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Consumer Attitude Towards Shellfish In The Greek Market: A Pilot Study

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Abstract

During the last decade, the Greek shellfish industry has experienced significant changes affecting both the market demand and the availability of the end products. Although, shellfish and seafood in general have been promoted as healthy food by marketing boards and private seafood companies in many countries all over the world, no attention has been paid so far to analysing the Greek consumer's purchasing behaviour and attitudes towards the shellfish market. This paper presents the results of the first survey in this field of research, which was carried out in northern Greece (area of Katerini and Greater Thessaloniki) from January to March 2002. A randomly selected sample of 400 consumers filled in a questionnaire, which covered basic marketing aspects of shellfish consumption such as choice, purchase, reasons for consuming shellfish, confidence in shellfish hygiene certification, media influence, etc. Data analysis includes descriptive statistics, as well as chi-square (χ^2) tests (crosstabulation) to examine possible relations between consumers' demographic and socio-economic characteristics and shellfish marketing aspects.

Analyses of the results have shown that the majority of Greek consumers prefer the exploitable to cultured shellfish and in general do not eat shellfish often. They prefer the traditional fish shops for purchasing shellfish and consume them mainly in summer. The strongest reason to buy shellfish is their taste, while freshness is considered as the most important criterion when deciding to buy shellfish. Moreover, the vast majority of the consumers prefer a certification of quality, trust the confirmation provided by the veterinary authorities, but do not prefer ready-to-eat shellfish. Results revealed that consumers' behaviour and attitudes vary considerably according to their demographic and socio-economic characteristics. The results of this study could prove to be helpful for decision makers towards a more rational planning of production and improvement of distributing roots, which in turn would improve product quality and promote shellfish consumption.

Keywords: Greek shellfish market, Consumer survey, Preferences, Attitudes.

Introduction

The shellfish species found often in Greece are mussels (*Mytilus galloprovincialis*), warty venus (*Venus verrucosa*), horse mussels (Modiolus barbatus), donax shells (*Donax trunculus*) and flat oysters (*Ostrea edulis*). Other shellfish species are scallops (*Flexopecten glaber*), cockles (*Cerastoderma glaucum*), Noah's ark (*Arca noae*), grooved carpet shells (*Tapes decussatus*), callista (*Callista chione*) and razor shell (*Ensis minor, E. ensis* and *E. siliqua*). Mussel is the sole cultured species with significant economic results in Greece. The mussel industry has grown impressively over the last decade in Greece with the financial support of both E.U. and national funding. Attempts have been made to culture flat oysters (PNEUMATIKATOS *et al.*, 1992; ANGELIDIS & PHOTIS, 1997), but without success.

The mussel culture production rises to approximately 35,000 tn (mainly in the Thermaikos gulf) (GALINOU-MITSOUDI, 1999), 1,100 tn for warty venus (mainly in the Thermaikos gulf, Lesbos island, Stylida and Kavala), 800 tn for horse mussels (mainly in the Thermaikos gulf, which is the main fishing area), 60 tn for donax shells (mainly in Xanthi

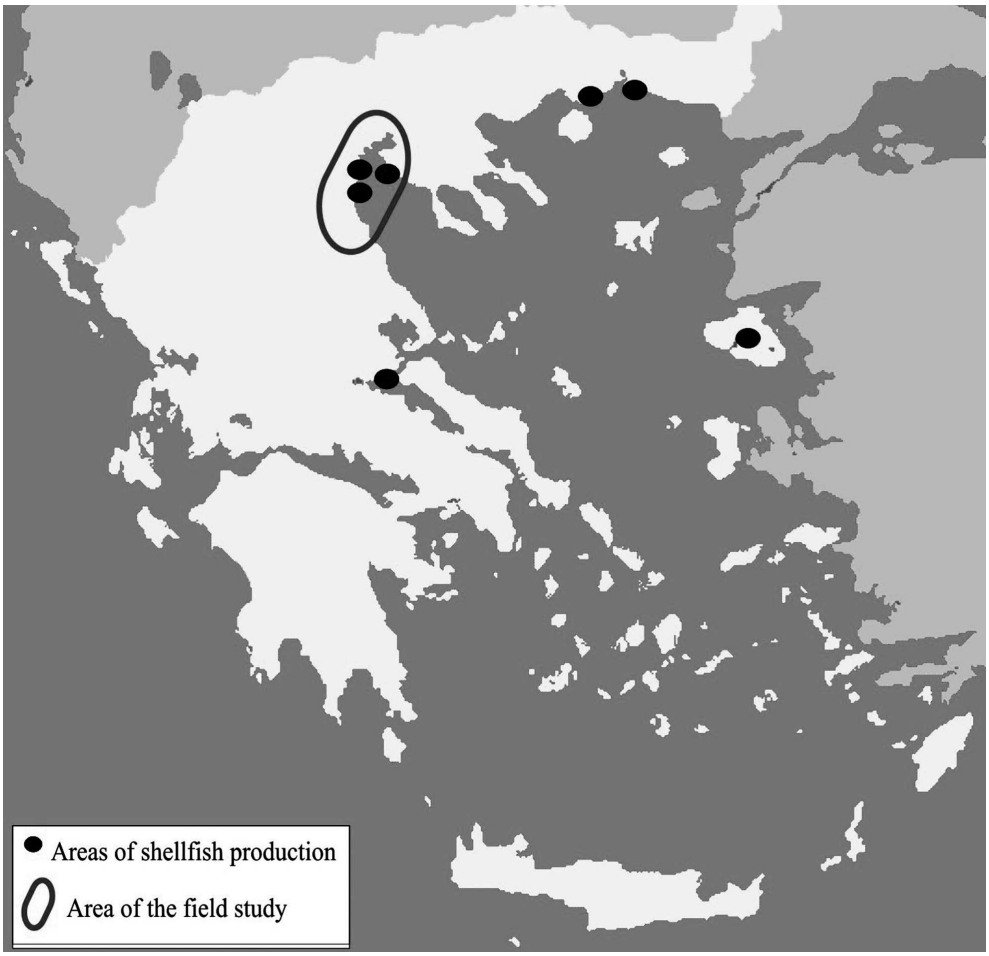

Fig. 1: Areas of shellfish production and field study region.

and Kavala) and 500 tn for flat oysters (mainly in Stylida) (Fig. 1). Ten years ago, about 1,500 tn of flat oysters used to be harvested per year in the Thermaikos gulf. This native stock gradually declined due to the presence of the marteiliosis disease (ANGELIDIS *et al.*, 2001; VIRVILIS *et al.*, 2002).

During the past three years (2000-2002), the shellfish production of the Thermaikos gulf has been faced with the problem of phycotoxins, mainly DSP (Diarrheic Shellfish Poisoning). These incidents have been occurring internationally for 15-20 years and are now recognized as Harmful Algal Blooms (HAB's) (LANDSBERG, 2002). Owing to the DSP incidents, the shellfish harvest activities in the Thermaikos gulf were stopped in spring every year, for approximately three months. Fecal bacterial contamination has been occurring in some areas as well. Since 2001, the horse mussel harvest has stopped in Thermaikos gulf because of heavy metal contamination (personal communication with the local veterinary authorities). Virus or radioisotope contamination has never been reported. The sanitary condition of shellfish production is closely monitored by the local veterinary authorities. The National Reference Laboratory is the responsible organization for the HAB's monitoring program.

