



## Consumer knowledge and use of information about fish and aquaculture

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### ARTICLE INFO

#### Article history:

Received 16 March 2012  
 Received in revised form 19 December 2012  
 Accepted 7 January 2013  
 Available online 6 March 2013

#### Keywords:

Consumer  
 Fish  
 Information  
 Knowledge

### ABSTRACT

This paper explores consumers' knowledge about fish and aquaculture and assesses the use and importance of different information cues about fish. Cross-sectional data were collected in 2008 through a consumer survey ( $n = 3213$ ) in the Czech Republic, Germany, Greece, Italy, Portugal, Romania, Sweden and the UK. Consumers' knowledge about fish generally, and about aquaculture in particular, was relatively low and differed significantly between countries. Consumers from all countries reported an indication of quality and/or food safety as an information cue when buying fish. The information sources most frequently used by Europeans were labelling and sellers in retail or supermarkets. The Internet was identified by consumers in all of the countries as one of the most important sources of information about sea and freshwater fish products. Policy makers and food marketers are encouraged to develop a simple and easily recognisable mark (relating to quality, food safety and nutrition) to assist consumer decision-making. Information campaigns focusing on issues such as the nutritional benefits of eating fish are also recommended.

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### Introduction

Food labelling has become a regulatory and certification issue and not just a means of communicating with consumers. European food law states that fish and fishery products require appropriate labelling that indicates the commercial designation of the species, the production method (caught at sea or in inland waters, or farmed) and the catch area or the country of origin. In the case of products caught at sea or in inland waters, labelling should provide information about the catch area as specified by the [FAO \(2008\)](#). This information should be available at each stage of the product distribution and, together with the scientific name of the species, it should be provided on the label or product packaging, or on a commercial document accompanying the goods. Particular rules for the labelling of fish and fishery products in accordance with Article 4 of the European Council Regulation (EC) No 104/2000 have been established under the Commission Regulation (EC) No 2065/2001. From January 2005, traceability throughout the food chain, from primary production through to the retailer, is a fundamental principle of EU food law (Regulation EC/178/2002). According to [Jacquet and Pauly \(2008\)](#), a global mandate for species, country of origin and production method labelling, as well as the verifiability of eco-labels, is necessary for all seafood, since seafood is traded all over world.

Fish is a perishable commodity that originates from different geographical areas. The seafood market is global, very diverse and complex. Consumers prefer to have sufficient and reliable information about fish origin and other essential product characteristics ([Asensio and Montero, 2008](#)). It is important to investigate the type of information consumers are interested in, the information sources they use about fish and how current information provision ties in with, or fails to meet, consumer expectations and intentions for use. Voluntary and mandatory labelling information has increased, mainly as a result of the stricter traceability requirements informed by legislation, stricter reseller demands and changing consumer preferences ([Cheftel, 2005](#)). Traceability of fish and fish products is required, both for consumer protection and for regulatory enforcement, in particular with respect to illegal, unreported and unregulated fishing ([Ogden, 2008](#)). Nevertheless, providing more information to consumers does not necessarily mean that consumers will benefit from it. The risk of information overload and potential adverse effects resulting from consumer indifference, or misunderstanding, when confronted with too many information cues on the package or label has been recognised ([Verbeke, 2008](#)). [Tan et al. \(2011\)](#) showed that advisories may be ineffective at communicating important health risk information about fish consumption to intended audiences. A lengthy and highly detailed format that is difficult to interpret is still used to issue advisories with respect to fish consumption among intended audiences ([Burger and Waishwell, 2001](#); [Chess et al., 2005](#)).

It is a challenge for food scientists, food and health policy makers and food marketers to identify what kind of information consumers are interested in and how this information should be

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provided to consumers (Roos et al., 2004). Including too much information on the label can be confusing, whereas too little information can be misleading. Labels are an important tool for communicating with consumers. Consumers claim that labels should be understandable and more easily accessible, to facilitate consumer understanding (Kehagia et al., 2007). A relevant question to be addressed is whether all the information is needed at every stage of the distribution channel? For instance, some more detailed information that could potentially confuse consumers could be available only on request, for example via a web link or a folder.

Use of information sources is associated with consumer behaviour and/or food choice (Alba and Marmorstein, 1987). Empirical evidence shows differences in the use of information sources by consumers depending on the food product, the communicated information and the potential health or safety risk (Gutteling and Wiegman, 1996; Jungermann et al., 1996). With respect to fish, a previous study has shown that consumers mostly use personal sources of information, such as fishmongers and family and friends (Pieniak et al., 2007).

