

SEAFOODSENSE D18

Report on ETHICOD consumer study: detailed description of the procedures

R. Schelvis, K. Sveinsdóttir, E. Martinsdóttir and A. Kole

Report number C010/08



Institute for Marine Resources and Ecosystem Studies

Wageningen **IMARES**

Location IJmuiden

Client: MATIS
Mrs. Emilia Martinsdóttir
Skúlagötu 4, 101 Reykjavík
Iceland

Publication Date: January 2008

- Wageningen **IMARES** conducts research providing knowledge necessary for the protection, harvest and usage of marine and coastal areas.
- Wageningen **IMARES** is a knowledge and research partner for governmental authorities, private industry and social organisations for which marine habitat and resources are of interest.
- Wageningen **IMARES** provides strategic and applied ecological investigation related to ecological and economic developments.

© 2007 Wageningen **IMARES**

Wageningen IMARES is a cooperative research organisation formed by Wageningen UR en TNO. We are registered in the Dutch trade record

Amsterdam nr. 34135929,
BTW nr. NL 811383696B04.

The Management of IMARES is not responsible for resulting damage, as well as for damage resulting from the application of results or research obtained by IMARES, its clients or any claims related to the application of information found within its research. This report has been made on the request of the client and is wholly the client's property. This report may not be reproduced and/or published partially or in its entirety without the express written consent of the client.



A_4_3_2-V4

SEAFOODplus

RTD project 2.2. SEAFOODSENSE - Deliverable 18

The ETHICOD experiment performed in October-November 2006. A joint experiment with SEAFOODplus projects 2.2 (SEAFOODSENSE), 2.3 (SEA-INFOCOM), 2.4 (CONEVALUATE) and 5.2 (ETHIQUAL)

Contents

Contents	3
Summary	4
1. Introduction	5
2. The objectives of the ETHICOD project	5
3. Methods and materials	6
3.1 Experimental design	6
3.2 Independent variables	6
3.3 Dependent variables	11
3.4 Fish products	13
3.5 Consumers	17
3.5.1 In-Home panel	17
3.5.2 Central location panel	17
3.6 Analytical sensory evaluation	17
4. Results	18
5. References	19
Referees and Authors	20
Annex A: Experimental design ETHICOD project	21
Annex B: Product questionnaire for (non-)cooks (both in-home and central location test)	23
Annex C: General questionnaire ETHICOD	31

Summary

The aim of this product test was to determine the effects of pre-slaughter stress on both the intrinsic sensory properties as well as the consumer perception of the products. Variables included the effect of information provided with the products, the effect of knowledge that the consumers have on welfare aspects, the effect of reliability of the information provided and the effect of the different test situations.

The consumer tests were performed in both Iceland and The Netherlands both in an in-home and a central location situation. Consumers' attitude and behaviour towards animal welfare were asked.

This report describes the procedures followed.

Results are to be published in various journals in the period of 2008-2009.

1. Introduction

Within the EU integrated project SEAFOODplus there were six research pillars. Pillar 2 dealt with consumer studies, pillar 5 with aquaculture. New developments make it possible to improve animal welfare during production and slaughter process. The interest of European consumers towards animal friendly produced products is increasing. The effects of welfare measures on product quality and on consumer perception are yet unknown. We conducted this study to determine the effects of pre-slaughter stress on the quality of cod fillets and on consumer perception.

The SEAFOODplus project ETHICOD was a result of collaboration between the SEAFOODplus project ETHIQUAL (5.2) and several SEAFOODplus projects from pillar 2 (consumer research pillar). The project ETHIQUAL produced cod and these were used for consumer product testing. This proved beneficial from a scientific as well as a financial point of view. It resulted in cooperation between scientist from Norway, Iceland, the Netherlands, Belgium and Spain. The ETHICOD project meetings were held in October 2005 (Granville) and in June 2006 (Tromsø).

This report gives an overview of the procedures followed for the ETHICOD consumer product test in Netherlands and Iceland and the analytical sensory evaluation in Iceland. This report is Deliverable 18 for the SEAFOODplus project Seafoodsense (project 2.2)

2. The objectives of the ETHICOD project

1. To measure the effect of pre-slaughter stress on the intrinsic product qualities. Measured by sensory analyses.
2. To measure the effect of pre-slaughter stress on the consumers' product perception. Measured by consumer product tests (low stress slaughter conditions versus standard stress slaughter conditions).
3. To measure the effect of welfare information on the consumers' product perception. Measured by consumer product test with two levels of welfare information provided (low stress slaughtering versus standard stress slaughtering).
4. To measure the effect of consumers' knowledge about welfare information on the consumers' product perception. Measured by consumer product test with two levels of welfare information provided (short information on a product label versus more extensive information presented on a separate sheet).
5. To measure the effect of consumers' trust in welfare information on the consumers' product perception. Measured by consumer product test with different sources of welfare information (information from a private sources versus information from a governmental source).
6. To measure the effect of test location on the consumers' product perception. Measured by a consumer product test in different test locations (in-home versus central location).

7. To measure the effect of consumers' attitudes towards animal welfare and sustainability on the consumers' product perception. Measured by a consumer product test and an questionnaire on attitudes and behavior.
8. To measure the effect of seafood consumption level on the consumers' product perception. Measured by a consumer product test and a questionnaire on Fish Consumption Behavior.
9. To measure the effect of cultural background on the consumers' product perception and welfare information. Measured by a consumer product test in three different European countries (Spain¹, Netherlands and Iceland).

3. Methods and materials

3.1 Experimental design

The experimental design (annex A) was made in such a way that the objectives of the project could be realized with optimal use of resources (fish, consumers and finances). There were 14 different product test sessions in Iceland, the Netherlands and Spain, using five consumer panels in in-home and central locations. In-home consumer testing is meant when consumers take home the products for testing in a 'real-life' situation. Central location consumer testing is meant when consumers come to a central location to test the products that were prepared for them.