With a view to protecting public health and to providing safe products of high quality to the consumers, new regulations have been imposed on shellfish production and market. Despite these regulations and the provision of better services in the Greek shellfish market, the demand for shellfish products has not increased and the per capita consumption is still low. Most of the shellfish production is exported to European markets, mainly to Italy and France. On the other hand, the traditional Greek consumer's attitude has been rapidly changing, mainly due to socio-economic changes such as the improvement of the standards of living, the great expansion of the media, the promotion of biological products, the development of the tourism industry, etc. Thus, in regard to fishery products, we notice requirements for special packing, certificate of quality, etc. (BATZIOS *et al.* 2002a).

Within this framework, the consumers play a critical role, that of the link between supply and demand, and information on their basic requirements and desires is needed to implement modern strategies for product development and marketing to meet the consumers' demands on shellfish. Although much research attention has been paid to seafood markets in other European countries, namely Spain (MANRIQUE & JENSEN, 1998), France (GIRARD *et al.* 1998; CHARLES & PAQUOTTE, 1998) and Norway (MYRLAND & *et al.* 2000), such knowledge is lacking for the Greek shellfish market. Similar studies have also been conducted for the U.S. market by CHENG & CAPPS (1988) on fresh and frozen finfish and shellfish, as well as by HANSON *et al.* (1994) on seafood.

In this paper we present a survey that was designed and undertaken to investigate the consumers' preferences and attitudes concerning basic marketing aspects of shellfish consumption. These aspects are reflected in a number of questions posed to Greek consumers in order to highlight their attitudes and preferences towards shellfish. Taking into account that this research is exploratory in nature, it focuses on the investigation of the consumers' attitudes and preferences towards shellfish and if consumers' demographic and socio-economic characteristics diversify their behaviour. This could prove to be very beneficial for a more rational organization of the distribution roots, which in turn would promote shellfish consumption in Greece.

Material and Methods

Research was undertaken through a questionnaire designed and developed to investigate the Greek consumer's attitude and preferences towards the shellfish market (BATZIOS *et al.* 2002b). Four hundred

consumers, randomly selected, filled in a questionnaire according to the following step by step procedure.

Qualitative research

Following marketing literature on consumer behaviour (MITCHELL & BRANINGEN, 2000; KAMENIDOU, 1999; GOODMAN, 1999) and in view of the exploratory nature of this research, we opted for qualitative research in order to explore and probe consumers' way of thinking about a certain subject (DE RUYTER & SCHOLL, 1998) and to generate questions which could subsequently be tested in the consumer survey. For this purpose, personal interviews with twenty- five adult consumers were conducted, one consumer from each municipality of the areas of Katerini and Greater Thessaloniki (northern Greece). Consumers were selected employing the judgemental sampling method, both in order to vary in their demographic and socio-economic characteristics and since for qualitative research it is not necessary to use a random sampling method (NICKEL *et al.* 1995).

Field research

In the light of the above objective, a structured questionnaire was prepared, based on the findings of the qualitative research and related literature (HONKANEN *et al.* 1998; MYRLAND & *et al.* 2000). As the sample would be drawn on a random basis, the questionnaire was simple and consisted of twenty-one questions divided into two sections. The first section consisted of seventeen questions, covering consumers' preferences and attitudes towards various shellfish marketing aspects such as awareness of shellfish species, frequency and quantity of shellfish purchased at a time, points of purchase, season of shellfish consumption, etc. Special attention was given to criteria of participants' choice (size of the shellfish species, price, freshness, appearance of the shell, hygienic conditions of the fish shop, shellfish packaging and shellfish sea of origin) and their importance when buying shellfish. Furthermore, trends concerning shellfish such as frequency of consumption according to preferred species, certification of shellfish quality and sea of origin, ready-to-eat shellfish etc., have been recorded. Questions also covered aspects such as the influence of the media, reasons for consuming shellfish, frequency of shellfish consumption out of the home, as well as confidence in the competent veterinary authorities regarding the confirmation of shellfish hygiene and safety to the consumer. The second section collected general information regarding four demographic and socio-economic characteristics of consumers, namely householder's age, net monthly family disposable income, educational level and place of residence (HONKANEN *et al.* 1998).

At first, two specialists in the area of shellfish retailing examined the first draft of the questionnaire, in order to obtain content validity. The questionnaire was then pre-tested on a sample of fourteen respondents selected by convenience in order to obtain face validity (BLACK, 1999). They were timed and their opinions about the questions were taken into account, to make the questionnaire more functional. After making the necessary modifications, a field research was undertaken in Greater Thessaloniki (twelve municipalities; 307,875 households) and the area of Katerini (thirteen municipalities; 32,966 households), since this is the area where the shellfish are mainly produced and distributed (Fig. 1). The research was carried out over a ten-week period, from January to March 2002. Field data was collected employing personal interviews. The only sampling frame available was the population (NSSG, 2001: CENSUS 1991) and a map with the streets and building blocks of Greater Thessaloniki and Katerini. Sampling was employed in two phases (PETRIDIS, 1997). In the first phase the stratified sampling method with proportional allocation was employed, where each municipality comprised

a cluster. In the second phase the three-stage random cluster sampling method was employed, as practised by KAMENIDOU (1999) and KAMENIDOU *et al.* (2002) for the same area, with sample unit one adult per family, namely the one making the purchasing decisions. Due to economic constraints, combined with the lack of recently informed sampling frames, the sampling method employed was the most applicable. Four hundred (N=400) valid questionnaires were collected by this method. This sample size is considered efficient for generalizations of percentages from the sample to the corresponding population with a standard error of 5% and a level of confidence of 95% (STATHAKOPOULOS, 1997; NARINS, 1997), as well as for the statistical analysis performed (LEHMANN *et al.* 1998).

Data analysis

Descriptive statistics were used for the statistical analysis of the field data. Data was further statistically analyzed addressing variables of respondent's demographic (place of residence and age) and socio-economic (net monthly family disposable income and educational level) status. Regarding the respondent's place of residence, data was split into urban (Greater Thessaloniki), semi-urban (Greater Katerini) and rural (the rest of the Katerini area) areas of residence. With respect to the householder's age, data was split into four groups: a) ≤35, b) 36-50, c) 51-65 and d) >65 years old. Furthermore, according to the net monthly family disposable income level (converted from Greek drachmas) data was split into five groups: a) ≤1027 €, b) 1028-1320 €, c) 1321-1760 €, d) 1761-2348 € and e) >2348 €. Finally, according to the householder's level of education data was split into elementary, secondary and higher levels of education. Chi-square (χ^2) procedure was used and a number of statistical tests of independence were performed to examine the possible relation between each of the above-mentioned characteristics of respondent's demographic and socio-economic status with the questions on the consumer's preferences and attitudes towards shellfish (BATZIOS, 1999; ZAR, 1999; BATZIOS *et al.*, 2002b). Furthermore, in case of significance, the Adjusted Standardized Residuals in the crosstabulation tables were carefully examined to detect departures from independence (NORUSIS, 1999). All statistical analyses were carried out using the statistical package SPSS 7.5.

Results

The analysis of the data collected shows quite a good distribution of the respondents regarding their demographic and socio-economic dispersion (age, place of residence, education and income). With respect to the place of residence, 75.5% (n=302) of the respondents live in urban areas, 9.3% (n=37) in semi-urban, while the remaining 15.2% (n=61) live in rural areas. Furthermore, one third (33.0%, n=133) of the total respondents originate from families with the householder's age being less than 36 years old, 44.7% (n=179) between 36 to 50 years old, 17.1% (n=68) between 51 to 65 years old and 5.2% (n=20) being more than 65 years old. Regarding the income level, one fourth (24%, n=96) of the respondents have an income of less than € 1028, 22% (n=88) from € 1028 to 1320, 22% (n=88) from € 1321 to 1760, 18% (n=72) from € 1761 to 2348, while 14% (n=56) have income more than € 2348 per month. Finally, according to the householder's level of education (elementary, secondary and higher), 47% (n=188) of the respondents have a higher education, 38% (n=152) secondary education, while 15% (n=60) have an elementary level of education.