Consumer knowledge is an important factor in the consumer decision-making process. It influences how consumers gather and organise information, and ultimately, which products they purchase (Alba and Hutchinson, 1987). Pieniak et al. (2010a,b) identified knowledge as a relevant determinant of fish consumption. Consumers with a higher level of knowledge about fish were found to eat fish more frequently. That held true for both subjective knowledge (i.e. people's perceptions of what or how much they know about a product, based on their subjective interpretation) and objective knowledge (i.e. accurate information about the product, stored in the consumer's long-term memory). This highlights the importance of assessing European consumers' knowledge in relation to fish and aquaculture.

The overall objective of this study is to explore consumer knowledge with regard to fish generally (in a food context) and aquaculture in particular; to assess the importance of product information relating to fish; to identify consumers' use of different information sources about fish; and to discuss similarities and dissimilarities for these issues between different European countries. Recommendations will be formulated for more effective communication, with the aim of increasing current fish consumers' knowledge base and facilitating consumer decision-making in the specific case of fish consumption.

## Materials and methods

### Data collection

Quantitative descriptive data were collected through a cross-sectional consumer survey in eight EU-countries: the Czech

Republic (CZ), Germany (DE), Greece (GR), Italy (IT), Portugal (PT), Romania (RO), Sweden (SE), and the United Kingdom (UK). These countries have been selected to cover different geographical areas in Europe, i.e. Western Europe, Northern Europe, Eastern Europe and the Baltic States, Central Europe and Southern Europe. Furthermore, this selection of countries enables the consideration of heterogeneity in terms of fish consumption levels, habits and traditions.

Participants were selected from the IPSOS Online Access Panel. This panel consists of individuals who have been recruited via off-line recruitment methods (e.g. street contact procedures or random walk), and who agreed to participate in future surveys. Despite potential bias from excluding non-Internet users and lower accuracy than e.g., telephone interviews (Dever et al., 2008), the use of a panel has the advantage of high response rates and efficient data collection, due to its lower costs and timelines as compared to probabilistic off-line recruitment procedures. Furthermore, panel members are familiar with the different scales typically used in surveys, which is beneficial for the reliability and validity of the responses and constructs. Self-administered questionnaires are also less subject to socially desirable bias as compared to telephone interviews (Yeager et al., 2011). All contact and questionnaire administration procedures were managed electronically. Data collection was performed in June 2008. Only people who were mainly responsible for food purchasing within the household, and who consume fish, participated in the study. Quota control variables were living environment (rural versus urban) and age, within the range of 18–70 years (Table 1). Total sample size was 3213 respondents; approximately 400 in each of the eight countries. Gender distribution, with a 65/35 female–male ratio, reflects the selection criterion of being responsible for food purchasing within the household. The Greek and Czech samples were slightly younger, and the Swedish sample somewhat older when compared to the other countries. The sample studied is representative within each country for age and region.

### Questionnaire content

The questionnaire was developed in English and then translated into the other national languages by professional translation services within each country. The self-administered questionnaires measured a variety of constructs in relation to fish, including consumption behaviour, knowledge, use of information sources and interest in information cues relating to fish. All structured electronic questionnaires have been pre-tested in each language through pilot studies.

Fish consumption frequency was measured on a five-point scale, with the response categories: more than once a week (1);

**Table 1**  
Socio-demographic profile of the sample ( $n = 3213$ ).

		Germany $n = 401$	Sweden $n = 401$	Italy $n = 403$	UK $n = 402$	Greece $n = 400$	Romania $n = 403$	Portugal $n = 403$	Czech Rep. $n = 400$	Total $n = 3213$
Gender (%)	Female	65.1	65.1	65	64.9	65	65	65	65	65
	Male	34.9	34.9	35	35.1	35	35	35	35	35
Age (%)	18–24	13.3	13.6	13.7	13.7	12.0	15.0	14.0	18.0	14.2
	25–34	19.2	20.4	24.5	22.8	22.0	23.0	22.0	23.0	22.1
	35–44	26.2	22.6	22.1	23.9	22.0	19.0	21.0	18.0	21.8
	45–54	17.8	17.9	16.5	17.6	35.3	20.0	19.0	20.0	20.5
	55–70	23.5	25.5	23.2	22.0	8.7	23.0	24.0	21.0	21.4
Number of people in household (%)	1	23.2	25.0	10.8	21.4	11.6	8.5	15.4	7.5	15.4
	2	40.9	40.6	30.2	37.3	25.1	25.3	28.8	27.7	32.0
	3	16.0	15.7	24.6	19.2	24.9	32.8	24.5	21.1	22.2
	4	13.1	11.7	20.9	14.6	29.2	24.1	22.2	31.9	21.0
	5+	6.8	7.0	13.5	7.6	9.2	9.3	9.0	11.8	9.1

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