SEAFOOD TOMORROW

Nutritious, safe and sustainable seafood for consumers of tomorrow

Grant agreement no: 773400

Deliverable D4.3

Consumer acceptance and market opportunities for eco-innovative solutions

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Dissemination Level	
PU Public	x
PP Restricted to other programme participants (including the Commission Services)	
RE Restricted to a group specified by the consortium (including the Commission Services)	
CO Confidential, only for members of the consortium (including the Commission Services)	

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1. Summary

This deliverable summarises findings of Task 4.1. Consumers' acceptance, sensory perception and preferences of solutions (TL: UGent; Participants: IDMer, CBHU, Aeiforia, ECU, M3-39). The findings are based on focus group discussions, consumer surveys and experimental auctions in three EU-regions representing different seafood production and consumption traditions and habits: West (Belgium), Central (Hungary) and South (Italy). Ethics approvals have been obtained for each of these studies prior to the start of any data collection. Consumers' acceptance, sensory perceptions, personal (knowledge, consumption frequencies, attitudes, socio-demographics) and environmental (information, context, shopping) determinants, as well as preferences towards solutions for seafood production (e.g. nutrient sources, aquaculture systems; WP1 products) and processing (e.g. sodium reduction, tailor-made seafood, monitoring tools for quality and safety; WP2 products) were assessed and reported to demonstrate the market opportunities for the eco-innovative solutions developed within the SEAFOOD[TOMORROW] project.

2. Objectives

The main objectives of the Task 4.1 were to assess consumer acceptance of the eco-innovative seafood solutions and products through qualitative focus group discussions and quantitative surveys; consumer acceptability through experimental auctions combined with sensory tasting and information provision; and market opportunities for the new seafood products, techniques and/or processes for sustainable production of safe and high quality seafood in the EU.

3. Background

Promoting healthy diets and lifestyles to reduce the global burden of non-communicable diseases requires a multisector approach involving the various relevant sectors in societies (Miller *et al*, 2012). Consumer habits are changing, and issues such as overindulgence, convenience, health, ethics, variety, value for money, sustainability and safety are becoming more important (Thorsdottir *et al*., 2012). Seafood is an important food commodity consumed in Europe with an average annual per capita consumption of 22.2 kg (Thorsdottir *et al*., 2012). However, a downward trend in European per capita seafood consumption has been registered since 2008, as EU consumers buy less seafood but spend more money on it (EUMOFA, 2017). The majority of European consumers do not meet the dietary recommendations of eating two portions of fish per week, and a huge variation in seafood consumption frequencies and habits exists across EU countries, as well as in the different strata of the population, with lower intake among children, young adults and older adults (European Commission, 2015). Therefore, it is important to understand consumers' preferences and behaviour, as well as the associated characteristics and determinants, in order to optimize and validate the seafood envisaged solutions that address their interests and needs.

This deliverable summarises findings of the Task 4.1 Consumers' acceptance, sensory perception and preferences of solutions in three EU-regions representing different seafood production and consumption traditions and habits: West (Belgium), Central (Hungary) and South (Italy). The studies were coordinated and conducted by Ghent University in Belgium and supported and conducted in Hungary by Campden BRI Hungary and in Italy by the academic spin-off AEIFORIA, University Cattolica del Sacro Cuore and ECU.

Three phases of studies were conducted to effectively capture consumers' initial reactions, attitudes and the behaviour intentions (Figure 1). Phase 1 was based on qualitative exploratory data collection using focus groups. Data were collected

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through two focus group discussions in each region involving 6-8 participants per discussion group. These discussions allowed collecting a diversity of reactions, opinions, beliefs and expectations from a select group of consumers in relation to the eco-innovative solutions. Phase 2 was based on quantitative and conclusive data collection using a consumer survey. A consumer survey with 400 participants in each region was performed. The survey assessed consumer attitudes (e.g. benefit and risk perceptions), expectations (e.g. in relation to information), and intentions towards eco-innovative solutions that are relevant for consumers. Phase 3 was based on quantitative and conclusive data collection using experimental auctions. It was performed to collect data on consumers' willingness-to-pay (WTP) in each of the three regions. Sensory consumer tasting was integrated in the experimental auctions, allowing accounting for the impact of taste preference. The experimental auctions were performed among approx. 300 adults per region, with a specific focus on gender and specific segments of the population, such as children and elderly consumers, for T2.2 products.

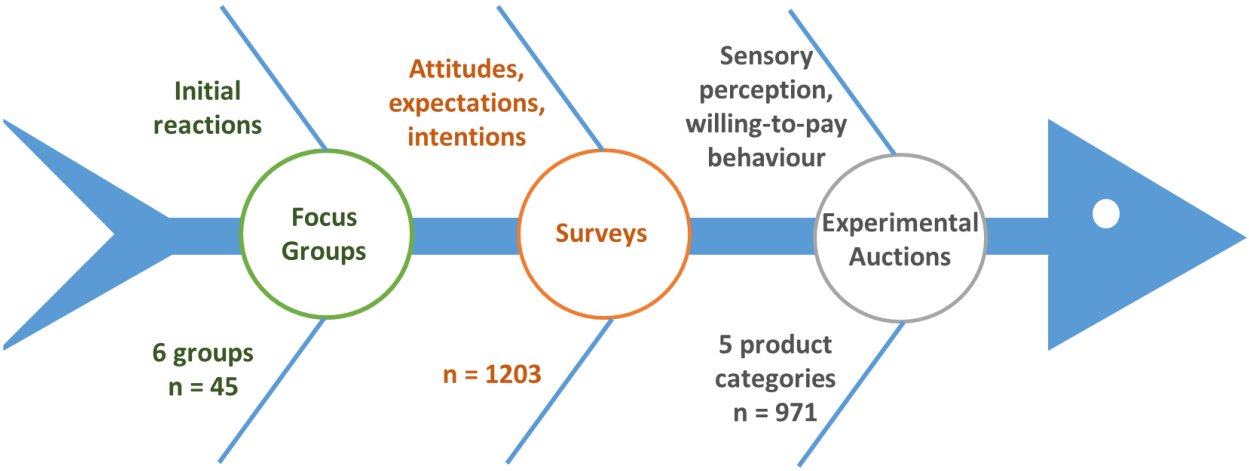

Figure 1. Three phrases of studies to assess consumers' initial reactions, attitudes and the behavioural intentions towards the eco-innovative seafood solutions of SEAFOOD[TOMORROW] (task T4.1).

4. Methodology

Ethics approvals have been sought and obtained by the Medical Ethics Committee of Ghent university hospital (Reference numbers: B670201836636; B670201941488 and B670201940848 respectively for the focus group discussions, surveys and experimental auctions) (see ANNEX I) based on the research protocols, information sheets and questionnaires prior to the start of the respective data collection.

All participants were asked to provide a written informed consent before taking part in the study (cf. Informed consent). In order to guarantee the anonymity and confidentiality of the participants and their information provided, a unique code or id number was used as identity in the database.

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4.1 Focus group discussions

4.1.1 Participant selection and recruitment

The six consumer focus group discussions were carried out during June and July 2018 in Belgium (BE), Hungary (HU) and Italy (IT).

In Belgium and Hungary, participant selection and moderations of the discussions was done by a specialised market research and recruitment company (AskIt Communications in Belgium, Gajdos Tibor EV in Hungary), both abiding the ICC/ESOMAR International Code on Market and Social Research regarding ethics in social sciences research (ICC/ESOMAR, 2008). In Italy, participants were selected and recruited by researchers of the Catholic University of Piacenza (Università Cattolica del Sacro Cuore, UCSC) and by the European Consumers Union (ECU) with respect for the ethics.

Each focus group consisted of 6 to 8 participants, in line with the guidelines for conducting focus group discussions. General consumers was targeted, not experts or particular consumer groups. Two focus groups were held in each region and in each region each focus group consisted of a different group of consumers. Groups were divided based on consumption and preference of seafood products:

- Group 1: high frequency seafood consumers and preference for seafood products
- Group 2: low frequency seafood consumers and no preference for seafood products

Among those groups attention was paid to the age distribution (young: 18-35; adults: 35-60; seniors: 60-65). Before participant selection, each partner collected information on the seafood consumption pattern in their country in order to make a relevant distribution of the age.

Additional selection criteria for each consumer group were based on gender (equal distribution of males and females), variation in educational background, no allergies for fish products or self-restrictions, responsible for food purchase. Furthermore, each group needed to include female participants who have children of the age 8-12 years. The table below provides an overview of the selection criteria for each consumer group.