Shellfish known and tasted

The vast majority of total respondents reported they know mussels (99.5%), warty venus (58.9%) and flat oysters (78.9%). Only

Table 1
Consumer's attitude to shellfish with respect to criteria of participants' origin and socio-economic status (%).

Independent Variable	Groups	Species known: Mussels Yes	Mussels No	Mussels χ^2 test	Warty venus Yes	Warty venus No	Warty venus χ^2 test	Flat oysters Yes	Flat oysters No	Flat oysters χ^2 test	Scallops Yes	Scallops No	Scallops χ^2 test	Callista Yes	Callista No	Callista χ^2 test	Frequency of purchase: Once per week	Once per month	Once in 3 months	Occasionally	χ^2-test	Quamtity of purchase: Till 1 kg	1.5-2 kg	More 2 kg	χ^2-test
Income	1	99.0	1.0	3.4	53.1	46.9	2.4	72.4	27.6	7.3	36.7	63.3	1.5	38.8	61.2	3.1	7.5	16.1	16.1	60.2	7.2	79.1	16.5	4.4	12.2
	2	100	0.0	NS	59.5	40.5	NS	75.0	25.0	NS	44.0	56.0	NS	35.7	64.3	NS	6.1	14.6	15.9	63.4	NS	65.4	33.3	1.2	NS
	3	100	0.0		58.5	41.5		85.4	14.6		42.7	57.3		41.5	58.5		7.4	17.3	18.5	56.8		71.3	26.3	2.5	
	4	98.6	1.4		64.8	35.2		84.5	15.5		45.1	54.9		38.0	62.0		3.0	16.4	28.4	52.2		73.1	25.4	1.5	
	5	100	0.0		59.3	40.7		74.1	25.9		42.6	57.4		50.0	50.0		3.8	15.4	23.1	57.7		74.0	18.0	8.0	
Education	1	100	0.0	0.61	50.0	50.0	5.9	50.0	50.0	15.1	50.0	50.0	3.7	50.0	50.0	2.5	0.0	0.	66.7	33.3	7.1	66.7	33.3	0.0	0.4
	2	100	0.0	NS	43.4	56.6	S	58.5	41.5	S	30.2	69.8	NS	30.2	69.8	NS	7.8	21.6	11.8	58.8	NS	70.0	26.0	4.0	NS
	3	99.4	0.6		61.1	38.9		82.2	17.8		43.9	56.1		41.2	58.8		5.4	15.1	20.2	59.2		72.6	24.3	3.1	
Residence	1	99.3	0.7	1.1	62.1	37.9	5.8	79.1	20.9	0.53	45.2	54.8	5.7	39.5	60.5	0.01	6.2	14.8	21.0	58.1	3.4	76.0	21.3	2.8	12.8
	2	100	0.0	NS	54.1	45.9	S*	81.1	18.9	NS	27.0	73.0	S*	40.5	59.5	NS	5.7	14.3	14.3	65.7	NS	76.5	20.6	2.9	S
	3	100	0.0		45.9	54.1		75.4	24.6		36.1	63.9		39.3	60.7		3.4	20.7	15.5	60.3		51.8	42.9	5.4	
Age	1	99.3	0.7	3.08	56.7	43.3	4.8	80.6	19.4	1.5	45.5	54.5	1.5	4.3	56.7	3.5	7.6	19.7	18.9	53.8	12.7	72.5	23.7	3.8	5.9
	2	100	0.0	NS	61.7	38.3	NS	80.0	20.0	NS	39.4	60.6	NS	40.6	59.4	NS	3.5	11.6	20.8	64.2	NS	72.0	25.6	2.4	NS
	3	98.4	1.6		62.5	37.5		73.4	26.6		45.3	54.7		35.9	64.1		8.5	16.9	20.3	54.2		67.2	27.6	5.2	
	4	100	0.0		38.1	61.9		76.2	23.8		38.1	61.9		23.8	76.2		0.0	25.0	10.0	65.0		90.0	10.0	0.0	
Total sample	%	99.5	0.5	----	58.9	41.1	---	78.9	21.1	---	39.8	60.2	---	42.4	57.6	---	5.5	15.9	19.5	59.1	----	72.4	24.4	3.2	----
	N	399			399			399			399			399			375					369			

Notes: χ^2-test = Likelihood-ratio χ^2, S=Significant (P≤ 0.05 or * P≤ 0.10), NS=Not significant (P>0.10), N=Total sample.
Income: 1= ≤ 1027 €, 2= 1028-1320 €, 3= 1321-1760 €, 4= 1761-2348 €, 5= > 2348 € (converted from Greek Drachmas).
Education: 1= elementary education, 2= secondary education, 3= higher education. Residence: 1= Urban, 2= Semi-Urban and 3= Rural areas.
Age: 1= ≤ 35 years old, 2= 36-50 years old, 3= 51-65 years old, 4= > 65 years old.

39.8% know scallops and 42.4% callista (Table 1). The results of the breaking down of this data in parallel with the criteria of the participants' demographic (place of residence and age) and socio-economic (net monthly family disposable income and education level) status are shown in Table 1. These results reveal that there are no significant differences between consumers of different income or age levels, regarding the shellfish species they know, such as mussels, warty venus, flat oysters, scallops and callista ($P>0.10$). Consumers with higher education seem to know warty venus and flat oysters in higher percentages compared to those of lower education ($P\leq0.05$), but this is not true for mussels, scallops and callista ($P>0.10$). Warty venus and flat oysters are more common to consumers from urban than other areas ($P\leq0.10$).

The majority of the respondents (98.0%) have tasted mussels at least once, while the corresponding percentage for warty venus is 50.9%, for flat oysters 65.9%, for scallops 26.7% and for callista 33.8%. This attitude is not diversified significantly by the consumers' age, but varies significantly with respect to income or educational level, especially for flat oysters. More specifically, consumers with high income are more familiar with flat oysters. Consumers of higher education level have tasted warty venus, scallops and flat oysters in higher percentages than those of lower educational levels. Furthermore, a significantly higher percentage of the respondents living in urban areas have tasted scallops.

Regarding the remaining shellfish species mentioned above (horse mussels, donax shells, cockles, Noah's ark, grooved carpet shells and razor shells), most of the respondents declared they are not used to eating them or they do not know them at all.

Frequency and quantity of shellfish consumption

A high percentage (59.1%) of the total respondents reported low frequency of shellfish consumption and only on special occasions, while a percentage of 19.5% once per three months. Only 15.9% of the respondents consume shellfish once per month and a percentage of 5.5% consume it weekly (Table 1). The breaking down of the responses in parallel with the criteria of participant's demographic and socio-economic status does not significantly diversify this consumer profile.

The majority of the respondents (72.4%) reported shellfish consumption per family meal equal to 1 kg, whereas 24.4% prefer 1.5-2 kg and only 3.2% consume more than 2.0 kg. Differences between consumers of different age, income or educational level are not considered as significant ($P>0.10$), while for those living in rural areas there is a different behavioral pattern ($P\leq0.05$) (Table 1).

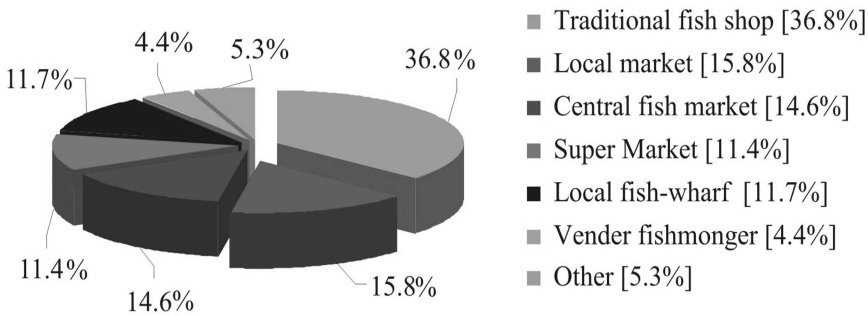

Fig. 2: Points of purchase shellfish.