3.2 Independent variables

For the ETHICOD project the following experimental conditions were included:

- Handling conditions/ pre slaughter stress. One group of fish was not crowded prior to the slaughtering, one group was crowded for 30 minutes prior to slaughtering. The choice to work with pre-slaughter stress variation instead of slaughter stress variation was made by scientists on welfare and aquaculture. It is known that the regulations for animal friendly slaughtering will soon be implemented in the EU legislation. This makes it unlikely to get products on the market with large variation in stress conditions, caused by slaughtering as such. But pre-slaughter conditions are not regulated yet and preliminary research showed that pre-slaughter stress could have an effect on intrinsic product qualities.
- Welfare information. The effect of welfare information for consumers interacts with consumer knowledge and trust regarding this information. These three variables are known to differ between countries: northern Europe versus southern Europe and between consumption frequency: high versus low consumption. For SEAFOODplus projects 2.3 and 2.4 the results of the survey (performed in SEAFOODplus project 2.1) can be linked with this consumer test varying on *kind of welfare information* (Low stress condition or regular stress condition), *knowledge about animal welfare* (high level of knowledge by explaining what is meant by animal welfare or low level of knowledge by an animal friendly

¹ Not described in this report.

label only) and *trust in this information* (information provided by a commercial source like a brand or provided by the government like a certificate)

- In-home versus central location. In-home test is the more realistic consumer product testing. Nevertheless it has several well known drawbacks (high costs, larger panel needed). To evaluate the differences and similarities of in-home preference with lab-test preference the best methodology can be selected in future consumer testing of Seafood products.
- Free or fixed preparation method for in-home consumers. Do you allow consumers to choose their own preparation methods? Forced preparation method (of which central location test is an example) is likely to influence (reduce) the preference of a product. For the seafood sensory model (developed in SEAFOODplus project 2.2) the aim is to know how consumers prefer their seafood product best. Small differences in for example texture (due to the pre-slaughter stress) might very well be masked or changed by different (in-home) preparation methods and therefore will require different process control or marketing by the industry. The previous SEAFOODplus project 2.2 consumer test performed in four different countries, showed that different preparation methods affected preference significantly in the Netherlands.
- Countries. The different countries can be selected for many reasons. Within this design, consumers' cultural background will be varied: North versus South Europe and Fish consumption frequency: high versus low.

The above independent variables conditions are summarized in table 1. This table shows how the different interest of the four SEAFOODplus projects interacts. It shows the added value of combining the efforts.

Table 1. Conditions tested in ETHICOD consumer test.

Conditions	Main interest for SEAFOODplus project nr:	Tested in product test session (Annex A)
Pre-slaughter handling	5.2 - 2.2	3 - 8
Ethical information	2.3 - 2.4 - 5.2	1 - 2 - 4 - 5 - 6
Trust (source) X country	2.3 - 2.4	10 - 11 - 14
Knowledge	2.3 - 2.4	12 - 13 - 14
In-home/lab	2.4 - 2.2	3 - 7 - 8
Free/fixed inhome (convenience)	2.2	6 and 7
Countries	2.4	4 - 5 - 6 - 9 - 12 - 13

The design of the ETHICOD study required more fish than was available from SEAFOODplus ETHIQUAL project. For product test session 1-8 it was essential to have fish from ETHIQUAL since in these sessions the effect of pre-slaughter stress conditions were tested. For session 9-14 the fish could be any commercial fish available because the fish was 'only' the carrier of the information. A summary of the fish used is given in table 2.

Table 2. Fish used in ETHICOD consumer tests in Iceland, the Netherlands and Spain.

	Product test session 1 – 8 ETHIQUAL cod	Product test session 9 – 14 Commercial farmed cod
Sensory analyses	10560 g	5280 g
In-home tests	1200 fillets	1650 fillets
Central location tests	480 portions	
Total weight	335 kg	418 kg
Total fillets (of 250 g)	1340	1672

The product packaging labeling

The consumer test products were labeled on the packaging (figure 1).



Figure 1. Product with label according to experimental design

Some consumers received products with no information about the slaughter conditions, others received only short information and again others received more extensive information on both the product label and on a separate information sheet. The information on the label was also printed inside the questionnaire, to serve the consumers that did not prepare the fish and therefore did not see the label on the packaging.

According to the experimental design the following labels were made:

No info, label. Used in session 3, 6 and 9

Species: Cod, farmed
Country: Norway
Weight: ca. 500 g
Price: --

Production:

Store: Refrigerated 0-4°C
Eat before: xx October 2006

Low stress, label. Used in session 14

Species: Cod, farmed
Country: Norway
Weight: ca. 500 g
Price: –

Production:
Production with special precautions to minimize stress and suffering for the fish

Store: Refrigerated 0-4°C
Eat before: xx October 2006

Low stress, label – government. Used in session 11

Species: Cod, farmed
Country: Norway
Weight: ca. 500 g
Price: –

Production:
Production with special precautions to minimize stress and suffering for the fish as established and checked by the legal Norwegian authorities.

Store: Refrigerated 0-4°C
Eat before: xx October 2006

Low stress, label – industry. Used in session 10

Species: Cod, farmed
Country: Norway
Weight: ca. 500 g
Price: –

Production:
Production with special precautions to minimize stress and suffering for the fish as established and checked by the producers organization of fish farmers.

Store: Refrigerated 0-4°C
Eat before: xx October 2006

The extended information was presented as a short bullet points in formation on the packaging label as well as an extra sheet that always started with the following introduction:

'Fish farming is increasing. This also causes different EU legislations and control systems being developed right now, including interest for public opinions on these topics. Next to the regular quality assurances other aspects play a role. The current study concerns fish from different farming systems. Therefore we do not only ask you to evaluate the fish, but at the same time we would like to ask your opinion about the farming systems.

There are different farming systems. Apart from being land based or sea based and different feeding of the fishes, the main differences depend on the daily living circumstances of the fish and on the way the fish are slaughtered.

We know not everyone is familiar with the daily practices concerning fish farming. Therefore, for your convenience more detailed information can be provided. If you have additional questions, you can always contact us.'

Standard, extended. Used in session 5, 8 and 12

(Separate sheet)

Species: Cod, farmed

Country: Norway

Weight: ca. 500 g

Price: --

Production:

Normal production

- Sea cages with standard amount of fishes per cage
- Pumping of fishes before slaughtering
- Slaughtering by bleeding.

