź					Chi <sup>2</sup> df = 4	Total Razem
		at all w ogóle	very rarely bardzo rzadko	occasionally sporadycznie	quite often dość często	often często		
Miasto Urban center	city duże	34 (16.7)	30 (14.7)	32 (15.7)	6 (2.90)	3 (1.50)	2.4 <sup>ns</sup>	105 (51.5)
	small town małe	27 (13.2)	27 (13.2)	30 (14.7)	10 (4.90)	5 (2.40)		99 (48.5)
Razem – Total		61 (29.9)	57 (27.9)	62 (30.4)	16 (7.80)	8 (3.90)		204
Płeć Gender	female kobieta	47 (23.0)	44 (21.6)	47 (23.0)	10 (4.90)	6 (2.90)	1.6 <sup>ns</sup>	154 (75.5)
	male mężczyzna	14 (6.90)	13 (6.40)	15 (7.30)	6 (2.90)	2 (0.98)		50 (24.5)
Razem – Total		61 (29.9)	57 (27.9)	62 (30.4)	16 (7.80)	8 (3.90)		204
Wiek Age	20–35	5 (2.40)	6 (2.90)	9 (4.40)	5 (2.40)	3 (1.50)	22.5 <sup>***</sup>	28 (13.7)
	36–50	12 (5.80)	14 (6.86)	23 (11.3)	6 (2.94)	3 (1.47)		58 (28.4)
	51–65	24 (11.8)	21 (10.3)	21 (10.3)	3 (1.47)	2 (0.98)		71 (34.8)
	>65	20 (9.80)	16 (7.84)	9 (4.41)	2 (0.98)	0 (0.00)		47 (23.0)
Razem – Total		61 (29.9)	57 (27.9)	62 (30.4)	16 (7.84)	8 (3.92)	–	204

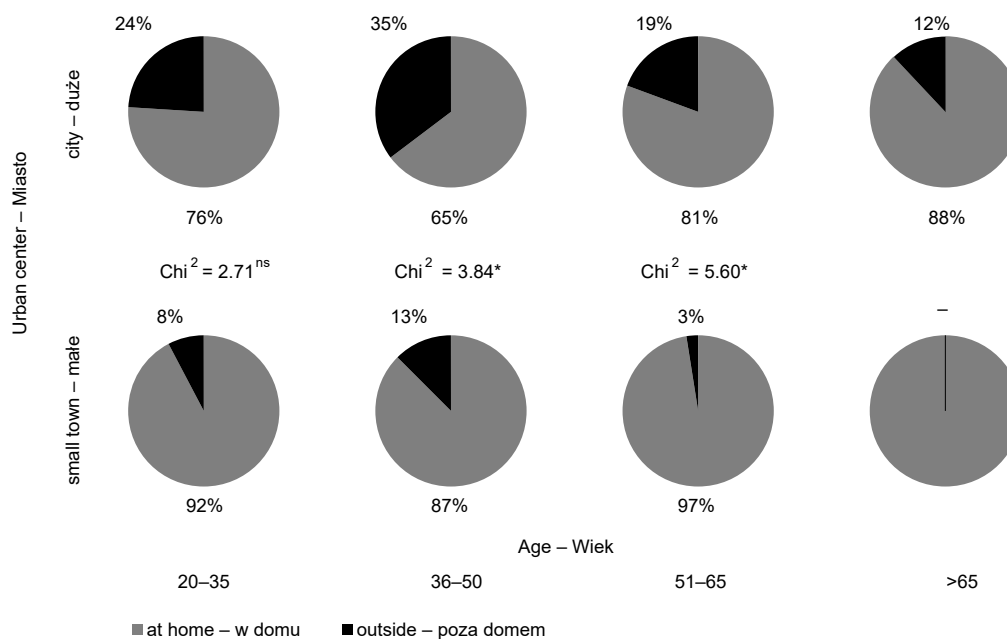
studies where consumers regardless of gender assessed the impact of advertising on the seafood purchase as score 1 (Irrelevant). In the regions of high *frutti di mare*

consumption, the culinary traditions of a family home seem to be a major factor affecting the consumption volume (Deroma et al., 2013).