Points of purchase

Approximately a third (36.8%) of the respondents buy shellfish from the traditional fish shops, whereas 15.8% prefer the local markets (Fig. 2). The most preferred point of shellfish purchase for consumers of middle or high income level and for those living in urban areas is the traditional fish shop, while the consumers from rural areas prefer the vendor fishmongers ($P \leq 0.05$). Consumers with elementary education, independently of age, show a clear preference for local markets, or central fish markets, or for local fish-wharfs for buying shellfish, ($P > 0.10$) (Table 2).

Season of shellfish consumption

A high percentage of the respondents (47.7%) prefer to consume shellfish in summer, while a relatively high percentage consume them all year round (31.8%). Only 2.3% consume shellfish in autumn, 5.5% in winter and 12.7% in spring (Table 2). The breaking down of this data in parallel with the criteria of the participant's demographic and socio-economic status indicates a non-significantly different consumer attitude ($P > 0.10$). In spite of the statistical evaluation mentioned, there is clear evidence that older consumers (>51 years old) prefer to consume shellfish all year round.

Shellfish consumption out of the home and frequency of the consumption

Almost two-thirds (65%) of the total respondents usually eat shellfish out of the home, independent of their socioeconomic status (Table 2). Almost one fourth (23.1%) of the consumers reported that they eat shellfish in restaurants during the holidays, or family outings (40.9%), or at special festivities (4.3%), or just occasionally (31.7%). This behavior seems to be independent of the income, age or place of residence, but depends on the educational level. Thus, consumers with secondary education prefer eating shellfish in restaurants and during family outings or excursions, in contrast to consumers of a higher educational level. The respondents reported that when they have their meal out of the home, in restaurants or taverns, they choose to eat shellfish 'every time'(3.8%), 'one out of two times' (4.6%), 'occasionally'(42.5%), 'seldom' (32.5%), or 'never' (16.5%).

Ready to eat shellfish

Only a very small percentage of the respondents (8.8%) reported that they would buy ready-to-eat shellfish (pre-cooked), while the majority (83.2%) expressed a clearly opposite opinion (Table 2). This seems to be independent of the place of residence, or the educational level of the consumers, while it significantly depends on the consumer's age and income level. More specifically, older consumers (>65 years old) exhibit a less negative opinion and a higher percentage of them (30.0%) would buy ready-to-eat shellfish.

Criteria and their importance in deciding shellfish purchase

The information about the importance that the respondents attribute to some criteria when they buy shellfish (i.e. size, freshness, appearance, hygienic conditions of the fish shop, shellfish packaging, price and shellfish sea of origin) is presented in Table 3. It can be noted that, the vast majority of respondents (94.3%) consider freshness as a criterion of very high importance. In addition, the hygienic condition of the fish shop is a criterion of very high importance for 67.2% of the respondents. Moreover, a high percentage of respondents consider the shellfish sea of origin (56.1%) or shellfish appearance (53.7%) as criteria of very high importance.

The statistical analysis, following the breaking down of this data in parallel with the criteria of participant's demographic and socio-economic status, indicates that the level of importance, which the respondents attribute to the above criteria, is independent of the place of residence or age. The only exception is the shellfish appearance, which is considered as a criterion of very high importance by the minority

Table 2
Consumer preferences for shellfish with respect to criteria of participants' origin and socio-economic status (%).

Independent Variable	Groups	Points of purchase								Season of consumption						Consumption out of home			Ready-to-eat shellfish			
		Traditional fish shop	Local market	Central fish market	Super markets	Local fish-wharf	Vender fishmonger	Other	χ^2-test	Spring	Summer	Autumn	Winter	All along year	χ^2 test	Yes	No	χ^2-test	Yes	No	I don't know	χ^2-test
Income	1	25.9	16.0	21.0	11.1	9.9	7.4	8.6	34.0	9.2	42.5	0.0	8.0	40.2	15.6	64.1	35.9	2.4	5.4	81.5	13.0	15.7
	2	39.7	15.1	9.6	11.0	12.3	5.5	6.8	S*	15.4	52.6	2.6	2.6	26.9	NS	66.7	33.3	NS	15.7	77.1	7.2	S
	3	36.1	19.4	15.3	4.2	15.3	4.2	5.6		13.0	50.7	4.3	5.8	26.1		59.3	40.7		4.9	86.6	8.5	
	4	41.9	16.1	12.9	11.3	12.9	3.2	1.6		15.0	48.3	3.3	3.3	30.0		66.7	33.3		4.4	92.6	2.9	
	5	46.8	12.8	12.8	21.3	6.4	0.0	0.0		13.3	40.0	2.2	8.9	35.6		71.7	28.3		11.5	82.7	5.8	
Education	1	0.0	33.3	33.3	0.0	33.3	0.0	0.0	10.5	0.0	100	0.0	0.0	0.0	9.66	25.0	75.0	2.6	25.0	50.0	25.0	6.3
	2	25.0	16.7	18.8	10.4	14.6	8.3	6.3	NS	14.6	37.5	0.0	6.3	41.7	NS	66.0	34.0	NS	16.0	74.0	10.0	NS
	3	39.0	15.8	13.7	11.6	11.0	3.8	5.1		12.5	48.6	2.7	5.4	30.7		65.2	34.8		7.5	85.0	7.5	
Residence	1	42.2	16.8	13.7	10.5	9.8	1.6	5.5	37.5	12.6	46.0	2.3	5.4	33.7	5.5	65.6	34.4	4.6	7.8	85.1	7.1	6.9
	2	29.4	8.8	20.6	17.6	17.6	2.9	2.9	S	18.2	48.5	0.0	3.0	30.3	NS	48.6	51.4	S*	5.7	77.1	17.1	NS
	3	15.4	17.3	15.4	11.5	15.4	19.2	5.8		9.4	54.7	3.8	7.5	24.5		70.2	29.8		15.8	77.2	7.0	
Age	1	36.5	18.3	11.3	14.8	7.0	5.2	7.0	21.1	12.2	50.4	3.3	3.3	30.9	13.8	66.4	33.6	1.2	9.2	79.4	11.5	15.1
	2	36.9	13.4	15.9	10.2	12.1	5.7	5.7	NS	12.0	50.6	2.5	7.6	27.2	NS	62.2	37.8	NS	7.5	87.9	4.6	S
	3	38.5	15.4	17.3	9.6	17.3	0.0	1.9		17.0	36.2	0.0	4.3	42.6		68.3	31.7		4.8	84.1	11.1	
	4	33.3	22.2	16.7	5.6	22.2	0.0	0.0		11.1	33.3	0.0	5.6	50.0		70.0	30.0		30.0	65.0	5.0	
Total sample	%	36.8	15.8	14.6	11.4	11.7	4.4	5.3	----	12.7	47.7	2.3	5.5	31.8	---	65.0	35.0	----	8.8	83.2	8.0	----
	N	335								347						376			377			

Notes: χ^2-test = Likelihood-ratio $\chi 2$, S=Significant (P≤ 0.05 or * P≤ 0.10), NS=Not significant (P>0.10), N=Total sample.
Income: 1= ≤ 1027 €, 2= 1028-1320 €, 3= 1321-1760 €, 4= 1761-2348 €, 5= > 2348 € (converted from Greek Drachmas).
Education:1= elementary education, 2= secondary education, 3= higher education. Residence: 1= Urban, 2= Semi-Urban and 3= Rural areas.
Age: 1= ≤35 years old, 2= 36-50 years old, 3= 51-65 years old, 4 = >65 years old.

of relatively young consumers (age less than 35 years old) (46.7%), in contrast to the older consumer's belief (60.6%) [$\chi^2=14.454 > \chi^2_\alpha=12.59$, df=6, $\alpha=0.05$]. Neither educational, nor income level diversifies significantly the importance given to the above criteria, with the exception of price. Price is the main criterion for consumers of elementary educational level (100.0%), in contrast to those of secondary (41.3%), or higher level of education (22.5%) [$\chi^2=13.299 > \chi^2_\alpha=9.49$, df=4, $\alpha=0.05$]. Similarly, as the level of income increases, the percentage of consumers who consider price as a criterion of very high importance decreases, thus the importance given to price greatly depends on income level (Table 4).