Store: Refrigerated 0-4°C

Eat before: xx October 2006

Different fish farming systems exist. Seafish can be farmed on land or in the sea. Also they can be fed differently. Apart from that, the main differences between systems are in the daily living circumstances of the fish and in the way the fish are slaughtered.

Cod is usually farmed in sea cages. It is cheapest to have as much fishes per cage as possible. Doing so it is accounted for that the fish will become ill or even die easier when the fish density is too high. Before slaughtering the fishes are driven together for some time, because that way it is easier to pump them onto the slaughtering platform. The fish are pumped onto the platform through large tubes. There the gills are cut. The actual slaughter happens when the fish are bleeding to death. This takes about thirty minutes.

Low stress, extended. Used in session 4, 7 and 13

(Separate sheet)

Species: Cod, farmed

Country: Norway

Weight: ca. 500 g

Price: --

Production:

Production with special arrangements minimize stress and suffering for the fishes.

- Sea cages with lower amount of fishes per cage
- Individual catching of fishes prior to slaughter to reduce stress
- Quick painless slaughtering.

Store: Refrigerated 0-4°C

Eat before: xx October 2006

Different fish farming systems exist. Seafish can be farmed on land or in the sea. Also they can be fed differently. Apart from that, the main differences between systems are in the daily living circumstances of the fish and in the way the fish are slaughtered.

Cod is usually farmed in sea cages. The more animal friendly systems less fish are kept together in one cage compared to more regular systems. To minimize stress the fish will not be driven together nor pumped out of the cage, but they are picked from the cage one by one. On the slaughtering platform they are electrically stunned first and then slaughtered as fast as possible. Research shows this combination method causes a minimum level of stress for the fish.

3.3 Dependent variables

Product test questionnaire

With each product the consumers received a questionnaire (see Annex B).

The questionnaire included instructions on how to fill out the questionnaire and an example question with three possible answers. Session number and consumer number were printed on each sheet.

The consumers were asked to answer one question about overall liking (9-point hedonic scale, anchor points: extremely dislike – neither like nor dislike- extremely like) and had the opportunity to describe/comment why they have made this choice (on anything). Continued with attributes: appearance, odor, taste (flavor), mouth feel (texture) (9 points hedonic scale). Furthermore: good quality, attractive, soft, rubbery, tender, juicy, fatty, dry, firm, strong taste, lean, fresh, healthy, natural, nutritious, risky, safe (9 points not at all-very much). The consumers were asked about their ambivalent thoughts and feelings and whether they would recommend this product to others, their expected/planning/willing to buy this product (9 points disagree-agree). Their price expectations of price referred to an mean price in the supermarkets of € 18,95/kg (expected price, maximum price, expensive, fair, cheap). Each consumer was asked to value their own knowledge on farming systems for each product (10 points, not at all-very much + no idea) and to value the importance of farming processes like living conditions, slaughter methods, stress (9 points, not at all-very much). And finally they answered questions about the information provided; easy to understand, enough, relevant, important, familiar, reliable (9 points, not at all-very much).

Cooks: For the person that prepared the product each household received one slightly modified questionnaire. It was assumed that only this person would see the product in the packaging. The cooks were asked to select one of the listed preparation methods: boiling in water, microwave, baking in oven, frying, baking in pan, grill/bbq, raw and other. They were asked to avoid the use of strong ingredients or spices in their recipes and to use the same method of preparation for all products they would receive. In addition, the cooks were asked to give a brief description of the recipe used. Prior to the preparation they answered questions on; overall liking, appearance, odor, good quality, attractive, fresh and healthiness of the product. They were also asked to fill out or describe the storage method, the consumption date, the preparation method description and the convenience of the preparation being easy, fast, familiar and practical.

Additional questionnaire

In the final product test session each consumer received a separate general questionnaire. This included questions on Animal welfare issues in farmed cod (Annex C).

The study concerns the perceived differences between regular farmed cod versus cod that is handled in a stress reducing condition and the impact of information about fish farming animal welfare on consumer perception of farmed cod.

Information in general, therefore also information about animal welfare in fish farming consists of three external elements that are relevant for consumer information processing:

- The source of the information,
- The medium of the information, and
- The message.

The way the information is processed and the impact of the information for consumers is determined by four factors:

- The likelihood that the information is elaborated (hypothesis: when information is not processed by a consumer it will not affect product evaluation);
- Part of the elaboration likelihood is the subjective trust in the information (hypothesis: information that is not trusted will not be elaborated);
- Expectancy value (hypothesis: if the value of the information is anticipated to be low, the information will not affect product evaluation);
- The expectancy value is defined as the product of the valence of the communicated condition (stress for fish) and the probability that the condition will occur (farming conditions are stressful to fish). The values in relation to ethical issues are anticipated emotions more so than economical values (hypothesis: if the anticipated emotional value of the information is low, it will not affect product evaluation).

In combination with the probability that the anticipated emotion will be elicited by the communicated condition (farming is stressful) determines the impact that the information is likely to have (hypothesis: low probability results in low expectancy values; no impact of the information) on product evaluation.

Other constructs that explain the interaction between ethical information and the evaluation of farmed cod filets, are the amount and type of experience with fish eating and specific experiences with close animals (e.g. location of growing up [countryside – urban environment]; having or having had small pets, including fish).

With respect to the impact of the information:

The relative importance of animal welfare among other aspects, Self perceived knowledge about fish farming and welfare practices, and general attitudes towards fish farming. Among these attitudes can be discerned Emotions, Morals, Control, Involvement, and Neophobia

With respect to the trustworthiness and the use of welfare information, we measured the tendency to avoid information, the trust consumers put in different sources, the likelihood to use certain information sources, media skepticism, media usage.

Both The Netherlands and Iceland used almost the same questionnaires translated in their own language. The questionnaires were developed from previous consumer tests with seafood.

The Netherlands printed and scanned all forms in FIZZ for Windows, 2.10A (Biosystemes) for data collections. Iceland had to insert the result in Excel by hand.