**Fig. 1.** Relationship between the place of residence (A) and gender (B) of the respondents and the choice of the place to eat seafood

**Rys. 1.** Zależność pomiędzy wielkością ośrodka zamieszkania (A) oraz płcią (B) respondentów i wyborem miejsca spożywania owoców morza

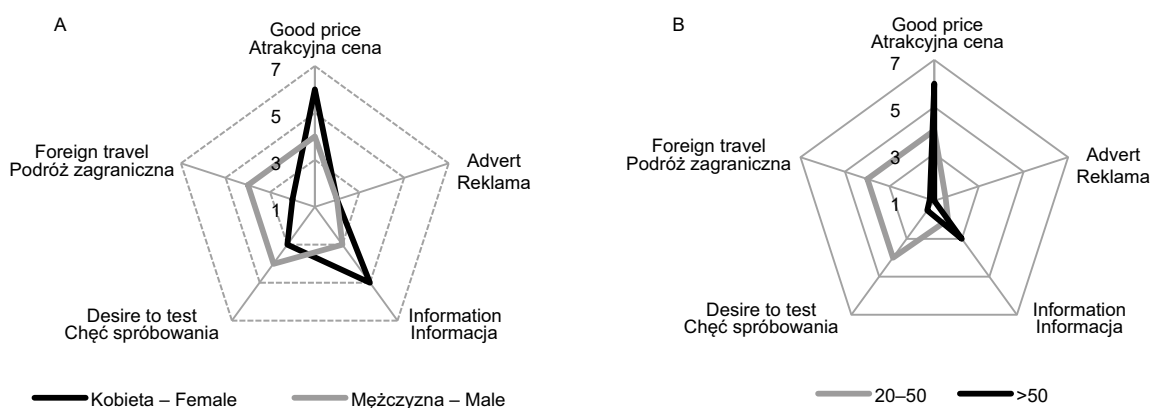


**Fig. 2.** Relationship between the place of residence and age of the respondents and the choice of place to eat seafood

Explanations: see Fig. 1.

**Rys. 2.** Zależność pomiędzy wielkością ośrodka zamieszkania respondentów a ich wiekiem i wyborem miejsca spożywania owoców morza

Objaśnienia: patrz rys. 1.



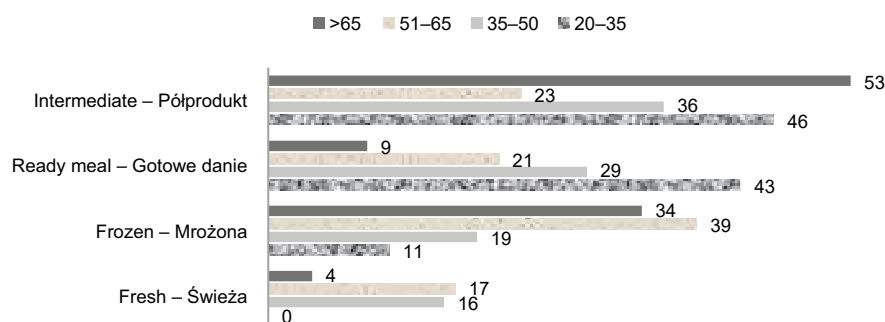
**Fig. 3.** Motivation for buying seafood depending on gender (A) and age (B) of the respondents

Explanations: Bolger scale: 1 – irrelevant, 7 – the most important.

**Rys. 3.** Motywacja respondentów do zakupu owoców morza w zależności od płci (A) i wielkości ośrodka zamieszkania (B)

Objaśnienia: skala Bolgera: 1 – bez znaczenia, 7 – największe znaczenie.