Criteria of shellfish freshness

With respect to freshness, most of the respondents examine shellfish odour (66.0%), or status of the shell (56.8%), or the information on the package label (55.7%). Only 28.4% of the total respondents examine water clarity inside the package as a criterion of freshness. The statistical analysis of the results reveals that this consumer attitude does not depend on the educational and income level ($P>0.10$). In contrast, consumer attitude depends on age and place of residence.

More accurately, only 10.0% of the older consumers (>65 years old) consider water clarity as a criterion of shellfish freshness, contrary to younger consumers who exhibit higher percentages (e.g., 33.3% for age group from 36 to 50 years old) [$\chi^2=7.276 > \chi^2_\alpha=5.99$, df=2, $\alpha=0.05$]. For the remaining of the freshness criteria, the consumer's viewpoint does not depend on age. Furthermore, place of residence diversifies the consumer attitude to criteria of freshness, only with respect to the status of the shell. Thus, consumers living in rural areas show a higher interest in the status

Table 3
Criteria and their importance when buying shellfish (%).

Criteria	Very important	Important	Not important
Size	17.3	51.4	31.3
Freshness	94.3	5.5	0.3
Shellfish appearance	53.7	40.9	5.5
Hygienic conditions of fish shop	67.2	29.3	3.6
Shellfish packaging	17.9	47.2	34.9
Price	25.6	53.1	21.3
Shellfish sea of origin	56.1	35.1	8.8

Table 4
Significance that consumers of different income level attribute to price when buying shellfish (%).

Income level (in Euro, converted from Greek Drachmas*)	Price of shellfish		
	Very important	Important	Not important
≤1027 €	44.4 *(4.4)*	37.0 *(-3.3)*	18.5
1028-1320 €	30.4	50.7	18.8
1321-1760 €	19.1	58.8	22.1
1761-2348 €	12.5 *(-2.5)*	66.1 *(2.2)*	21.4
>2348 €	12.2 *(-2.2)*	61.0	26.8
Test of independence: $\chi^2=27.242 > \chi^2_\alpha=15.51$, df=8, $\alpha=0.05$			

Notes: The numbers in brackets denote the adjusted standardized residuals in the crosstabulation table, used to detect departures from independence.

* The research was performed before the introduction of Euro as a single currency unit in the E.U.

Table 5
Consumer's attitude to shellfish with respect to criteria of participants' origin and socio-economic status (%).

Independent Variable		Reasons for shellfish consumption														
		Tradition			Low price			Healthy food			Nutritive content			Taste		
	Groups	Yes	No	χ^2 test	Yes	No	χ^2 test	Yes	No	χ^2 test	Yes	No	χ^2 test	Yes	No	χ^2 test
Income	1	11.2	88.8	5.16	3.4	96.6	3.54	23.6	76.4	1.40	24.7	75.3	3.83	55.1	44.9	6.00
	2	11.0	89.0	NS	1.2	98.8	NS	17.1	82.9	NS	25.6	74.4	NS	61.0	39.0	NS
	3	13.8	86.3		6.3	93.8		18.8	81.3		18.8	81.3		60.0	40.0	
	4	23.1	76.9		3.1	96.9		18.5	81.5		32.3	67.7		46.2	53.8	
	5	15.7	84.3		2.0	98.0		17.6	82.4		21.6	78.4		66.7	33.3	
Education	1	0.0	100	1.28	0.0	100.0	1.46	50.0	50.0	2.34	75.0	25.0	4.66	50.0	50.	4.33
	2	14.0	86.0	NS	6.0	94.0	NS	22.0	78.0	NS	24.0	76.0	S*	44.0	56.0	NS
	3	14.8	85.2		2.8	97.2		18.2	81.8		23.5	76.5		59.6	40.4	
Residence	1	12.2	87.8	13.02	3.5	96.5	0.50	18.1	81.9	0.79	23.0	77.0	0.90	61.0	39.0	7.79
	2	38.2	61.8	S	2.9	97.1	NS	17.6	82.4	NS	29.4	70.6	NS	38.2	61.8	S
	3	12.5	87.5		1.8	98.2		23.2	76.8		26.8	73.2		50.0	50.0	
Age	1	11.5	88.5	3.66	4.6	95.4	16.00	19.2	80.8	0.17	33.1	66.9	12.05	60.0	40.0	1.49
	2	18.5	81.5	NS	1.2	98.8	S	19.0	81.0	NS	17.9	82.1	S	58.3	41.7	NS
	3	11.9	88.1		0.0	100.0		16.9	83.1		27.1	72.9		50.8	49.2	
	4	10.0	90.0		20.0	80.0		20.0	80.0		10.0	90.0		55.0	45.0	
Total sample	%	14.6	85.4	---	3.2	96.8	---	18.8	81.2	---	24.1	75.9	---	57.6	42.4	---
	N	377			377			377			377			377		

Notes: χ^2-test = Likelihood-ratio χ^2, S=Significant (P≤ 0.05 or * P≤ 0.10), NS=Not significant (P>0.10), N=Total sample. Income: 1 = ≤ 1027 €, 2= 1028-1320 €, 3= 1321-1760 €, 4= 1761-2348 €, 5= > 2348 € (converted from Greek Drachmas). Education:1= elementary education, 2= secondary education, 3= higher education. Residence: 1= Urban, 2= Semi-Urban and 3= Rural areas. Age: 1= ≤ 35 years old, 2= 36-50 years old, 3= 51-65 years old, 4= > 65 years old.

of the shell (70.9%) than those living in urban areas (52.9%) [$\chi^2=7.73 > \chi^2_\alpha=5.99$, df=2, $\alpha=0.05$].

Reasons for shellfish consumption

The information about the reason for shellfish consumption by the consumers (i. e. tradition, taste, low cost of purchase, etc.) is shown in Table 5. The strongest reason for the Greek consumer to buy shellfish is their taste (57.6%). Consumers do not choose shellfish considering the low cost of purchase (96.8%) or tradition (85.4%) and quite a high percentage (24.1%) eat shellfish because of their nutritive content, or because they consider shellfish as healthy food (18.8%). This attitude does not seem to significantly depend on income. With respect to age, the older consumers (>65 years old) are more sensitive to cost matters (20.0%) than those of younger age (e.g. 4.6% for consumers of ≤35 years old, or 1.2% for those of 36-50 years old) [$\chi^2=16.007 > \chi^2_\alpha=7.81$, df=3, $\alpha=0.05$]. Young consumers also show a clear preference for shellfish because of their nutritive content (33.1%), contrary to older consumers (10.0%)

[$\chi^2=12.057 > \chi^2_\alpha=7.81$, df=3, $\alpha=0.05$]. Furthermore, consumers with elementary educational level choose shellfish as a healthy food (75.0%), contrary to those who have secondary (24.0%), or higher education (23.5%) [$\chi^2=4.664 > \chi^2_\alpha=4.61$, df=2, $\alpha=0.10$]. Additionally, tradition, high quality and nutritive content are criteria of very high importance for the consumers, irrespective of place of residence. In contrast, consumers from rural areas are less sensitive to shellfish taste (50.0%) than those living in urban areas (61.0%) [$\chi^2=7.790 > \chi^2_\alpha=5.99$, df=2, $\alpha=0.05$].