Selection criteria for each consumer group:

Group 1: high frequency seafood consumers and preference for seafood products	**Group 2: low frequency seafood consumers and no preference for seafood products**
• consuming seafood products at least once a week • preference for seafood products • 4 men and 4 women, between the ages of 18-65 • variation in age between 18 and 65 • variation in educational background • no allergy for fish products or self-restrictions (e.g. vegetarian) • responsible for food purchases in the family • include female participants who have children of the age 8-12	• consuming seafood products less than once a month • no preference for seafood products • 4 men and 4 women, between the ages of 18-65 • variation in age between 18 and 65 • variation in educational background • no allergy for fish products or self-restrictions (e.g. vegetarian) • responsible for food purchases in the family • include female participants who have children of the age 8-12

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4.1.2 Study design

The focus group discussions followed a topic guide that facilitated a semi-structured conversation and discussion. The topic guide was developed by the researchers of the three EU-regions and was also presented at the 6 month consortium meeting for further inputs. Based on these inputs the topic guide was further developed and finalised.

The final topic guide consisted of an introduction, a short warming-up exercise and six specific topics. Consumers were asked about their associations with seafood products (topic 1). Next, the eating habits and seafood purchase of consumers were gathered (topic 2). Consumer perceptions of the healthiness of seafood products were discussed in topic 3. This was followed by consumers' perceptions related to healthier seafood products for specific target groups (children (8-12y), pregnant women, elderly consumers (60+)). Consumer perceptions about labelling and sustainability of seafood products were assessed in topic 5. Finally, consumer perceptions on natural sources added to the feed of the seafood were collected in topic 6. At the end of the discussion, participants had the chance to add any other issue that was not yet tackled during the discussion.

Overview of the topics and aim of each topic of the topic guide:

Topic	**Aim**
Topic 1: Associations with seafood products	*Getting to know consumer associations related to seafood products*
Topic 2: Consumers' eating habits and purchase	*Obtaining information about consumption and purchase*
Topic 3: Healthiness of seafood products	*Obtaining insight into consumer perceptions of the healthiness of seafood products*
Topic 4: Consumer perceptions related to healthier seafood products for target groups	*Obtaining insight into consumer perceptions of the healthiness of seafood products for target groups (children (8-12y), pregnant women, elderly (60+))*
Topic 5: Consumer perceptions about labelling sustainability of seafood products	*Obtaining consumer perceptions about labelling and sustainability*
Topic 6: Natural resources in fish feed	*Getting to know consumer perceptions on natural sources added to the feed of the seafood.*

Projective techniques were included in the topic guide in order to collect more intuitive information of consumers on specific topics.

Overview of the projective techniques used:

Projective technique	**Task**
PR technique 1: about seafood	*Participants had to complete two sentences "the good thing about seafood products is..." and "the bad thing about seafood products is..."*
PR technique 2: seafood purchasing	*Ranking of the main top 5 drivers according to importance when purchasing fresh seafood products and processed seafood products.*
PR technique 3: health benefits for three target groups	*Participants had to indicate which of the components in the seafood product support the health benefits of children, pregnant women and elderly. A list of health benefits was presented to the participants of which they could select (reduced in salt content, rich in selenium, rich in omega 3, rich in DHA, rich in iodine, rich in vitamin B12, rich in vitamin D).*

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PR technique 4: concept telling	*The participants were provided a concept description document as an example of one of the recipes that could be developed within the project. They had to select from a list of statements which of the statements fitted better product concept.*
PR technique 5: seafood origin	*The participants were asked to divide the seas/oceans/countries provided into preferred and non-preferred groups.*
PR technique 6: Seafood sustainability issues	*First, participants had to list for which aspects they would be willing to pay more for seafood products that are produced in a sustainable way. Secondly, the sustainability labels (MSC and ASC) were shown and participants had to indicate if they knew the label and the meaning according to them.*
PR technique 7: Best to improve sustainability	*The participants had to complete the sentence "The best thinkable way to improve the sustainability of seafood products is...".*

The English topic guide and projective technique documents were distributed to all three EU-regions and were translated in the native language of the region (Annex II). The translated topic guide was strictly followed by the moderator of the focus group discussions. Specific directions were given in order to increase the conformity of the discussions in the different regions. The focus group discussions were performed in the native language of the participants (Dutch in Belgium, Hungarian and Italian).

4.1.3 Content analysis

All focus group discussions were audio- and video-recorded and transcribed verbatim for thematic analysis. Open coding was employed, messages were compared and grouped into different themes based on similarities using NVIVO software (NVIVO Pro 11). Based on the patterns of meaning in the content as outlined in the topic guide the main themes were identified. The participants were given a code in order to ensure their anonymity.

4.2 Consumer surveys

4.2.1 Participant recruitment

Participants were recruited by the market research agency Dynata in Belgium and Hungary. In Italy, recruitment was done by the network of Aeiforia, University Cattolica del Sacro Cuore and ECU.

4.2.2 Consumer survey content and pretest

The master questionnaire was developed in English and translated into the respective national languages, i.e. Dutch for the Belgium, Hungarian for Hungary and Italian for Italy. The translated versions of the questionnaire were checked by the project partners who are native speakers of the respective languages. In Belgium and Hungary, the online survey was conducted in collaboration with the contracted market research agency (Dynata) using their online consumer access panels. In Italy, the online survey was conducted using SurveyMonkey. The questionnaire was first pretested by the market research agency in Belgium and Hungary and was checked by the involved researchers for clarity of content, language/ wording, overall understanding, length of the survey and programming of the online survey. Using the feedback obtained, the questionnaire was refined and finalized. The outline of questionnaire is presented in ANNEX III. The survey began with a check for sample inclusion criteria, followed by the description of the project and the informed consent. The questions were divided into seven sections: (1) Socio-demographics and personal information; (2) Seafood consumption; (3) General attitudes and perceptions towards seafood products; (4) Health; (5) Sustainability; (6) Information; (7) Reactions towards eco-innovative solutions.

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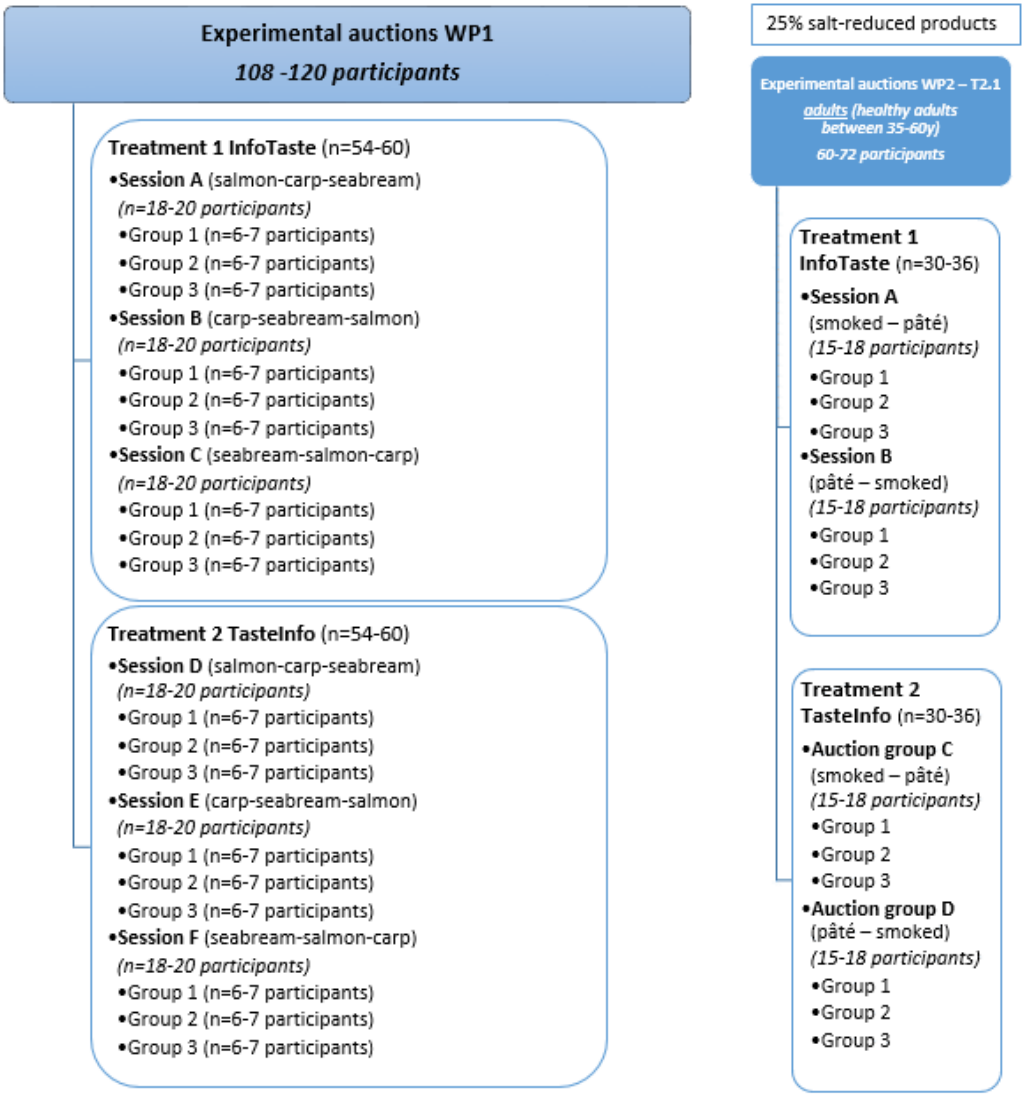
4.2.3 Statistical analysis

Statistical analyses were carried out with SPSS Statistics 25.0 (IBM SPSS, Armonk, NY, USA).