**Fig. 4.** Declaration on seafood product purchase (%) according to the age of the respondents

**Rys. 4.** Deklaracja zakupu owoców morza (%) w zależności od wieku respondentów

Consumers who declared their willingness to purchase seafood would mostly choose the intermediate products (37%), regardless of gender or place of residence and then subsequently frozen forms (28.5%), ready-made meals (23%) and the least frequently fresh products (11%). These proportions changed in relation to the respondents' age. The oldest respondents would actually buy the intermediate (53%) or frozen (34%) products. People aged 51–65 years prefer buying frozen foods (39%) and comparable proportions (17–23%) of other products. People between 36–50 years choose mostly intermediate products (36%) and ready meals (29%), allowing also for selection of fresh seafood. Finally, the youngest consumers do not declare the willingness to purchase fresh products, but intermediate products (46%) and ready meals (43%), see Fig. 4.

The greatest popularity of the intermediate seafood products and the lowest interest in fresh seafood might be associated with the need of pre-treatment of the latter and a simultaneous lack of knowledge on the *frutti di mare* cooking techniques, which was also demonstrated by Birch and Lawley (2012) and the Olsen (2003). In their studies, also the youngest consumers indicated ready-to-eat meals as the most preferred option. In our study, the fresh seafood was demonstrated as the least desirable product to buy. This is not in the agreement with the results of the report (Seafood Study, 2015) indicating, based on the conducted consumer research, the need to develop the market of fresh fish and seafood. This argument might arise from the fact that the surveyed preferences related to not only

the seafood but also the fish product formats, which according to Polish consumers lose their qualities in terms of texture and taste upon freezing. The opposite effect is reported for seafood, such as shrimps, mussels or squid (Seafood Study, 2015). The lack of differences between male and female respondents also in terms of the size of the place of their residence may suggest a similar level of culinary expertise in seafood preparation, although the studies of Birch and Lawley (2012), Cardoso et al. (2013) and Almeida et al. (2015) identify women as a group more eagerly buying the fresh seafood.

## CONCLUSIONS

1. The age of the respondents had a significant influence on all the surveyed customer characteristics and seafood purchase preferences.
2. The respondents' gender had a significant effect on the seafood type recognition, place of their consumption and motivation for purchase.
3. The size of the place of residence was the least important characteristics in the study.
4. The consumers poorly recognized the seafood types and their intake was low in general.
5. A group that was best at seafood type identification were the respondents aged 36–50 years, most often consuming *frutti di mare* and declaring also the most frequent consumption of seafood outside their homes.
6. There is a strong need to spread the knowledge of seafood and the possibility of its consumption among Polish consumers.

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## ANALIZA PREFERENCJI NABYWCZYCH KONSUMENTÓW OWOCÓW MORZA W POLSCE

**Streszczenie.** Spożycie owoców morza w Polsce regularnie wzrasta, aczkolwiek nadal jest na niskim poziomie w odniesieniu do spożycia ryb i ich przetworów. Celem niniejszej pracy było uzyskanie informacji na temat częstotliwości spożycia oraz preferencji nabywczych dotyczących owoców morza wśród grup konsumenckich dużego i małego ośrodka miejskiego, biorąc pod uwagę – oprócz wielkości miejsca zamieszkania – również wiek oraz płeć ankietowanych. W badaniu wzięły udział 204 osoby, w tym 50 mężczyzn oraz 154 kobiety. Narzędziem badawczym był autorski kwestionariusz wywiadu zweryfikowany w badaniu próbnym. Badanie przeprowadzono w małym (ok. 4 tys. mieszkańców) i dużym (ok. 400 tys. mieszkańców) ośrodku miejskim wśród konsumentów dokonujących zakupów. Wiek respondentów był czynnikiem istotnie wpływającym na wszystkie badane cechy i preferencje nabywcze. Płeć respondentów istotnie wpływała na rozpoznawalność rodzajów owoców morza, miejsce ich spożycia oraz motywacje do zakupu. Wielkość miejsca zamieszkania była najmniej istotną cechą w badaniach. Istnieje silna potrzeba popularyzacji wiedzy dotyczącej owoców morza i możliwości ich spożycia wśród polskich konsumentów.

**Słowa kluczowe:** badania ankietowe, preferencje nabywcze, owoce morza, *frutti di mare*

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