Frequency of shellfish purchase by species

The respondents to this question reported that when they decide to buy shellfish, they prefer mussels very often (37.7%), often (33.9%), or seldom (26.0%) (Table 6). For warty venus, the corresponding percentages are 4.6%, 15.5% and 30.7%, while 49.2% of respondents never choose them. Flat oysters are eaten by consumers very often (5.6%), or often (20.0%), while 37.4% of the total respondents never eat them at all. A high percentage of the total respondents (75.6%) never choose scallops, while only 18.3% buy them seldom and 6.1% often or very often. Furthermore, only 11.8% of the consumers prefer callista very often or often, while 19.9% buy them seldom and 68.2% never buy them at all.

Statistical analysis, following the breaking down of data in parallel with the criteria of participant's demographic and socio-economic status, reveals that the frequency of buying mussels depends on the consumer's age [$\chi^2=15.523 > \chi^2_\alpha=14.68$, df=9, $\alpha=0.10$], or educational level [$\chi^2=16.248 > \chi^2_\alpha=12.59$, df=6, $\alpha=0.05$], but not on income level, or place of residence. Thus, consumers with a higher educational level buy mussels very often in a significantly higher percentage (40.6%), compared to those who have a secondary education (21.7%). Furthermore, the majority of older consumers (>65 years old) prefer buying mussels often (52.9%), contrary to younger consumers (36.4-26.8%).

Regarding the frequency of buying warty venus, the consumer attitude does not depend on income, but is diversified significantly with respect to age, educational level or place of residence. More accurately, the percentage of consumers from rural areas who never prefer to buy warty venus (60.9%) is considered significantly higher compared to that of consumers from urban areas [$\chi^2=11.695 > \chi^2_\alpha=10.64$, df=6, $\alpha=0.10$]. Also, consumers with a higher educational level seem to buy warty venus more frequently than those with lower levels of education [$\chi^2=12.283 > \chi^2_\alpha=10.64$, df=6, $\alpha=0.10$]. Similar behavior is exhibited amongst younger consumers when compared to older ones [[$\chi^2=15.653 > \chi^2_\alpha=14.68$, df=9, $\alpha=0.10$].

The consumer's attitude regarding frequency of choosing either scallops or callista, when buying shellfish, does not seem to diversify significantly with respect to the criteria of participant's demographic and socio-economic status ($P>0.10$), except for place of residence ($P\leq0.05$). Finally, the place of residence or age level does not significantly diversify the frequency of buying flat oysters, whereas this is not confirmed with respect to income or educational level. To be specific, consumers with higher education buy flat oysters more frequently when compared to those with lower education [$\chi^2=10.72 > \chi^2_\alpha=10.64$, df=6, $\alpha=0.10$]. In addition, flat oysters are preferred by middle-income consumers [$\chi^2=28.471 > \chi^2_\alpha=21.00$, df=12, $\alpha=0.05$].

Exploitable shellfish or cultured mussels?

The majority of total respondents (52.4%) usually prefer to buy exploitable shellfish, rather than cultured mussels (47.6%), independently of their age or socio-economic status (Table 7). With respect to the place of residence, consumers from urban areas are more used to cultured mussel consumption than to exploitable (from natural populations)

Table 6

Consumer's attitude to shellfish with respect to criteria of participants' origin and socio-economic status (%). Frequency of shellfish purchase by species.

		Species known																								
		Mussels					Warty venus					Flat oysters					Scallops					Callista				
Independent Variable	Groups	Very often	Often	Seldom	Never	χ^2 test	Very often	Often	Seldom	Never	χ^2 test	Very often	Often	Seldom	Never	χ^2 test	Very often	Often	Seldom	Never	χ^2 test	Very often	Often	Seldom	Never	χ^2 test
Income	1	28.7	35.6	33.3	2.3	13.7	2.7	11.0	21.9	64.4	17.5	2.7	15.1	26.0	56.2	28.4	0.0	2.8	19.7	77.5	14.3	0.0	9.9	18.3	71.8	17.9
	2	38.8	31.3	30.0	0.0	NS	3.1	15.6	31.3	50.0	NS	7.7	18.5	29.2	44.6	S	0.0	6.6	13.1	80.3	NS	3.3	5.0	18.3	73.3	NS
	3	41.3	34.7	21.3	2.7		7.2	21.7	30.4	40.6		8.8	22.1	45.6	23.5		1.7	12.1	17.2	69.0		5.0	18.3	16.7	60.0	
	4	42.9	34.9	19.0	3.2		0.0	15.2	37.0	47.8		6.3	27.1	41.7	25.0		0.0	2.3	13.6	84.1		2.2	6.5	23.9	67.4	
	5	42.3	30.8	21.2	5.8		9.3	16.3	32.6	41.9		0.0	19.0	42.9	38.1		0.0	2.6	28.9	68.4		7.3	2.4	24.4	65.9	
Education	1	0.00	100.0	0.0	0.0	16.2	0.0	0.0	50.0	50.0	12.2	0.0	33.3	33.3	33.3	10.7	0.0	0.0	33.3	66.7	5.9	0.0	0.0	0.0	100.0	5.6
	2	21.7	43.5	34.8	0.0	S	0.0	7.1	23.8	69.0	S*	2.5	7.5	32.5	57.5	S*	0.0	0.0	18.4	81.6	NS	0.0	10.8	13.5	75.7	NS
	3	40.6	31.8	24.8	2.8		5.4	17.0	31.7	45.9		6.1	21.8	37.8	34.4		0.8	6.3	18.4	74.5		3.6	8.5	21.1	66.8	
Residence	1	41.2	32.6	23.3	2.9	9.7	5.4	15.6	34.4	44.6	11.6	5.8	19.6	40.2	34.4	6.7	1.0	5.4	21.7	71.9	15.6	3.0	6.2	22.0	68.4	7.6
	2	26.5	35.3	35.3	2.9	NS	0.0	12.1	24.2	63.6	S*	9.1	21.2	24.2	45.5	NS	0.0	6.5	0.0	93.5	S	3.1	12.5	12.5	71.9	NS
	3	28.3	37.7	34.0	0.0		4.3	17.1	17.4	60.9		2.1	20.8	31.3	45.8		0.0	4.3	17.4	78.3		2.2	17.8	15.6	64.4	
Age	1	42.6	36.4	17.8	3.1	15.5	7.8	12.9	31.0	48.3	15.6	6.7	22.7	38.7	31.9	9.7	0.7	7.2	22.5	70.3	8.1	3.5	8.0	23.0	65.5	9.9
	2	33.5	32.3	31.1	3.0	S*	0.8	14.1	32.0	53.1	S*	4.6	21.5	36.2	37.7	NS	0.9	4.3	15.4	79.5	NS	3.3	9.0	18.9	68.9	NS
	3	42.9	26.8	30.4	0.0		8.5	25.5	25.5	40.4		6.8	11.4	38.6	43.2		2.5	5.5	17.5	75.0		2.5	12.5	20.0	65.0	
	4	23.5	52.9	23.5	0.0		0.0	16.7	33.3	50.0		0.0	8.3	25.0	66.7		0.0	0.0	9.1	90.9		0.0	0.0	0.0	100.0	
Total sample	%	37.7	33.9	26.0	2.5	---	4.6	15.5	30.7	49.2	---	5.6	20.0	37.0	37.4	---	0.7	5.4	18.3	75.6	---	3.1	8.7	19.9	68.2	---
	N	366					303					305					279					286				

Notes: χ^2-test = Likelihood-ratio χ^2, S=Significant (P≤ 0.05 or * P≤ 0.10), NS=Not significant (P>0.10), N=Total sample.
Income: 1=≤ 1027 €, 2= 1028-1320 €, 3= 1321-1760 €, 4= 1761-2348 €, 5= > 2348 € (converted from Greek Drachmas).
Education:1= elementary education, 2= secondary education, 3= higher education, Residence: 1= Urban, 2= Semi-Urban and 3= Rural areas.
Age: 1= ≤ 35 years old, 2= 36-50 years old, 3= 51-65 years old, 4= > 65 years old.