4.3 Experimental auctions design

4.3.1 Participant recruitment and sample distribution

For WP1 products for adults in general, the experimental auctions were performed in November – December 2019 with a total of 272 participants. For WP2 products for adults in general (n = 185), children (n = 160), pregnant women (n = 172) and seniors (n = 188), the experimental auctions were preformed throughout 2020. The targeted sample size and timeframe were heavily affected due to the COVID-19. The following diagrams show the number and types of participants targeted in each product category:



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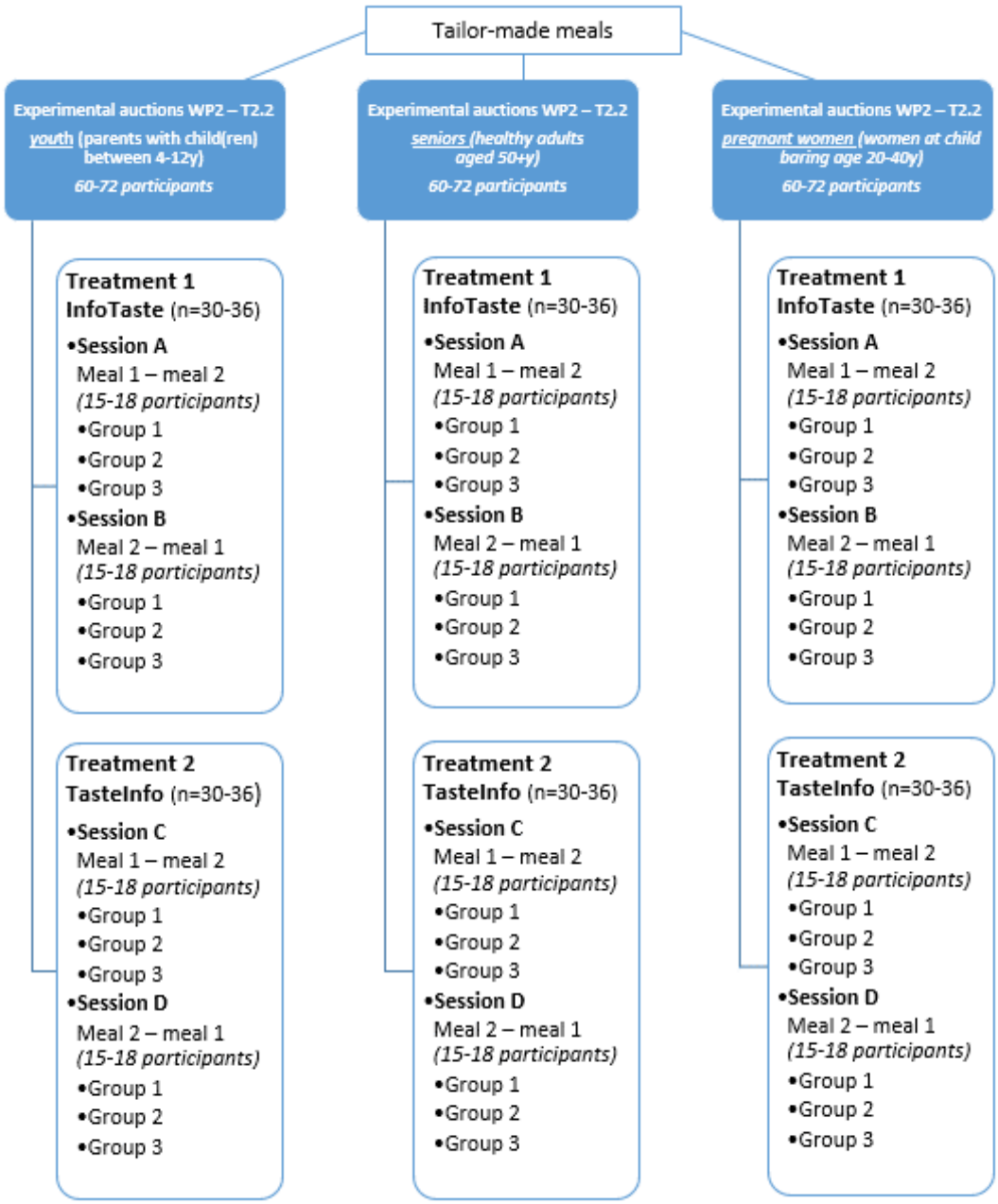

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4.3.2 Expimental auctions design

Second price Vickrey auctions were performed in this study across different sessions to cover all treatment effects with a full-factorial design. Below is an example of the flow of experimental auctions based on the WP1 products for adults in general for two of the six sessions. Detailed descriptions about the rotation and comparisons can be referred to ANNEX IV.

Sequence			Treatment 1 InfoTaste			Treatment 2 TasteInfo		
			Session A			Session D		
1			Instruction and practice round			Instruction and practice round		
2			Hunger level assessment			Hunger level assessment		
			Randomise			*Randomise*		
			Salmon	Carp	Seabream	Salmon	Carp	Seabream
3	5	7	Visual evaluation	Visual evaluation	Visual evaluation	Visual evaluation	Visual evaluation	Visual evaluation
4	6	8	Control bid round	Control bid round	Control bid round	Control bid round	Control bid round	Control bid round
					E			*E*
9	11	13	Info	Info	Info	Taste	Taste	Taste
10	12	14	Bid	Bid	Bid	Bid	Bid	Bid
					A			*C*
15	17	19	Taste	Taste	Taste	Info	Info	Info
16	18	20	Bid	Bid	Bid	Bid	Bid	Bid
					B			*D*
21	23	25	Reference price	Reference price	Reference price	Reference price	Reference price	Reference price
22	24	26	Bid	Bid	Bid	Bid	Bid	Bid
27	28	29	Draw bidding round for Salmon →	Draw bidding round for Carp →	Draw bidding round for Seabream	Draw bidding round for Salmon →	Draw bidding round for Carp →	Draw bidding round for Seabream
30			Questionnaire consumer frequency and socio-demo			Questionnaire consumer frequency and socio-demo		
31			Each highest bidder for each seafood product purchases the fortified Salmon/Carp/Seabream			Each highest bidder for each seafood product purchases the fortified Salmon/Carp/Seabream		

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Randomisation of WP1 seafood products:

Treatment	Session	Seafood product 1	Seafood product 2	Seafood product 3
1	**A**	Trout	Carp	Seabream
	B	Carp	Seabream	Trout
	C	Seabream	Trout	Carp
2	**D**	Trout	Carp	Seabream
	E	Carp	Seabream	Trout
	F	Seabream	Trout	Carp

4.3.3 Statistical analysis

Statistical analyses were carried out with SPSS Statistics 25.0 (IBM SPSS, Armonk, NY, USA).

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5. Results and discussion

5.1 Focus groups

Sample characteristics

Participants were divided in two groups based on the consumption frequency of seafood products (high frequency consumers, HFC and low frequency consumers, LFC). Among those groups age was distributed according to the target groups of the project (young: 18-35; adults: 35-60; seniors: 60-65).

Each consumer group had an equal distribution of males and females and each group included female participants who have children (age 8-12). Table 1 provides an overview of the demographics, seafood consumption frequency and purchase frequency of seafood products of the participants per EU-region.

Table 1. Age range, distribution of gender, frequency of participants with children, consumption and purchase frequency of seafood products of consumer participants (n=45).

	Belgium (n=13)		Hungary (n=16)		Italy (n=16)	
	HFC (n=6)	LFC (n=7)	HFC (n=8)	LFC (n=8)	HFC (n=8)	LFC (n=8)
Age range (years)	34-64	27-67	21-58	23-64	19-61	25-65
Gender (frequency)						
Male	3	4	4	4	4	4
Female	3	3	4	4	4	4
Participants with children (frequency)	3	4	5	4	2	4
Consumption frequency	high	low	high	low	high	low
Purchase frequency						
Daily	0	0	3	0	0	0
Weekly	6	0	4	0	8	0
Once every 2 weeks	0	0	1	0	0	0
Once a month	0	2	0	0	0	0
Multiple times a year	0	5	0	0	0	8
Less frequently	0	0	0	8	0	0

5.1.1 Topic 1: Associations with seafood products

Free word association seafood products

In the three EU-regions, seafood products were associated with:

- sensory characteristics: taste, smell (smell at fish market), product (local product, fresh products)
- fishery (labour, fisherman, fishing nets, wild caught seafood)
- place of purchase (fish markets, little harbours)
- health (omega-3, vitamins, minerals, nutrition, sport)
- sea/oceans/coastal areas (North sea, Mediterranean sea)
- consumption (during Christmas)
- financial (price)
- leisure (sport fishing, relaxing)

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- pollution

Figure 2 gives a graphical illustration of consumers' associations given in the three EU-regions (Belgium, Hungary and Italy). Most frequently used words during this association exercise were: fish, smell, fresh, market, sea, seafood, ate, caught, coast, health, omega and wild.