3.4 Fish products

The fish was farmed by Fiskeriforskning within the SEAFOODplus project 5.2 (ETHIQUAL). Approximately 800 fishes of 1 kg weight were available. A pre-trial test on pre-slaughter stress variation was carried out using 40 fish in August 2006 (for sensory assessment only). All fish were grown in the same cage during the last few months before slaughter. On Monday 2nd of October 2006 the fish were slaughtered. Fish with low stress pre-slaughter condition were harvested first. These approximately 280 fishes were individually harvested and immediately stunned by blow on the head, followed by gill cut and bleeding in ice water. The remaining fish (approximately 430 fish) were crowded for 30 minutes (figure 2). These extra 30 minutes of crowding were considered to provide the extra stressful condition for this group of fish. After crowding the fish were treated identical to the first group.



Figure 2 Pre-slaughter crowding; standard pre-slaughter stress condition.

After slaughter the fish were stored in ice and transported to the filleting company. Two days later (Wednesday 4th of October) the fishes were machine filleted, trimmed and packed interleaved in plastic prior to freezing. (figure 3-6)



Figure 3 Machine filleting cod



Figure 4 Machine filleting cod



Figure 5 Filleted cod



Figure 6 Packed cod fillets prior to freezing

The samples were transported from Norway to Iceland and The Netherlands on the 9th of October.

This commercial farmed cod was bought from a farm in Iceland: Fish farming Thoroddur, Thorsberg ehf, Strandgotu, 460 Tálknafirði. The fish were processed on the same dates and send to The Netherlands.

Test sessions in-home test

The day prior to the consumer test, samples were thawed at 0-4°C during 24 hours. The thawed fillets were portioned for each household (approximately 500 grams) and were placed in a plastic container with water absorbing paper. Per household the container were placed in polystyrene box including a cooling element and the questionnaire for the consumers. (figure 7-9). In Iceland, the polystyrene boxes were kept at 0-1°C until picked up at Matis by the consumers the same day (within 7 hours). In the Netherlands, the polystyrene boxes were distributed to the consumers on Tuesday via TasteNet distribution.



Figure 7. Packaging of cod for in-home consumer test.



Figure 8. Labeling the cod products



Figure 9. Packaging of products in polystyrene boxes.

Test session central location test.

Preparation of samples: Samples were served plain, no additives.

All samples were prepared and placed in aluminum boxes. On the testing day (Thursday November 2nd in The Netherlands and October 19th in Iceland), approximately 2-3 hours before cooked and served to consumers. Uncooked samples in aluminum boxes were stored at 0-4°C, covered with a plastic film.

Fish portions were around 50g and 3x7x2 cm³ in size. They were cut by hand on a plastic board. Fish portions were placed in the aluminum boxes (Alform, 150160m, 160mL) with the skin-side down. In The Netherlands following aluminum boxes were used Plus Pack, item no 07614 10600, prod. Nr. 80959, 140 ml.

In Iceland the samples were cooked for 6 minutes in pre warmed oven (Convotharm Elektogeräte GmbH, Eglfing, Germany) with air circulation and steam. The samples were covered with aluminum paper directly after cooking.

Preparation procedure in The Netherlands was “aux bain marie” Samples were not covered and placed in an oven (the Miele H 216) set at 200°C in a 2 cm layer of boiling water during 12 minutes.

Samples were served directly after cooking (aluminum paper removed), 1 at a time (figure 10). Cooking and serving was done according to a randomized serving plan. In Iceland the consumers tested the commercial cod as well, not randomized, always as third product.

Sessions: In Iceland, 6 sessions were carried out each day at 10.00, 12.00, 14.00, 16.00, 18.00 and 20.00 with up to 28 consumers in each session.

In the Netherlands there were 4 sessions each day at 11.00, 13.30, 17.00 and 19.00. With maximum of 30 consumers per session.

The following things were placed on each table before the consumers arrived in the test room: water glasses and water jug, porcelain dish, plastic forks, napkins, a consumer-coded questionnaire (liking sheet), the consumer name and number taped to the table (figure 11).

In The Netherlands the consumers were placed at the tables, separated by a partition (figure 12).

Consumers were guided to the test location and seated. They received an information sheet with information on how to test the samples and how to act during the sessions, that 2-3 consecutive samples would be served and on how to fill in the liking sheet. They could eat as much of the sample as they needed to finish the questions and to raise their hand if they had any questions and when they were finished tasting the samples. They were asked not to talk about the test or the products during tasting. The consumers also received instructions on how to fill out the additional questionnaire, which they received after the last sample.

When the consumers had filled out the questionnaire, trash and the questionnaire sheet was removed and the next sheet was handed out. This was repeated with all 2-3 samples.



Figure 10. Preparation of the cod samples for the central location test.



Figure 11 Central location test. Individual assessment of the cod products.



Figure 12. Central location test. Individual assessment of cod products.

3.5 Consumers

3.5.1 In-Home panel

In The Netherlands, consumers (average of 3 consumers within each family) were selected from an internal database with consumers that have been used for consumer studies before. In Iceland, consumers (two persons per household or more) from an internal consumer database were recruited, and in addition, by an advertisement in a newspaper. A total of 70 fish consuming families were selected and received 1 product per week. In The Netherlands, 150 fish consuming families were selected and divided in panel A (session 6-10-11-14) and panel B (session 9-12-13-14), receiving one product per week. In both countries, the criteria for participation was to be 18 years or older, and to consume fish at least once per month.

3.5.2 Central location panel

Both in Iceland and The Netherlands approximately 100 consumers were recruited. In Iceland, consumers were recruited from an internal consumer database, and in addition, by an ad in a newspaper. In The Netherlands, consumers from the same group of consumers participating in the central location test of 2004. All 18 years or older.