Table 7
Consumer's attitude to shellfish with respect to criteria of participants' origin and socio-economic status (%).

Independent Variable	Groups	Exploitable shellfish or cultured mussels?			Certificate of quality				Sea of shellfish origin				Media influence					Hygiene confirmation		
		Mussels	Free land shellfish	χ^2 test	Yes	No	Not interested	χ^2-test	Always	Some times	Never	χ^2-test	Strong	Quite a lot	Small	No effect	χ^2 test	Yes	No	χ^2 test
Income	1	47.7	52.3	7.08	85.6	1.1	13.3	11.15	46.1	42.7	11.2	10.9	45.7	31.5	18.5	4.3	8.6	90.2	9.8	2.2
	2	46.3	53.8	NS	91.6	1.2	7.2	NS	49.4	42.0	8.6	NS	41.0	42.2	13.3	3.6	NS	92.8	7.2	NS
	3	35.8	64.2		86.3	1.3	14.6		66.3	28.8	5.0		44.4	35.8	16.0	3.7		92.6	7.4	
	4	54.0	46.0		95.3	0.0	4.7		51.6	40.6	7.8		48.5	36.4	13.6	1.5		86.6	13.4	
	5	56.5	43.5		93.9	0.0	6.1		49.0	35.3	15.7		49.1	22.6	22.6	5.7		92.5	7.5	
Education	1	33.3	66.7	0.8	33.3	0.0	66.7	9.6	66.7	0.0	33.3	4.1	75.0	25.0	0.0	0.0	5.29	50.0	50.0	5.07
	2	42.9	57.1	NS	86.0	0.0	14.0	NS	48.0	40.0	12.0	NS	46.0	26.0	24.0	4.0	NS	94.0	6.0	S*
	3	48.4	51.6		91.0	0.9	8.0		53.4	37.6	9.0		45.5	35.2	15.4	3.9		91.0	9.0	
Residence	1	53.4	46.6	16.0	90.5	0.7	8.8	7.4	55.3	36.6	8.1	5.7	45.1	35.5	15.7	3.8	4.5	91.5	8.5	6.7
	2	35.3	64.7	S	80.0	0.0	20.0	NS	37.1	45.7	17.1	NS	37.1	31.4	25.7	5.7	NS	80.0	20.0	S
	3	26.8	73.2		93.0	1.8	5.3		50.9	36.4	12.7		54.4	28.1	14.0	3.5		96.5	3.5	
Age	1	46.2	53.8	0.35	88.5	0.0	11.5	16.8	46.9	40.8	12.3	10.2	40.5	42.0	15.3	2.3	9.8	93.1	6.9	1.9
	2	47.2	52.8	NS	91.7	1.2	7.1	S	55.4	35.1	9.5	NS	49.1	28.3	18.3	4.0	NS	90.8	9.2	NS
	3	50.9	49.1		94.7	0.0	5.3		61.4	31.6	7.0		45.9	36.1	14.8	3.3		86.9	13.1	
	4	47.4	52.6		68.4	5.3	26.4		42.1	57.9	0.0		55.0	25.0	10.0	10.0		90.0	10.0	
Total sample	%	47.6	52.4	---	89.9	0.8	8.8	----	52.7	37.7	9.6	----	46.0	34.0	16.4	3.6	---	90.9	9.1	---
	N	367			366					365			385					385		

Notes: χ^2-test = Likelihood-ratio χ^2, S=Significant (P≤ 0.05 or * P≤ 0.10), NS=Not significant (P>0.10), N=Total sample.
Income: 1=≤ 1027 €, 2= 1028-1320 €, 3= 1321-1760 €, 4= 1761-2348 €, 5= > 2348 € (converted from Greek Drachmas).
Education:1= elementary education, 2= secondary education, 3= higher education. Residence: 1= Urban, 2= Semi-Urban and 3= Rural areas.
Age: 1= ≤35 years old, 2= 36-50 years old, 3= 51-65 years old, 4= > 65 years old.

shellfish, when compared to consumers from rural areas (P≤0.05).

Certification of shellfish quality and origin

A certification of shellfish quality and origin seems to be preferred by the 89.9% of the consumers, independently of place of residence, income, or educational level (Table 7). The older consumers show a different profile by being less sensitive to this criterion (P≤0.05). Furthermore, 52.7% of the total respondents are concerned all the time about the shellfish sea of origin, while for 37.7% of them this happens only occasionally (Table 7). This consumer attitude seems to be independent of place of residence or socio-economic status (P>0.10).

Media influence

The media influences consumer's behavior very much. More specifically, 46.0% of the total respondents reported having been strongly influenced by the media regarding the safety of shellfish, and almost one out of three respondents (34.0%) are influenced quite a lot, while for 16.4% the influence is very small. For 3.6% it does not have any effect (Table 7). The statistical evaluation following the breaking down of this data in parallel with the criteria of participants' demographic and socio-economic status indicates no dependence between the degree of media influence and the participants' demographic and socio-economic status (P>0.10).

Shellfish hygiene confirmation

The vast majority of total respondents (90.9%) trust the confirmation provided by the veterinary authorities, regarding the enforcement of E.U. legislation covering shellfish hygiene (Table 7), regardless of the consumer's income level or age (P>0.10). In contrast, consumers with elementary education are less demanding (P≤0.10). Surprisingly, with respect to residence, consumers from semi-urban areas show less confidence in the official announcements provided by the veterinary authorities (P≤0.05). A high percentage of the respondents (87.4%) reported that they had never faced a health problem related to the consumption of shellfish, and this was independent of the place of residence or socio-economic status.

Discussion

The analysis and evaluation of the results clearly indicated that shellfish are consumed quite rarely in Greece, independently of consumers' demographic and socio-economic status. There is an obvious lack of tradition of shellfish consumption, in spite of the presence of a wide range of shellfish species in the Greek seas. This is deduced directly from the consumers' answers and from the clear trend towards consuming shellfish mainly during the summer. Consumers with a long tradition of shellfish consumption, such as French and Italians, consume shellfish during autumn and spring, but mainly during winter (FAO, 2002).

Greek consumers show a greater preference for exploitable shellfish than for cultured ones. This does not hold true only towards the shellfish, but also to other aquaculture products as well, with the exception of urban consumers who seem to have overcome this habit (BATZIOS *et al.*, 2002a). This characteristic preference is related to the lack of confidence Greek consumers exhibit towards cultured fish and seafood in general, owing to the fact that they have not had adequate information on cultured fish nutrition and the possible existence of veterinary drug residues in the edible tissues, or consider their taste unsatisfactory (BATZIOS *et al.* 2002c). It worth noting that in France, which has a strong tradition of shellfish consumption, the source of seafood products has been gradually shifting away from wild harvest to aquaculture (GIRARD *et al.*, 1998). The French market is quite attractive, accounting for 25% of the European apparent consumption of mussels

while its production does not exceed 15% of the European production (CHARLES & PAQUOTTE, 1998).