Figure 2. Associations with seafood products based on word frequency query (NVivo) for all three EU-regions (Belgium, Hungary, Italy).

Consumption frequency

All EU-regions conducted the focus group discussions for two different consumer groups (high frequency consumer group (HFC), low frequency consumer group (LFC)). The answers reflected the consumption frequency of both groups.

In **Belgium** the high frequency consumers consumed at least once a week seafood products. Some of the participants consumed seafood products daily or 4 time a week. They also mentioned that they consume more seafood products during summer. For the low frequency consumer group the participants could be divided into two groups: 4 participants rarely ate seafood products, the other 3 participants of this group appeared to consume once a week seafood products.

Hungary: The participants in the first group consume fish once a week. During the discussion it became clear that there is a cultural change, because previously the fish consumption was concentrated on the big events such as Christmas, holiday season, special occasion, but nowadays it has been spread during the whole year.

The next generation, children, was also said as important factor to increase the consumption. Due to the health benefits of the fish products the parents are looking for the preferred preparation methods.

"PART421: It's been 5 years since we started buying and preparing fish at home regularly (weekly), thanks to my son."

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The participants said that consumption also depends on the price "to be expensive, but there are price-cuts regularly, and it worth it to stock up."

The low frequency consumer group also mentioned the big events e.g. Christmas and Balaton as a holiday resort where a good fish is part of the holiday eating habit.

This group much more preferred if somebody else prepared the fish food to avoid the smell during preparation. They also preferred the fish food in the restaurant for the same reason. They eat 1-2 month, but in some cause e.g. fish pasta, fish salad more often.

Italy: The participants in the low frequency consumer group rarely consume fish.

The high frequency consumer group consume seafood once to four times a week.

Role of seafood in the diet

Personal diet

The role of seafood in the personal diet was mainly linked to health and health benefits.

Next to health benefits, it was also linked to taste, reward and as a component of a meal. However, some participants mentioned it had no important role in their personal diet.

Belgium: The role of seafood in the personal diet was mainly linked to health and health benefits and taste.

"PART611 I eat seafood because I like it. And because it is healthy"

Next to health benefits and taste, participants mentioned it functions as a reward.

"PART212 For me it mainly depends if I want to treat myself. I really like shrimp and mussels and so on. So that's a reward. "

Some participants (in the low frequency consumer group) mentioned it had no important role in their personal diet.

Hungary: The role of seafood in de personal diet was related to sport and lose weight, etc.

Italy: The answers were related to health benefits and nutritional aspects (e.g. omega 3), protein alternative to meat, eggs, cheese. The low frequency consumer group assessed seafood role as covering 15 to 40% of the diet.

Family diet

The main role to consume seafood products in the family diet is because of educational reasons. Participants mention it is important that children learn to eat and get to know all flavours. Additionally, they mention it is good for their health.

Belgium: Participants mention it is important that children learn to eat and get to know all flavours and for their health. Belgian participants also mention it is sociable and that is it linked with holidays.

Hungary: The answers were related health of the children and health benefit for the family.

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Italy: The answers were related to health benefits and nutritional aspects (e.g. omega 3), protein alternative to meat, eggs, cheese.

Country

The main role in the three EU-regions was linked to location, holidays and tradition.

Belgium: The role of seafood in Belgium is mainly linked to location, holidays and tradition according to the participants.

Hungary: The role of fish / seafood products is still highly related to cultural/consumption habits such as Christmas, Balaton, holiday and special occasions.

Italy: The role of seafood products is highly related to cultural/consumption habits, depending on regional variations (e.g. North vs South). The high frequency consumer group assessed seafood role as covering 15 to 60% of the diet.

PR technique_1: Positive/negative aspects of seafood products? Complete the sentence:
"The good thing about seafood products is..."
"The bad thing about seafood products is..."

Table 2. PR technique_1: Positive/negative aspects of seafood products per EU-region.

Belgium	HFC (n=6)		LFC (n=7)	
	Aspect	Freq.	Aspect	Freq.
Good	Healthy	5	Tasty	5
	Varied diet	3	Healthy	3
	Tasty	2	Varied diet	1
	Nutritional aspects	1		
	Easy to digest	1		
Bad	Bony	4	Bony	4
	Price	3	Price	2
	Preparation	2	Smell	2
	Availability	1	Seasonal	1
	Origin	1	Pollution	1
			Preparation	1
			Shelf life	1
Hungary	HFC (n=8)		LFC (n=8)	
	Aspect	Freq.	Aspect	Freq.
Good	Healthy	7	Healthy	5
	Tasty	5	Omega fatty acids	2
	Varied diet	2	Low fat	2
	Natural	1		
Bad	Expensive	3	Smell	5
	Difficult to get fresh products	2	Expensive	4
	Bony	2	Taste	1
	Pollution	2		

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Italy	HFC (n=8)		LFC (n=8)	
	Aspect	Freq.	Aspect	Freq.
Good	Nutritional aspects	4	Freshness	1
	Taste	3	Taste	4
	Wide range of choice	2	Nutritional aspects	5
	Digestibility	3	Wide range of choice	1
Bad	Smell	1	Price	3
	Price	2	Low quality/pollution	3
	Origin	1	Preparation	3
	Bones	1	Allergens	1

Belgium: Most participants in HFC Group associate seafood with healthiness and a varied diet, 2 of them mentioned taste too. Even though people in LFC Group rarely eat seafood, they still positively associate it with taste and health. One participant also associates it with a varied diet.

The opinions in both groups on the bad things were mainly the presence of fish bones in seafood and the high price of the seafood products.

Hungary: Most participants in HFC Group associate seafood with healthiness and good taste, 2 of them mentioned the varied diet too. Even though people in LFC Group rarely eat seafood, they still know about the health benefits of these products, for example high omega fatty acid content and low-fat content.

The opinions of HFC Group on the bad things is really divided. The high price, difficulty of getting fresh seafood, fish bones and a polluted place of origin are divided equally. Five people of LFC Group consider the smell as a drawback, and half of the group thinks that seafood is too expensive.

Italy: Most participants in LFC Group associate seafood with positive nutritional aspects and good taste. People in HFC Group mentioned the positive nutritional aspects, taste, high digestibility and the variety which allows a wide range of choice.

The opinions of LFC Group on the bad things include the high price, low quality and pollution, the difficult and time-consuming preparation and one mentioned the problem of allergens. In HFC group people mentioned the high price, smell, the origin and the problem of fish bones.

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5.1.2 Topic 2: Consumers' eating habits and purchase

Eating habits

Consumption type of seafood

A wide variety of fresh, frozen, canned seafood products were consumed in all three EU-regions (Fig.2). However, some regional differences are noticed (see types of consumption per region below).

Figure 3. Types of seafood products consumed based on word frequency query (NVivo) for all three EU-regions (Belgium, Hungary, Italy).

Belgium: The participants listed the huge variety of the products: (smoked) salmon, cod, pangasius, sprat, (smoked) halibut, sardines, anchovies, (canned) tuna, soused herring, monkfish, mackerel, eel with herbs, tub gurnard, grey shrimps, scampi, crab, lobster, oysters, mussels, pod razor, Venus clams, coquilles, fish spreads, fish sticks.

Hungary: The participants listed the huge variety of the products:

- ready to cook/fry _ well prepared

- frozen fish products, mainly fish fingers (brand Iglo, Alaska) some participants rejected the fish fingers because of the fish content is low.

- canned fish (in oil and tomato sauce), in those ones who do not really prefer canned products they look for good quality products, no off flavour, etc.

- ruszli (marinated herring with onion rings)

- vacuum packed prepared fish products.

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Italy: The participants of the HFC group listed:

- Fresh seafood
- Frozen seafood
- Ready-to-eat seafood

The participants of the LFC group listed:

- Fresh seafood
- Frozen seafood
- Canned seafood

Someone mentioned that frozen and canned are more convenient and easier to prepare. Someone else said that they prefer fresh products but they are afraid that fresh seafood is not really fresh (in the North of Italy, far away from the sea). Some preferences appear in other parts of the discussion: for example smoked salmon, canned tuna, fresh products like seabream or mussels, fish sticks for children, frozen fillets like sole...