3.6 Analytical sensory evaluation

Eight members of the Matis (former Icelandic Fisheries Laboratories') sensory panel participated in the Quantitative Descriptive Analyses (QDA) of cooked samples of the farmed cod. The panelists were all trained according to international standards (ISO, 1993); including detection and recognition of tastes and odours, training in the use of scales, and in the development and use of descriptors. The members of the panel were familiar with the QDA method, and were experienced in sensory analysis of cod. An unstructured scale (left end = 0%, increasing intensity to the right end = 100 %) was used with a defined sensory attribute vocabulary, describing appearance, odor, flavor, and texture. The vocabulary to describe the products was previously developed and tested for cod products. (e.g. Wang et al 2007; Sveinsdóttir et al 2007; Bonilla et al 2007). The panel was trained to describe the intensity of each attribute for a given sample using the unstructured scale. Two sessions were held for training of the panel prior to this experiment using farmed cod produced with conventional and low stress pre-slaughter methods.

Samples weighing 40–50 g were taken from the loin part of the fillets and placed in aluminum boxes coded with three-digit random numbers. The samples were cooked for 6-7 minutes in a pre-warmed oven (Convotherm Elektrogeräte GmbH, Eglfing, Germany) at 95-100°C with air circulation and steam, and then served to the panel. Each panelist evaluated triplicates of each sample group in a random order in two sessions (three samples per session). The sensory evaluation was carried out in the same week as the central location consumer test, which was also the same week as the in-home consumers received their first samples. The commercial Icelandic farmed cod was evaluated in duplicate in a separate session.

A computerized system (FIZZ, Version 2.0, 1994-2000, Biosystèmes) was used for data recording. The descriptive analysis was carried out the day before the consumer test.

4. Results

The data of this study are to be analyzed.

Preliminary results were presented at the SEAFOODplus annual conference in Bilbao 5-7 June 2007.

Papers in preparation are:

Paper 1

Sensitivity of three different methods (QDA/central location/in-home) To be published in Journal of sensory studies.

First author: Kolbrun Sveinsdóttir

Paper 2

Consumer segmentation on ethical concern, effects liking on different products with ethical information (food qual and pref or journal of agriculture and environmental ethics).

First author: Adriaan Kole

5. References

Bonilla, A.C., Sveinsdóttir, K. & Martinsdóttir, E. (2007). Development of Quality Index Method (QIM) scheme for fresh cod (*Gadus morhua*) fillets and application in shelf life study. *Food Control*, 18 (4), 352-358

ISO (1993). Sensory analysis - general guidance for the selection, training and monitoring of assessors. Part 1: Selected assessors, 8586-1. Genf, Switzerland: The International Organization for Standardization.

Sveinsdóttir, K., Martinsdóttir, E., Green-Petersen, D., Hyldig, G., Schelvis, R. & Delahunty, C. (2007). Submitted to *Food Quality and Preferences*

Wang, T., Sveinsdóttir, K., Magnússon, H. & Martinsdóttir, E. (2007). Combined Application of Modified Atmosphere Packaging and Superchilled Storage to Extend the Shelf-Life of Fresh Cod (*Gadus morhua*) Loins. *Journal of Food Science* (Accepted)

Stone H, Sidel JL (1985). Sensory evaluation practices. Academic Press, Inc. Orlando, Florida. 311p.

Referees and Authors

Report C010/08
Project Number: 439 430 11 01

This report has been professionally prepared by Wageningen IMARES. The scientific validity of this report has been internally tested and verified by another researcher and evaluated by the Scientific Team at Wageningen IMARES.

Approved: Henk van der Mheen
Head Department Aquaculture

Signature:

Date: 31 January 2008



Approved: Aad Smaal
Scientific Team

Signature:

Date: 31 January 2008

Number of copies: 10
Number of pages: 38
Number of tables: 2
Number of figures: 12
Number of appendix attachments: 3

Annex A: Experimental design ETHICOD project

session number	pre slaughter method	Trust / Information source	Information on pre-slaughter processing	knowledge / information amount	Preparation method	test type	Spain	Iceland	Netherlands	nr subjects	fish
	ETHIQUAL Standard	-	-	label	Fixed	In-home	between subject design	within subject design	two panels n 70 (between/wi thin)	F=families	N filets of 250 gram
	ETHIQUAL Low stress commercial standard	Commercial Governmental	A standard B low stress	extended	Free	Laboratory				C=consumers	N Portions of 50 gram
1	Ethiqual Low stress	-	-	-	fixed	Laboratory		x	x	c = 200	portions 200
2	Ethiqual Standard	-	-	-	fixed	Laboratory		x	x	c = 200	portions 200
3	Ethiqual Low stress	-	-	-				x		f = 70	fillets 150
4	Ethiqual Low stress	-	B low stress	extended	free	in-home		x		f = 70	fillets 150
5	Ethiqual Low stress	-	A standard	extended	free	in-home		x		f = 70	fillets 150
6	Ethiqual Standard	-	-	-	free	in-home		x	Panel a	f = 140	fillets 300
7	Ethiqual Standard	-	B low stress	extended	free	in-home		x		f = 70	fillets 150
8	Ethiqual Standard	-	A standard	extended	free	in-home		x		f = 70	fillets 150
9	Ethiqual Standard	-	-	-	fixed	in-home	-	-	X	f = 70	fillets 150
9	Commercial Standard	-	-	-	free	in-home	x		Panel b	f = 70	fillets 150
10	Commercial Standard	commercial	B low stress	label	free	in-home	x		Panel a	f = 150	fillets 300
11	Commercial Standard	governmental	B low stress	label	free	in-home	x		Panel a	f = 150	fillets 300
12	Commercial Standard	-	A standard	extended	free	in-home	x		Panel b	f = 150	fillets 300
13	Commercial Standard	-	B low stress	extended	free	in-home	x		Panel b	f = 150	fillets 300
14	Commercial Standard	-	B low stress	label	free	in-home	x		Panel a + b	f = 150	fillets 300

not performed: lack of cod

Annex B: Product questionnaire for (non-)cooks (both in-home and central location test)

(The instructions on this page were presented on a separate sheet)

Instructions to fill out the questionnaire in the consumer test

- Remarks about the product or questionnaire can be placed at the end of the form
- Please answer these questions individually, without consulting others
- Pick the answers that approach your opinion best
- There are no wrong answers, the only right answers are your personal opinions.