The vast majority of Greek consumers knows and has tasted mussels, independently of their demographic and socio-economic characteristics. Consumers' awareness of other shellfish species is highly dependent on the place of residence and educational level. In spite of the coastal character of the whole area where this study took place, it is quite clear that, in terms of place of residence, various consumer groups show different attitudes. Consumers from urban areas seem much better informed, compared to those from semi-urban and rural ones, apparently because they have more chances to find and taste shellfish in organized fish markets. Thus, warty venus for example, is more known to consumers living in urban than in semi-urban or rural areas. Consumers of a higher educational level exhibit a similar attitude towards warty venus and flat oysters, but not towards scallops and callista. This group of consumers usually has more opportunities to travel and learn other countries' traditions concerning shellfish. Most of the consumers declared they were not familiar with horse mussels, donax shells, cockles, Noah's ark, grooved carpet shells and razor shells, or they did not know them at all.

The results confirm that there is a clear preference for buying shellfish from the traditional fish shops. Although there has been a rapid development and expansion of supermarkets in Greece in recent years, only a relatively small percentage of consumers choose them. Traditional fish shops are considered by the consumers to be routinely inspected by veterinarians who issue a certificate on shellfish sea origin, hygienic condition, freshness and quality (THEODOROU, 2001a and 2001b). Traditional fish shops are considered as the most preferable point of purchase for shellfish, and fish as well (BATZIOS *et al.* 2002b) and this attitude is independent of the consumers' age. Consumers from rural areas of residence or of low-income levels, buy mussels from vendor fishmongers or other places as well, exhibiting a lesser preference for the traditional fish shops. Shellfish are thought to be cheaper from vendor fishmongers than in traditional fish shops, but it should also be borne in mind that rural consumers do not have equal opportunities to use traditional fish shops, since these are often located in urban areas.

More than half of the respondents have clearly declared that they consume shellfish out of the home. This is in direct accordance with the findings of HONKANEN *et al.*, (1998) where two thirds of the Finnish consumers are used to eating seafood outside their homes. It is certain that the overall quantity of consumed shellfish will be considerably augmented if Greek people were accustomed to eating shellfish in their homes. Moreover, Greek consumers reported that they were not prepared to buy ready-to-eat-shellfish.

The majority of the respondents consider freshness, hygienic conditions of the fish shop, shellfish appearance of shell and sea of origin as criteria of very high importance, independently of the place of residence or age. Shellfish packaging, size and price are not criteria of much importance when consumers chose to buy shellfish. Neither educational nor income level diversify significantly the importance that the consumers attribute to the above criteria, except for price. It is worth highlighting the finding that the significance given to price directly depends on income level. More specifically, as the level of income increases the percentage of consumers who consider price as a criterion of very high importance decreases. Another interesting finding is that consumers with an elementary educational level think of the price of shellfish as a criterion of high importance, in contrast to those with higher education.

Regarding the evaluation of freshness, most of the respondents examine the shellfish odour, the condition of the shell and the information on the package label, independently of educational and/or income level. This

attitude significantly depends on age and place of residence.

For the majority of Greek consumers, the strongest reason for buying shellfish is their taste, while their relatively low price does not seem to affect their choice. Tradition, nutritive content of shellfish as well as the fact that they are considered as healthy food, influence consumers' decision less frequently. The consumers' profile is significantly diversified by their educational level, with those with elementary level regarding the attribute of healthy food as a reason for buying shellfish more frequently than other consumer groups. Contrary to older consumers, who are more sensitive to cost matters, younger consumers show a clear preference for shellfish because of their nutritive content.

Regarding the frequency of buying mussels, older respondents and those with higher education consume mussels more often than respondents who are younger and with a lower educational level. OLSEN (2003) also reported that age is positively related to the frequency of seafood consumption in Norway. This could be attributed to the fact that consumers with higher education are by definition more aware of mussels' characteristics as seafood, or they have adopted the habits of other countries with a strong tradition of consuming mussels, such as France and Spain. Moreover, older consumers choose mussels more often than younger ones, while income level or place of residence does not significantly influence the consumers' behaviour regarding the frequency of buying mussels. These results are in accordance with the findings of MYRLAND *et al.* (2000), regarding the way that age, education and income level affect seafood consumption in the Norwegian market. The frequency of buying other shellfish species (e.g. warty venus, flat oysters, scallops, callista) is very low, with the majority of the consumers buying them seldom or never. The consumers' attitude to warty venus consumption does not depend on income, but is significantly diversified with respect to age, educational level or place of residence. Furthermore, regarding the frequency of choosing either scallops or callista, this does not seem to diversify significantly with respect to the criteria of participant's demographic and socio-economic status, except for place of residence. Finally, place of residence or age do not significantly diversify the frequency of buying flat oysters, whereas this is not confirmed with respect to income or educational level. For instance, consumers with higher education buy flat oysters more frequently when compared to those with lower education.

Independently of place of residence, income, or education level, Greek consumers prefer to buy shellfish with a certification of quality and origin, verifying the highest possible hygienic conditions. Older consumers seem to exhibit a different attitude on this issue, being less sensitive, which could possibly be attributed to the fact that quality carries a different meaning for different groups of consumers. According to the findings of CHARLES & PAQUOTTE (1998) regarding the French market for oysters and mussels, it is the lack of confidence in the official labels that leads the older consumers to rely on their own knowledge of these products.

Greek consumers clearly trust the confirmation provided by the veterinary authorities, concerning the enforcement of E.U. legislation on shellfish hygiene, regardless of their income level or age. Although the vast majority of the consumers declared that they have never experienced health problems following shellfish consumption, they are very sensitive to shellfish hygienic problems. Health is an issue frequently mentioned as a reason for specific food choices and its emphasizing role is a growing trend and has a great influence on attitudes towards eating seafood (OLSEN, 2003). After a veterinarian restriction, the market is strongly influenced and the consumption of shellfish, generally, declines to low levels for a relatively long period, even after the end of this restriction. The information dispersed by the media on shellfish

safety, strongly influences the consumers' purchasing behaviour, regardless of their demographic and socio-economic status. Unfortunately, the media quite often over-emphasize the restrictive advice given by the veterinary authorities and consumers question shellfish hygiene and their safety status. This reaction is clearly shown from the results of this study, considering the high percentages of consumers being sensitive on matters such as shellfish quality certification and hygiene confirmation. This situation could be alleviated if consumers were properly educated on shellfish safety matters. Thus, the media not only has to play a role in interdiction announcements but should also educate consumers on issues of shellfish safety and quality.

The findings of this study could prove to be helpful for Greek producers and marketers of shellfish in order to identify new business opportunities and plan more efficient marketing strategies, which in turn would promote shellfish consumption. One successful approach to establishing the latter goal could be the organization of local festivities promoting the consumption of various species of shellfish, and different methods of cooking them.

Information programmes on shellfish safety and quality should be introduced, aiming at enhanced publicity for the Greek shellfish sector in general and in this way making the consumers more aware of the actual situation of the sector. The free communication of information along the distribution chain and an improved control of the production and distribution processes should be established. It should also be made clear to the Greek producers and marketers that shellfish enter a market where they are evaluated not only according to their price but also to various safety, quality and marketing aspects. The Greek shellfish sector should be market driven, taking into account not only the consumers' preferences and attitudes but also the structure and legislative framework of the target market. It is quite clear that the promotion intended to develop the shellfish market and encourage the consumption of shellfish should rely on the specific preferences the various groups of consumers have expressed in this study, according to their demographic and socio-economic characteristics.

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