Place of consumption

In general seafood products are mainly consumed at home, restaurant and along the coast.

Belgium: The majority of the participants consumes seafood products at home, restaurants and during holiday at the coast.

Hungary: The majority of the participants said to consume fish products at home, most rarely in restaurants.

Italy: The majority of the participants of the LFC group said to consume fish products at home, most rarely in restaurants. In the HFC group, people consume seafood equally at home and at the restaurant.

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Seafood purchase

Place of purchase

In general seafood products are purchased in supermarkets, fish shop, fish monger, local market.

Figure 4. Seafood place of purchase based on word frequency query (NVivo) for all three EU-regions (Belgium, Hungary, Italy).

Belgium: Majority of the participants purchases their seafood products at supermarkets, local markets and at the fish monger.

Hungary: Majority of the participants choose supermarkets, but prefer the market as well, but the opening hours and variety is sometimes less than the supermarket.

They agreed that the fish available in the market is fresh. In Hungary there are no local seafood markets for fish (no coastal areas). There are fish stands including seafood and river fish on marketplace.

"PART221: I sometimes shop at the market, but I rarely find what I want. The problem is that 99% of the meat products is pork, etc, only about 1% is fish, and when I get there, they are all out of salmon. I buy fish at bigger shops because it is guaranteed that I will find what I want. I don't know why the markets don't want to do something about this. You can find fish on holidays, but it is much rarer on ordinary weekdays."

"PART322: I heard you can get fresh fish at the market, but in small shops only pre-made, frozen, marinated food."

Italy: The majority of the participants of the LFC group choose supermarkets. It is more convenient because of the opening times and because they can buy seafood in the same place where they do the other shopping. The majority of the participants of the HCF group buy seafood at the fish shop.

Drivers of purchase of fresh seafood products

PR technique_2 Ranking exercise 1 for fresh seafood products

Belgium: In case of HFC group, the highest ranked mentioned drivers were taste and appearance when purchasing fresh seafood products. The most frequently mentioned drivers were price and appearance. However, participants have a different ranking score to these drivers.

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In case of LFC group, the highest ranked driver was price. The most frequently mentioned drivers were price, appearance and the expiration date. Price has an important role as it was mentioned among the most important aspects (table 3).

Hungary: In case of HFC Group, the highest ranked, most frequently mentioned drivers were cleanness, appearance, price, place of origin, selection, and pack size when purchasing fresh seafood products. The drivers are mostly the same for every participant, but the ranking scores are greatly varied.

In case of LFC group the most frequently mentioned driver was freshness. Price has an important role for them; it was mentioned among the most important aspects (table 3)

Italy: In both groups, the highest ranked, most frequently mentioned drivers were freshness, price, place of origin, and degree of preparation/time of preparation (table 3).

Table 3. Drivers of purchase of fresh seafood products for Belgium (a), Hungary (b), Italy (c).

BELGIUM	HFC: Fresh seafood products			LFC: Fresh seafood products	
Ranking score	Drivers	Freq.		Drivers	Freq.
5	taste	2		price	2
	appearance: fresh (colour)	2		fat content (preferably fat omega-3)	1
	recipe	1		recipe	1
	attractive	1		sustainable	1
	desire for type of fish	1		appearance	1
				no bones	1
4	freshness	3		price (promotion, availability (ecology))	2
	desire	1		appearance	2
	overfishing	1		smell	1
	type of fish (texture)	1		origin	1
				less waste	1
				desire	1
3	price	3		appearance	2
	variation of shellfish	1		taste	1
	no bones	1		fat content	1
	ability to buy	1		price	1
				fresh	1
				expiration date	1
2	price	3		sustainability (threatened, origin)	1
	appearance	2		no bones	1
	sustainable	1		experience	1
				cleaned	1
				price	1
				expiration date	1

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				frozen	1
1	bones	1		expiration date	2
	recipe	1		cleaned	2
	previous experience	1		farmed/wild	1
	type of fish	1		no bones	1
	appearance	1		frozen	1
				promotion	1

HUNGARY	HFC: Fresh seafood products			LFC: Fresh seafood products	
Ranking score	Drivers	Freq.		Drivers	Freq.
5	Cleanness	2		Freshness	6
	Appearance	2		Price	3
	Selection	1		Quality	1
	Place of origin	1		Storage	1
	Filleted	1		Purchase size	1
	Price	1			
4	Place of origin	3		Price	2
	Selection	2		Reliability	2
	Price	2		Appearance	1
	Cleanness	1		Consistency	1
	Shelf life	1		Freshness	1
	Freshness	1		Packaging	1
	Species	1		Selection	1
3	Pack size	3		Appearance	2
	Place of origin	1		Marketability	1
	Price	1		Price	1
	Acquisition	1		Selection	1
	Hygiene	1			
	Filleted	1			
	Cleanness of the counter	1			

ITALY	HFC: Fresh seafood products			LFC: Fresh seafood products	
Ranking score	Drivers	Freq.		Drivers	Freq.
5	Origin	2		Origin	1
	Quality	1		Best before date	1
	Price	1		Taste	1
	Nutritional aspects	2		Price	2
	Taste	1		Freshness	2

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	Freshness	1		Visual aspect	1
	Type	1			
	Feeding	1			
4	Sustainability	1		Oily fish	1
	Origin	3		Traceability	1
	Price	2		Nutritional aspects	1
	Freshness	3		Cooking preparation	2
	Quality	2		Price	1
	Preparation	1		Freshness	2
	Type	1		Taste	1
				Origin	1
3	Price	2		Visual aspect	1
	Origin	1		Freshness	1
	Type	2		Price	2
	Possibility of choice	1		Origin	1
	Colour	1		Easiness of cooking/preparation	1
	Residue disposal	1		Healthiness	1
				Goodness	1
2	Price	1		Price	3
	Quick cooking preparation	1		Quick cooking preparation	1
	Origin	1		Origin	1
	Smell	1		Place of purchase	1
	Place of purchase	1		Suggestion of the seller	1
				Smell	1
1	Price	1		Time for preparation	2
	Taste	1		Crustaceans	1
	Type	1		Taste	1
	Degree of preparation	1		Filth	1
				Type	2
				Colour	1

Drivers of purchase of processed seafood products

PR technique_2 Ranking exercise 2 for processed seafood products

Belgium: In case of the high frequency consumer group, the highest ranked, drivers were taste, E-numbers and sugars/pure and in function of a dinner. The most frequently mentioned drivers were the ingredients (including E-numbers, sugars and amount of mayonnaise), price and appearance, taste and desire when purchasing fresh seafood products.

In case of low frequency consumers, price was mentioned among the most important drivers. The most frequent mentioned drivers were impulse, desire, taste and the price and promotions (table 4).

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Hungary: In case of Group 1, the highest ranked, most frequently mentioned drivers were brand, pack size, consistent quality, and price when purchasing fresh seafood products. The listed drivers are more varied than in the case of fresh seafood products, and the ranking scores are still greatly varied for individual drivers.

In case of group 2, as they are not frequent buyers, fewer drivers came up for the processed seafood products. Price, quality, freshness, pack size was mentioned among the most important drivers.

Drivers when purchasing fresh/processed seafood products

The main drivers in terms of fish product purchasing are price, purchase/display size, variety/selection, outlook, hygiene in shop, place of origin, preparation (boneless).

Brand was not clearly a good indicator of the product quality. Frosta was mentioned as an example for that (table 4).

Italy: In case of LFC Group, the highest ranked, most frequently mentioned drivers were taste, quickness in preparation and brand. The listed drivers are more varied than in the case of fresh seafood products, and the ranking scores are still greatly varied for individual drivers.

In case of HFC group, fewer drivers came up for the processed seafood products. Price, quality, origin were mentioned among the most important drivers, and also brand (table 4).

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Table 4. Drivers of purchase of processed seafood products for Belgium (a), Hungary (b), Italy (c).