Example:

If you **totally agree** with an item, cross this box:

Totally disagree				Neither disagree nor agree				Totally agree
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>				

If you **slightly agree** with an item, cross this box:

Totally disagree				Neither disagree nor agree				Totally agree
<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>				

If you **totally disagree** with an item, cross this box:

Totally disagree				Neither disagree nor agree				Totally agree
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Questions for the person in the household that prepare the fish.

Preparation instructions:

- In total you will receive four (six) cod products in the coming four weeks.
- This cod needs to be prepared in the same way each week.
- Prepare the cod the same way for all persons in your household
- Do not use strong herbs and spices
- Select your favourite method of preparation from the list below

1. I am going to prepare the cod in the following way:

- Boiling
- Microwave
- Bake in the oven (in a oven dish with sauce or vegetables)
- Fry or deep-fry (in pan with butter or oil)
- Bake in pan (marinate and bake with vegetables or sauce)
- Grill or BBQ
- Raw (sushi or sashimi)
- Othere, namely.....

Please read the information on the packaging.

Answer the following questions before you prepare the cod.

2. What is your overall impression of this cod after you opened the packaging?									
Dislike extremely			Neither dislike nor like				Like extremely		
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

3. What is your impression of this cod regarding.....									
Dislike extremely			Neither dislike nor like				Like extremely		
appearance	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
odour	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

4. What is your impression of this cod with regard to the following attributes...									
	Not at all								Very much
Good quality	<input type="checkbox"/>								
attractive	<input type="checkbox"/>								
Fresh	<input type="checkbox"/>								
Healthy	<input type="checkbox"/>								

5. How did you store the cod?

- Un-chilled
- Chilled
- Other.....

6. When did you prepare the cod and eat it?

- Tuesday 17th October
- Wednesday 18th October
- Other.....

7. How did you prepare the cod?

(give a short description of the ingredients used, the time of preparation and preparation method)

Continue with the next questions right after you consumed the cod.

Questionnaire for consumer survey of cod

Product code: _____

Your number in the survey: _____

Date of birth (dd-mm-yy): ____-____-____

Product information: **(varied per session/product)**

Species: Cod, farmed
Country: Norway
Weight: ca. 40-50 g
Price: --

Production:
 Regular production

Store: refrigerated 0-4°C

Please answer the following questions during or just after eating the cod:

1. What is your **overall impression** of this cod?

	Dislike extremely			Neither dislike nor like				Like extremely		
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

2. What is your impression of this cod regarding.....

	Dislike extremely			Neither dislike nor like				Like extremely		
Appearance	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Colour (not asked in NL)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Odour	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Taste/Flavour	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Texture (mouthfeel)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

3. In more detail, what is your impression of this cod with regard to the following attributes...									
	Not at all								Very much
Good quality (only asked in NL)	<input type="checkbox"/>								
Attractive (only asked in NL)	<input type="checkbox"/>								
Soft	<input type="checkbox"/>								
Rubbery	<input type="checkbox"/>								
Tender	<input type="checkbox"/>								
Juicy	<input type="checkbox"/>								
Strong flavour	<input type="checkbox"/>								
Fatty	<input type="checkbox"/>								
Lean	<input type="checkbox"/>								
Dry	<input type="checkbox"/>								
Tough	<input type="checkbox"/>								
Firm (only asked in NL)	<input type="checkbox"/>								
Fresh (only asked in NL)	<input type="checkbox"/>								
Healthy (only asked in NL)	<input type="checkbox"/>								
Natural (only asked in NL)	<input type="checkbox"/>								
Nourishing (only asked in NL)	<input type="checkbox"/>								
Risky (only asked in NL)	<input type="checkbox"/>								
Safe (only asked in NL)	<input type="checkbox"/>								

4. Please give your opinion on the cod (mark one box per line): **(only asked in IS)**

Low quality	<input type="checkbox"/>	High quality						
Not at all fresh	<input type="checkbox"/>	Very fresh						
Unattractive	<input type="checkbox"/>	Attractive						
Unhealthy	<input type="checkbox"/>	Healthy						
Unnatural	<input type="checkbox"/>	Natural						
Not nutritious	<input type="checkbox"/>	Nutritious						
Risky	<input type="checkbox"/>	Without risk						
Unsafe	<input type="checkbox"/>	Safe						

5. I will recommend this products to others:

	Totally disagree	Neither disagree nor agree						Totally agree
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

6. Give your opinion:

	Totally disagree	Neither disagree nor agree						Totally agree
I have mixed thoughts about this product	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I have mixed feelings about this product	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
My thought and feelings about this product are conflicting	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

7. Provided that this product is available in your shops and you are the one who does the shopping:									
	Totally disagree			Neither disagree nor agree				Totally agree	
Next month I plan to buy this product	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Next month I expect to buy this product	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Next month I want to buy this product	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Next month I will try to buy this product	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

8. Good quality cod fillets on the average cost 1.100 kr (in NL € 18,95) per kg. Please answer the following with the cod you just consumed in mind.	
What do you expect this product would cost?	_____ kr €/kg.
What is the highest price you are willing to pay for this product?	_____ kr €/kg.
What would you suggest is an “expensive” price for this product?	_____ kr €/kg.
What would be a “fair” price for this product?	_____ kr €/kg.
What would you suggest is an “inexpensive” price for this product?	_____ kr €/kg.

9. Some questions about the farming conditions of this cod										
	Not at all							Very much		Don't know
Do you <i>feel</i> you know a lot about the way farmed fish are kept and handled?	<input type="checkbox"/>									
As far as you can judge, do you <i>feel</i> living circumstances of the fish in this fish farming is acceptable ?	<input type="checkbox"/>									
As far as you can judge, do you <i>feel</i> stress levels in this fish farming are acceptable?	<input type="checkbox"/>									
As far as you can judge, do you <i>feel</i> slaughtering practices in this fish farming are acceptable?	<input type="checkbox"/>									

9. How important you consider....(only asked in NL)									
	Not at all								Very much
The living conditions of farmed fish?	<input type="checkbox"/>								
The slaughter methods of farmed fish?	<input type="checkbox"/>								
The amount of stress the farmed fishes experience?	<input type="checkbox"/>								

10. I feel the information provided about the product was.....									
	Not at all								Very much
Easy to understand	<input type="checkbox"/>								
Sufficient	<input type="checkbox"/>								
Relevant	<input type="checkbox"/>								
Important	<input type="checkbox"/>								
Familiar to me	<input type="checkbox"/>								
Reliable	<input type="checkbox"/>								

Comments?