BELGIUM	HFC: Fresh seafood products			LFC: Fresh seafood products	
Ranking score	Drivers	Freq.		Drivers	Freq.
5	taste	2		price/promotion	3
	E-numbers and sugars/pure	2		habit	2
	in function of dinner party	2		fat content	1
	price	1		less waste	1
4	desire	2		addition (sugar, salt, e-numbers,…)	1
	freshness (date)	1		expiration date	1
	price	1		recipe	1
	results of test (commercial test)	1		appearance	1
	aperitif moment	1		taste	1
	amount of mayonnaise	1		impulse - desire	1
				price	1
3	price	3		experience	2
	packaging	1		preservatives	1
	freshness date	1		price	1
	something different	1		impulse	1
				fat content	1
				origin	1
2	appearance	3		appearance	2
	ingredients	2		combination with vegetables	1
				shop	1
				freshness	1
				less waste	1
				taste	1
1	ingredients	1		impulse	3
	freshness date	1		desire	1
	price	1		habit	1
	packaging	1		origin	1
	appearance	1		promotions	1

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HUNGARY	HFC: Processed seafood products		LFC: Processed seafood products	
Ranking score	Drivers	Freq;	Drivers	Freq.
5	Brand	2	Freshness	2
	Availability	1	Quality	2
	Experience	1	Price	2
	Price	1	Ingredients	1
	Fishing method	1	Pack size	1
	Species	1	Preservation method	1
	Spare food	1		
	Package	1		
	Experience	1		
	Comfort	1		
4	Consistent quality	2	Ingredients	1
	Pack size	1	Pack size	1
	Package	1	Price	1
	Brand	1	Quality	1
	Place of origin	1	Selection	1
	Species	1		
	Limited time	1		
3	Price	2	Price	2
	Brand	2	Quantity	1
	Pack size	2		
	Place of origin	1		
	Fishing method	1		
	Quality	1		

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ITALY	LFC: Processed seafood products		HFC: Processed seafood products	
Ranking score	Drivers	Freq.	Drivers	Freq.
5	Brand	2	Origin	3
	Taste	3	Quality	3
	Quick in preparation	3	Price	2
			Nutritional aspects	1
			Type	1
			Gluten free	1
			Taste	1
4	quality	2	Type	2
	Shelf-life	1	Origin	2
	Package	1	Brand	2
	Easiness of usage	1	Quality	1
	Microbiological safety	1	Nutritional aspects	1
	Price	1	Price	1
3	Price	3	Price	4
	Brand	1	Origin	2
	Added ingredients	2	Brand	1
	EC mark	1	Packaging	1
	Quantity	1	Preparation	1
			Type	1
2	Price	2	Taste	2
	Preservation	1	Price	1
	Brand	1	Preservation	1
	Place of purchase	1	Degree of preparation	1
	Microbiological safety	1		
	Calorific value	1		
1	Label	1	Degree of preparation	1
	Safety	1	Quality	1
	Salt content	1		
	Seafood Type	1		
	Origin	1		
	Little processed	1		

Tendency for experimentation with food

Most participants in all three regions were mostly positive, but had concerns or their positive attitudes had certain restrictions. Overall, three participants were negative. These participants were part of the low frequency consumer group.

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Belgium: Participants were generally positive towards trying something new. However, they are more prompted to try if the product is in promotion, if they are able to try it first or if friends recommended it.

"PART111 Yes, I do. If they introduce me something new, I want to lose some of the original taste I had in mind of cod or something for something similar in structure and taste (as alternative for overfished fish)."

Hungary: Everybody agreed in the HFC group that they are willing to buy new fish products. They found the good marketing tool if there is a cheap initial price together with tasting session in the shopping hall. They found useful that approach, because fish is not preferred by everyone, but through the tasting session the people can try first, before they spend any money.

In terms of the new variety they prefer "different fish species inside one package" that they can taste within short timeline. If the goal is to be aware in our preference within wider range of fish products.

The participants in the LFC group preferred any kind of solutions, e.g. use of trendy seasonings that decrease the strong, distinctive smell and taste of the fish. They were also keen on trying new products.

Italy: In the LFC group one participant showed no interest in these products; 4 were interested and 4 were interested but with some restrictions (e.g. price, seafood product type, characteristics).

The participants in the HCF group are all keen on trying new products.

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5.1.3 Topic 3: Healthiness of seafood products

Healthiness of seafood products

General perceived healthiness of seafood products

Belgium: In general the Belgian consumers of the high frequency consumer group have the perception seafood products are healthy, but they also stress the negative factors of pollution (plastics in the ocean) and stress the importance to eat in a varied way. The comparison with meat is made, in which they have the perception fish is still healthier.

"It is healthy but there is a but… Plastic, for example."

The low frequency consumer group is more negative and have the perception the healthiness of seafood products has changed in a negative way over the past years. The general perception is that it is unhealthy because of the pollution (plastics, heavy metals,

"PART612 I also like mussels and oysters and so on, but all the plastic in the sea ... on facebook you see nothing else ... fish that are found dead with much plastics in their stomach and if you eat that... this cannot be good? Also with heavy metals and stuff. If you have too much of that, that must be unhealthy. I am convinced of that. So I think: fish products in moderation."

"PART212 Fish used to have an aura: In my youth: fish was healthy. And now fish is ... (negative facial expression)"

Hungary: Generally the seafood fish found healthy in both group. Specially highlighted good against cardiovascular disease, rich in omega – 3 fatty acids, vit D, etc. the first group mentioned fish as protein source. In terms of the processed products the participants agreed that the use of the different additives, salt not all time can be considered healthy. The other remark was the freshness of the fish (quality/pollution of the water, fishing techniques, transport distance from the fishing pool-processing company)

However, both groups agreed that fish generally healthy they listed couples of negative factors in terms of the fresh and processed products.

Italy: In LFC group there were uncertain answers, highlighting that monitoring is needed and that healthiness depends on different factors (e.g. seas, processing methodology, price as indicator). The perception of unhealthy areas polluted water, antibiotics,… Although they had the perception processed products are healthier, however not all consumers agreed.

"PART832: I expect that a seafood product is healthy because there are controls and authorities which assess how things are done; however in the processing, in my opinion, the most of seafood healthiness is lost, like for example with tuna, but it is up to the consumer to look at the price. I am convinced that the price tells you a lot in this case. However processed products is less healthy than fresh products, although fresh products may have been caught in polluted seas. In general limits are set by the legislation and I feel quite safe."

"PART532: in my opinion work should be done on the concept of "healthy", which should be broaden up to the whole food chain, because no-one at present can say that canned tuna of a brand is more or less healthy than a fresh fish bought at the fishmonger's, which you might store in an incorrect way and then it might become a threat, compared to canned tuna. Then if you add too much salt, it can be, but now there are many canned seafood products with low salt content or without salt; then the kind of oil plays a role too."

Participants also mentioned the relation between price and healthiness of product and the relation to place purchased.

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"PART532: in my opinion the food industry plays with the concept of healthiness, healthy, etc… it must always be interpreted. It is not sure that fish bought at the fishmonger is healthier than frozen fish… they are so much diversified…."

Perception healthy but depending on type (fresh or processed). Some consumers are convinced processed is healthier because it is controlled and treated. Others are more convinced fresh seafood is healthier because of nutritional values.

"PART531: I would make a general statement: if we speak on nutritional benefits and healthiness of seafood respect to the meat there is no game. Surely seafood is healthier. On the other hand, concerning safety in general, the key issue is represented by traceability and by the guarantees that are offered. Indeed, if I do not have enough guarantee in terms of quality and traceability on fresh seafood, I will surely prefer the prepacked and processed ones."

"PART631: Yes, seafood products are healthy. I think that the fresh one are the most healthy especially concerning the nutritional values."

"PART731: In general, I would say yes, they are healthy. Then, I think it depends a lot on the single product. The same works for the typology: I believe fresh products are healthy. Concerning processed products, considering healthy or not may depends on how they are processed."

"PART831: Yes, surely they are healthy. I think the fresh ones are the most healthy although they should be guaranteed and certified regarding different factors such as the origin."

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Types perceived as more or less healthy

Belgium: General perception of Belgian consumers is that processed seafood products are less healthy. Moreover, they also shared the view that processed products are less healthy unless they contain fresh products. Preservatives, e-numbers, mayonnaise, sugar, colourings, ... are perceived as not healthy.

More healthy are the fresh seafood products: less salt and also the taste and smell is perceived as better. They also believe fatty fish is more healthy.

There were different types of factors listed in terms of healthiness: size of the fresh fish, origin, condition of growing/ production farming methods, frozen fish and the type of fish.

Hungary: Comparable perceptions as the Belgian consumers, they listed the same factors in terms of healthiness: types of the fish, size of the fresh fish, condition of growing, processed fish e.g. breaded fish product, canned fish

Italy: LFC Group mentioned that it is hard to answer this question. It depends on controls on the food chain, preparation and processing. One participant said that a product is healthy if it meets hygienic-sanitary requirements. In the HFC Group four participants said that processed products are healthier because of higher controls and because of treatments. One participant hopes that all seafood is healthy. Two believe that fresh products are healthier because of their nutritional aspects and origin. One believe that all seafood is healthy.

One participant mentioned the importance of the food chain:

"PART132: one thing can be said. In my opinion it also depends on controls on the food chain, how the product is caught, stored, transported… all the steps until when it is cut and prepared to be sold. The shorter the food chain, the better. If you start from healthy products it is good; if you start with a polluted sea, it is not good."

In group HFC: mixed opinions about the healthiness of processed products: some believe it is more heathy other think less healthy. *(previously: Perception healthy but depending on type (fresh or processed). Some consumers are convinced processed is healthier because it is controlled and treated. Others are more convinced fresh seafood is healthier because of nutritional values.)*

Perception of healthiness compared to past

Both **Belgian and Hungarian** consumers believe that the healthiness of seafood products has changed over the past 20 years. They believe it is less healthy now because of pollution. They all agreed that in the past there was less environment pollution, so it was much better, healthier. However, the **Italian** consumers stress the increased controls on seafood (and food in general) nowadays.

"PART132: Sure, controls have increased, laws are stricter… but the bad thing about these markets is the following: each universe has its own laws. The EU, China, America have their own regulations. So when a product moves, we lack the tenons, the regulations which would have to allow to understand more about the products that arrive… let's say that the different regulations do not communicate with each other. Trade laws. Certainly in recent years controls have increased and so we should eat healthies seafood. "

"PART732: there is more awareness and more controls in general"

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"PART232: I agree. But it is also because there have been laws about water. All aspects of water protection have a positive impact on seafood and I see it as a global benefit."

Influencing factors on behaviour

Importance of health

In general healthiness is perceive as an important factor in purchase.

Belgium: Healthiness of seafood products is perceived as an important factor in purchasing seafood products for the participants in the high frequency consumer group. However, in the low frequency consumer group the perceptions are mixed, some are not concerned with health during their purchasing and prefer products they like to eat, others are more concerned about healthiness.

Hungary: Healthiness of the fish product is one of the main driver in purchasing.

Italy: important factor, but also concerns about safety issues for fresh seafood products and pollution. Some participants do not perceive it as the main driver. Other important drivers are brand, label, appearance, transport, origin, way of preservation, freshness of product, certification and traceability.

Decision making healthy product

Belgium: Several factors were listed such as appearance and trust in EU controls.

Hungary: price, type of matrix (e.g. in oil) they are in, and origin (HFC Group). In LFC group beside the origin, some of the participants put focus on "E numbers" and traceability, transport, environment pollution-heavy metal content, practice applied in the fish farms, etc.

Italy: level of processing, nutritional value and microbiological aspects, appearance, trust in place of purchase, origin, preference for frozen. Other important drivers are brand, label, appearance, transport, origin, way of preservation, freshness of product, certification and traceability.

Nutritional benefits

Healthy components

Belgium: Both groups mention the presence of omega-3 fats in seafood products as healthy components. Other healthy components as less fat, proteins, low in calories and vitamins are also mentioned.

Hungary: Beneficial effects in case cardiovascular diseases and omega fatty acids were mentioned in both group. Also other components as well (like phosphor, mineral and vitamins) were listed in both groups, while LFC group highlighted protein, low calorie, good against high blood pressure and other aspects such as easy to digest and "doesn't make you bloated." Both groups showed scepticism about the health effect on some level: e.g. they have the feeling that it is changing from day to day what is healthy or not (even professionals can't follow it) and they can use other (and cheaper) foods for preventing heart diseases such as garlic.

Italy: omega-3, low in calories, phosphor. (better than meat)

- LFC Group omegas, phosphorus, low calorific content, digestibility, protein.

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- HFC Group low cholesterol, digestibility, omega 3, origin, doctors' information and social aspects (e.g. experts' opinion and social belief influence people's opinion about seafood healthiness).

Knowledge of nutritional components

Belgium:

- Reduced salt content: In both group positive cardiovascular affects (blood pressure, cholesterol) were mentioned.
- Rich in selenium: Participants do not really know, they guessed blood, memory, skin.
- Rich in omega 3: Participants linked it with brain and cognitive function.
- Rich in DHA: the participants had did not know what DHA means (nor group 1, neither group 2). One participant knew it is one of the fatty acids.
- Rich in iodine: Both groups linked it with the thyroid system.
- Rich in vitamin B12: It was mentioned that it is good for the immune system, for the eyes, bone structure in the high frequency consumer group. The low frequency consumer group did not know.
- Rich in vitamin D: Both group mentioned that vitamin D has something to do with the skin. One participant mentioned bone structure in combination with vitamin C.

Hungary:

- Reduced salt content: In both group it was mentioned that salt content is used for perseveration and some of the participants are aware that some processed food contains far more than needed. But in both group there was at least 1 person who thought that positive affects reducing salt content only is demagogy, or bad for the cognitive functions.
- Rich in selenium: It was mentioned that it is a trace element but they do not really know its advantages.
- Rich in omega 3: In the group 1 the participants linked it with the heart and the vascular system, in group 2 some mentioned that it is a fashion, or they just link it with fish taste & smell.
- Rich in DHA: the participants had did not know what DHA means (nor group 1, neither group 2)
- Rich in iodine: It was mentioned in both group that we need iodinated salt, but in group 1 more participants linked it the thyroid system.
- Rich in vitamin B12: It was mentioned that nervous system and blood cells need it.
- Rich in vitamin D: Both group as a good general knowledge about Vitamin D but some of them argue to go in the sun instead of taking Vitamin D.

Italy:

No answers (not asked)

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Reactions towards salt reduction

Role in purchase

Belgium: The salt content does play role during purchasing for the high frequency consumer group. However, in the low frequency consumer group it is not considered as important, except for one participant who pay attention to salt content because of heart disease.

Hungary: The salt content does not play role during purchasing. Some of them think that it is only "fashionable" or link it STOP Salt campaign in schools.

Italy: Most participants in both groups do not pay attention to salt content, except one participant who cannot eat salt.

Willingness to buy

Belgium: Participants had mixed opinions about their willingness to buy seafood products with reduced salt. Some are already used to buy products with reduced salt, others are concerned about taste, manipulation of the product, preservation and with what the salt is replaced.

"PART112 Yes, salt which is naturally in it does not need to be removed"

Hungary: They would not buy seafood product with reduced salt content, as they think it would be tasteless and they would put salt on it anyway.

They also have some information about the different salts: *"It depends whether we are talking about NaCl or CaCl2."*

Italy: Some participants would be willing to buy reduced salt products, others not. One participant mentioned he/she looks at total salt intake in whole diet.

"PART532: yes. I keep an eye on salt both in seafood and other food products. It is also true, however, that –as a mentioned before- now the offer of canned products is so wide that it is possible to find an alternative to that of high content salt"

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5.1.4 Topic 4: Consumers' perceptions related to healthier seafood products for target groups

Seafood for children

Healthiness for children

In all groups and regions seafood products is perceived as healthy for children.

Fit into diet

Belgium: Participants are convinced children should eat at least once a week seafood products. The importance of variation, education and for healthy development (growing, brain function) is stressed.

Hungary: Participants in both group mentioned that the kids should get used to eating fish even in the kindergarten, although the role of the parents (education) is also highlighted.

The group 2 (LFC) came to the conclusion that the main obstacle of giving more seafood products to children are high prices of seafood products.

Italy: Participants stress the importance of education, but are also concerned about the risks for children regarding pollution of the seas. They consider the children as more vulnerable. One participants also mention to adjust the product (e.g. breading).

Healthy types

Belgium: Perceived as less healthy: fish sticks, deep-fried fish, fish spreads, fish burgers

Perceived as more healthy: fresh fish, steamed fish, shell fish, sandwiches with fish, fish fillets.

Hungary: The breaded product is preferred by the children, but some negative comments in terms of additives listed in topic 2 and 3.

General health benefit was not questioned but the environment pollution and impact on fish quality were mentioned as a key issue.

Italy: perceived as less healthy are molluscs and crustaceans for their nutritional characteristics and because they easily develop allergies. Pangasius was also mentioned as a fish which is not healthy at all.

"More adapted fishes like sole and codfish or, in amylase, the ones more digestive. Then gilthead bream and sea bass are more consistent and tasty. These maybe are fine in a more advanced age. "

Suitable types

Generally, the presence of fish bones is perceived as less suitable for children.

Belgium: Perceived as less suitable: all fish products with bones and deep-fried seafood products. Perceived as more suitable are fish fillets, steamed fish, fish brochette.

Hungary: Both groups mentioned that fish products for children should be boneless. Group 1 discussed other important features: less intense fish smell, providing pate or fish stick, as it is generally liked by kids.

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Italy: fish without fish bones is considered as more suitable.

Benefits and drawbacks

Belgium: The perceived benefits are variation, health (omega-3), good habit for later, awareness, better to digest. Most important drawbacks are pollution and fish bones. Besides, one participant mentioned to limit smoked products.

Hungary: most important benefit according to participants is the healthiness (omega 3).

Italy: most important benefit according to participants is the healthiness of seafood products. The main drawback are the presence of fish bones. Besides, the participants mentioned allergy and the limitation it types they are willing to consume.