Thank you very much ... wait for the next sample/(or) now we would like you to ask you some additional questions.....

Annex C: General questionnaire ETHICOD

Additional questions/attitude survey

Mentioned in IS only: The Protection of Privacy Institution has been notified about this questionnaire, and the data from the survey will be treated according to their instructions. **Complete anonymity is assured in all data treatment.** Your name will never appear, and we will make sure that no information can be traced to individuals.

It is very important that as many participants as possible answer the questionnaire to make the results as reliable as possible. **Your answers are therefore very important.**

Your number in the test: _____

Date of birth (dd-mm-yy): ____-____-____

Please answer the following questions:

1. How often do you consume ...

	Never	Less frequently than 1 x every 6 months	1-5 x every 6 month	1 x month	2-3 x month	1 x week	2 x week	3-4 x week	Daily or almost every day	Do not know
Fish for main meal	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Fish at special occasion (restaurants, with guests etc.)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
fish for snack	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Ready to eat meals	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Farmed cod (asked in IS only)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Wild cod (asked in IS only)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Convenience food (from kiosk, streetkitchen, shop, petrol station etc.) (asked in IS only)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Snacks in general (asked in NL only)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

2. How important are the following aspects for the food you eat on a normal day? (asked in IS only)

	Not important at all					Very important	
Keeps you healthy	<input type="checkbox"/>						
Is nourishing	<input type="checkbox"/>						
Is produced without additives	<input type="checkbox"/>						
Is processed as little as possible	<input type="checkbox"/>						
Is as natural as possible	<input type="checkbox"/>						
Is inexpensive	<input type="checkbox"/>						
Is fast to prepare	<input type="checkbox"/>						
Is easy to make	<input type="checkbox"/>						
Is fresh	<input type="checkbox"/>						
Has a good taste	<input type="checkbox"/>						
Has a good quality	<input type="checkbox"/>						
Ethical produced	<input type="checkbox"/>						
Price	<input type="checkbox"/>						

2. How important are the following aspects for the food you buy? (asked in NL only)

	Not important at all					Very important	
The price	<input type="checkbox"/>						
Freshness	<input type="checkbox"/>						
Fast to prepare	<input type="checkbox"/>						
Safety	<input type="checkbox"/>						
No medicine residues	<input type="checkbox"/>						
Produced in a environment friendly way	<input type="checkbox"/>						
The taste	<input type="checkbox"/>						
No additives	<input type="checkbox"/>						
Quality	<input type="checkbox"/>						
Minimal processing	<input type="checkbox"/>						
Easy to prepare	<input type="checkbox"/>						
Animal welfare	<input type="checkbox"/>						
Naturally produced	<input type="checkbox"/>						
Healthy	<input type="checkbox"/>						

3. How important are the following aspects for the fish you eat on a typical day? (asked in IS only)

	Not important at all					Very important	
Has been caught and produced without suffering	<input type="checkbox"/>						
Has been caught and produced with respect to their rights and well being	<input type="checkbox"/>						
Is not threatening by over-fishing and loss of critical species	<input type="checkbox"/>						
Has been caught and produced in an environmental friendly way	<input type="checkbox"/>						
Has been produced in a way which has not polluted the sea or the other environments	<input type="checkbox"/>						

4. Indicate how often you use the following information when buying fish? (on the package, on the supermarket shelf or on the product label)

	Never					Always	
Fish species / name	<input type="checkbox"/>						
Weight	<input type="checkbox"/>						
Country of origin	<input type="checkbox"/>						
Fish welfare	<input type="checkbox"/>						
Nutritional composition	<input type="checkbox"/>						
Brand name	<input type="checkbox"/>						
Capture area	<input type="checkbox"/>						
Quality label	<input type="checkbox"/>						
Wild / Farmed	<input type="checkbox"/>						
Price	<input type="checkbox"/>						
Environmental friendly	<input type="checkbox"/>						
Expiry date (best-before-date)	<input type="checkbox"/>						

5. At a standard fish farm it is likely that.....

	Disagree		Neither agree nor disagree			Agree		Do not know
Stress during slaughtering is kept to a minimum	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
The fishes preventative receive antibiotics	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Fish welfare is not a point of attention	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
In The Netherlands fish is farmed in basins on the land	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Living conditions are very stressful	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
In Norway fish is farmed in basins on the land	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Contributes to a reduction of wild catch (only asked in NL)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Fishes are pumped to the slaughter platform. (only asked in NL)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	

The health of farmed fishes is well taken care of (only asked in NL)	<input type="checkbox"/>							
Fish farms pollute the environment (only asked in NL)	<input type="checkbox"/>							
Fishes are very well controlled for unnatural substances (only asked in NL)	<input type="checkbox"/>							
The fish welfare is very well taken care of (only asked in NL)	<input type="checkbox"/>							

6. What would you think if you'd know that for a farming method....? (asked in NL only)

	Very negative							Very positive
The living conditions are stressful	<input type="checkbox"/>							
Fishes are controlled for unnatural substances	<input type="checkbox"/>							
Fish welfare is taken care of	<input type="checkbox"/>							
Fishes will receive preventative antibiotics	<input type="checkbox"/>							
The farm pollutes the environment	<input type="checkbox"/>							
The welfare of fishes is NOT a point of attention	<input type="checkbox"/>							
The health of fishes is taken care of	<input type="checkbox"/>							
Stress at slaughtering is kept to a minimum	<input type="checkbox"/>							
The farm helps reducing the wild catch	<input type="checkbox"/>							
The fishes are pumped to the slaughter platform	<input type="checkbox"/>							

7. How much do you disagree or agree with the following statements?

	Totally disagree		Neither disagree nor agree				Totally agree	
The less effort (work, energy) I use on a meal, the better	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I prefer meals that are fast to prepare	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I feel fish is fast to prepare	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I feel fish is easy to prepare	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Good health is important to me	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I am very concerned about the health-related consequences of what I eat	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I often think about my health	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I think of myself as a person who is concerned about healthy food	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Cooking is important to me (asked in IS only)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Cooking means a lot to me (asked in IS only)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I care a lot about cooking (asked in IS only)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

only)								
I appreciate cooking very much (asked in IS only)	<input type="checkbox"/>							
Buying convenience food for dinner gives me value for the money (asked in IS only)	<input type="checkbox"/>							
It means a lot to me to have good health (asked in IS only)	<input type="checkbox"/>							
I like fish very much for dinner (asked in IS only)	<input type="checkbox"/>							
Fish is expensive (asked in IS only)	<input type="checkbox"/>							
Fish farming is harmful for wild fish stocks (asked in IS only)	<input type="checkbox"/>							
Fish farming can help to diminish over-exploitation of wild stocks (asked in IS only)	<input type="checkbox"/>							
I have no ethical concerns with eating farmed fish (asked in IS only)	<input type="checkbox"/>							
I like cod very much for dinner (asked in IS only)	<input type="checkbox"/>							
When I buy cod , I expect it to be wild (asked in IS only)	<input type="checkbox"/>							

8. Fish can be caught in the wild and fish can be farmed. To which production type do you associate the following aspects and how much? **(asked in IS only)**

	I do associate mostly to farmed fish			as much to farmed as to wild			I do associate mostly to wild fish	
I like very much for dinner	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Safe to eat	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Nutritious	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Good quality	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Good animal rights (Animal friendly production)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Has a better life	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Good taste	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Pollutes the environment (During production)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Animal friendly killing (Less stress during catch and slaughter)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Natural	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Unethical to eat	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

9. What is your opinion?

	Totally disagree		Neither disagree nor agree				Totally agree	
I am very knowledgeable about fish farming practices	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Compared to others I know a lot about fish farming practices	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Compared to others I know a lot about animal welfare at fish farms	<input type="checkbox"/>						
I feel I know a lot about the welfare of fish in fish farms	<input type="checkbox"/>						
Compared to an average person, I know a lot about fish (asked in IS only)	<input type="checkbox"/>						
I consider myself as an expert on fish (asked in IS only)	<input type="checkbox"/>						
I have a lot of knowledge of how to prepare fish for dinner (asked in IS only)	<input type="checkbox"/>						

10. How much do you disagree or agree to the following statements?

	Totally disagree		Neither disagree nor agree				Totally agree	
If I think about fish being farmed, I feel guilty	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
If I think about fish being farmed, I feel responsible	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
If I think about fish being farmed, I feel pity	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
If I think about fish being farmed, I feel indifferent	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I worry about the welfare of animals being kept for meat production	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
All the attention for animal welfare is overdone	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
It is wrong to keep fish in captivity	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Animal rights should be respected	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Humans are interfering with nature too much	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I feel society has a moral obligation to apply standards for animal welfare	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Farming fish is unnatural	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Farming fish is inevitable	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I would like animal friendly produced products to be labeled as such	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Consumers should be consulted more often about their opinion about animal welfare	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Animal friendly produced meat can be more expensive	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Fish farming has unknown effects on nature	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Fish farming is risky	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Farming fish is positive	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Farming fish is unethical	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Farming fish is negative (asked in NL only)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Farming fish is ethical (asked in NL only)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Normally I neglect information about animal welfare (asked in NL only)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Farming fish is harmful (asked in IS only)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

11. How much do you disagree or agree to the following statements?

	Totally disagree		Neither disagree nor agree				Totally agree	
I trust that fish farmers take care of the welfare of their fish	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Fish farmers are experts concerning fish welfare	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Fish farmers will be confronted by others if they don't take care about the welfare of their fish	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Fish farmers have an interest in hiding the truth about the fish's welfare	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I trust that the government take care of the welfare of their fish	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
The government are experts concerning fish welfare	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
The government will be confronted by others if they don't take care about the welfare of their fish	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
The government have an interest in hiding the truth about the fish's welfare	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I trust that retailers or supermarkets take care of the welfare of their fish	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Retailers and supermarkets are experts concerning fish welfare	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Retailers and supermarkets will be confronted by others if they don't take care about the welfare of their fish.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Retailers or supermarkets have an interest in hiding the truth about the fish's welfare.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

12. If I have a question about animal welfare on fish farming I certainly ask... (asked in NL only)

	Totally disagree		Neither disagree nor agree				Totally agree	
Environmental organizations	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Fish shop or supermarket	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Friends	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
The label on the packaging	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Greenpeace	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Fishery board	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Food Safety Authority	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Ministry of LNV	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Colleagues	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Food nutrition centrum Den Haag	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Government other	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Animal protection organization	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Neighbors	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Consumer organization	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Fish farmer	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Netherlands Institute for Fisheries research	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Ministry of Health (VWS)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

	Totally disagree		Neither disagree nor agree			Totally agree	
TNO	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Other.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

At last, some questions about you

12. Are you? (asked in IS only)

- male
 female

13. Highest completed education? (asked in IS only)

- Primary and secondary school
 Upper secondary school/skill training exceeding 9 years
 1-3 years at university college/university
 4-5 years at university college/university
 More than 5 years at university college/university

14. Where did you live (longest) until age 18?

- rural area
 urban area
 Village (option only in NL)

15.

	Yes	No	
Are you a member of any environmental or animal rights groups?	<input type="checkbox"/>	<input type="checkbox"/>	
Do you support such groups?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> Do not know (option in NL only)

16. Do you have or have you had ...

	Yes	No
One or more dogs	<input type="checkbox"/>	<input type="checkbox"/>
One or more cats	<input type="checkbox"/>	<input type="checkbox"/>
One or more birds	<input type="checkbox"/>	<input type="checkbox"/>
One or more fish	<input type="checkbox"/>	<input type="checkbox"/>

Thank you very much for your participation!

When you have finished to fill in the questionnaire, hand it over to us and collect your present☺