PR technique_3a Health benefits for children

Table 5 Perceived health benefits for children

	Belgium		**Hungary**		**Italy**	
	HFC	LFC	HFC	LFC	HFC	LFC
Reduced salt content	6	1	3	0	2	4
Rich in selenium	1	2	1	4	5	5
Rich in omega 3	4	6	8	7	6	6
Rich in DHA	1	2	0	1	0	5
Rich in iodine	3	2	3	1	5	6
Rich in vitamin B12	6	3	2	3	8	7
Rich in vitamin D	4	4	6	3	7	4

Belgium: The HFC group perceives reduced salt content and rich in vitamin B12 as the most important factors for children. The LFC group evaluated rich in omega-3 as the most important factor for children.

Hungary: Both groups think that omega 3 is an important factor for children. Participants in the lFC Group don't think reduced salt content is healthy, while almost half of the HFC Group considers it as an important factor.

Italy: In both groups B12 content scored the highest for children.

Seafood for pregnant women

In general, the knowledge of products which should be avoided by pregnant women is rather limited in all regions. Although in all regions they mention to avoid raw seafood products while being pregnant.

Healthiness for pregnant women

Belgium: Participants perceived certain types of seafood products as unhealthy for pregnant women: smoked salmon, sushi. Fish high in mercury is also mentioned as unhealthy.

Hungary: The participants in group one think that seafood is not recommended for pregnant women (only omega 3 supplements instead), on the other hand LFC group believes that it is highly recommended because its protein and mineral content.

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Italy: Participants believe it depends on the kind of product. They would avoid molluscs and crustaceans for allergies issues, uncooked seafood.

Fit into diet

Belgium: Participants agreed it is important have variation in diet, the method of preparation is also important for safety and intake of omega-3.

Hungary: The LFC group believes seafood is recommended due to mineral, protein and good digestion.

Italy: The Italian consumers agreed it fits the diet for pregnant women.

Healthy types and suitable types

Belgium: They should avoid mussels and oysters, raw fish. They also believe fish spreads are less healthy and pregnant women should pay attention to salt content.

Hungary: The raw fish products are not recommended for pregnant and also highlighted the importance of origin as fish may contain pollutions which can be dangerous for foetus.

Italy: Raw seafood products should be avoided.

Benefits and drawbacks

Belgium: Omega-3 is considered as the benefit. Drawbacks are concerns about plastics and pollution.

Hungary: Participants highlighted the importance of origin as fish may contain pollutions which can be dangerous for foetus.

Italy: benefits are the health of foetus and women. Drawbacks are the risk of food poisoning.

PR technique_3b Health benefits for pregnant women
Table 6 Perceived health benefits for pregnant women

	Belgium		**Hungary**		**Italy**	
	HFC	LFC	HFC	LFC	HFC	LFC
Reduced salt content	3	1	4	3	5	7
Rich in selenium	3	2	3	6	6	8
Rich in omega 3	6	5	8	6	6	8
Rich in DHA	3	2	5	3	5	6
Rich in iodine	2	1	4	3	0	6
Rich in vitamin B12	3	3	7	6	3	5
Rich in vitamin D	3	4	6	5	8	7

Belgium: Both groups perceived omega-3 as the most important.

Hungary: The answers of the 2 groups are similar in this case, omega 3 is considered to be the most important, while iodine and reduced salt is the least important factor. In LFC Group, twice as many participants think selenium is an important factor for pregnant women.

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Italy: The answers of the 2 groups are different in this case, omega 3 and vitamin D are considered to be the most important in LFC group. In HFC group the most important was vitamin B12.

Seafood for elderly consumers

Healthiness for elderly and fit into diet

Belgium: Seafood consumption is considered as important for elderly for health reasons (healthy fats, less salt, cholesterol). It was also believed that one should adjust their diet according to one's health (e.g. diabetes, heart disease).

Hungary: The seafood was claimed as being healthy for elderly but there were some discussion if the elderly can eat as much as they can cover their necessary intake (some of the participants in group 1 believes that fish does not contributes so much to the health of elderly if they have it only once a week for example. Group 2 saw other difficulties such as high prices of seafood, which are too high for elderly.

Italy: The seafood was claimed as being healthy for elderly because of its nutritional benefits. HFC Group mentioned vitamins and omega 3; and products with reduced salt content in case of some pathologies.

Healthy types

Belgium: Fresh fish and fatty fish types are considered as healthier, all processed seafood products are considered as less healthy.

Hungary: In both groups found fish products generally healthy, but there doubts if the quantity eaten by them could cover the suggested daily intake. In terms of the fish product types they have the same concerns what they listed above. Only one participant highlighted that it depends on the disease they have. One participant's reaction was reduced salt content is good for elderly.

Italy: digestible products and ready-to-eat with high digestibility (e.g. no fried fish)

Suitable types

Belgium: Seafood products with fish bones are considered as less suitable.

Hungary: Both groups emphasize that fish products targeting elderly must not contain fish bones (similar to children).

Italy: fish bones and chewing problems, digestibility. Ready-to-eat products seem more suitable.

Benefits and drawbacks

Belgium: The main benefits of seafood are considered to be the easiness to digest, vitamins and also psychological wellbeing (fish on Fridays, nostalgia).

Hungary: In group one some of the participants listed some additional beneficial attributes such as low salt content, unsaturated fatty acids. Group 2 did not have too much information about the nutritional benefits.

Italy: HFC Group suggested that some seafood types (e.g. fat fish, oily fish) may be a problem for elderly due to digestibility, and also some preparations (e.g. fried fish). Drawbacks can be: bones, chewing problems (for the over 80), cooking/preparation of fresh seafood (which may be difficult), price.

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PR technique_3c Health benefits for elderly

Table 7. Perceived health benefits for elderly

	Belgium		**Hungary**		**Italy**	
	HFC	LFC	HFC	LFC	HFC	LFC
Reduced salt content	6	6	6	2	0	5
Rich in selenium	2	4	3	6	1	7
Rich in omega 3	5	6	8	7	7	8
Rich in DHA	2	4	2	2	3	5
Rich in iodine	4	3	2	2	4	7
Rich in vitamin B12	5	5	5	2	8	7
Rich in vitamin D	4	5	8	3	7	6

Belgium: Both groups perceive reduced salt content as an important factor for elderly. Additionally, Omega-3 and vitamins B12 and D are also perceived as important in both groups.

Hungary: Similarly to the previous questions, omega 3 is considered to be the most important factor. The opinions on vitamin D are really different though, eight out of eight participants of HFC Group think it is important, while only three out of eight participants think the same in LFC Group. Reduced salt content and vitamin B12 is being considered less important by Group 2 when compared to Group 1. In conclusion, HFC Group gave much more importance to these factors than LFC Group.

"PART421: I think there's no difference, whether it's an elderly person, pregnant woman or an athlete. Everyone needs what's in seafood."

Italy: Omega 3 scored the highest in LFC group; whilst the reduced salt content scored the highest in HFC group. The opinions on selenium and DHA are very different, maybe due to a different knowledge (HFC Group never listed DHA – nor for children, pregnant women nor for elderly – and this may mean that they do not know DHA).

Consumers' initial reactions and evaluation of eco-innovative solutions

Value of eco-innovative solutions

In general, the Belgian consumers are more negative towards this products concept. Hungarian and Italian consumers were more open to the concept description.

Belgium: Overall the concept description was not appealing to the high frequency consumer group (e.g. they had question with "more healthy", and they also do not preferred canned seafood products). On the other hand they believe it could be valuable for people who eat very unhealthy.

"PART711 No but if you look at it: or they eat this or something else, or candy, than it is better they eat thin instead of something else. You have an alternative, that is convenient. Because not everybody has the time to cook. Than this is convenient/more easy."

"PART611 I agree. If someone eats very unhealthy, better to take something like this, which takes less time and less effort."

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Also the low frequency consumer group has questions and double with concept description. Only one participants things it could be valuable.

Hungary: The product concept was seen as being suitable to improve the health of the above listed target groups.

Italy: Participants believe it is valuable. Other participants are more sceptical about the value of fortified products:

"PART532: personally, I don't think so. It is difficult to improve a product which is already considered as one of the best from a nutritional point of view. It would be useful to improve consumption within the diet of each age group. Introducing an added value is less important than the valorisation of consumption"

"PART732: valorising consumption is the first thing, because it is not done sufficiently. The second step could be the introduction of modified products to promote consumption"

"PART632: I am close to what PART532 said. A fortified product can't be healthier unless it is in a diet and life style of a person; a fortified products wouldn't make the difference on a person's health"

Positive:

"PART332: I do not agree, because if you find a product that is consumed and increases the pleasure for example of children and elderly, why not? A simple example about my children; when they wanted to eat fish, they ate only Findus fish sticks. This was a good product for their growth. Then if you do not want to buy the product with added value, you are free not to buy it."

LFC Group showed some scepticism towards this kind of products. Only 2 participants think it valuable for consumers. The reasons are:

- Introducing an added value to seafood (which is already high value) is not important

- A fortified product can't be healthier unless it is in a diet and life style of a person; a fortified product wouldn't make the difference on a person's health

- Being against fortification and pro natural products (which are the best)

In HFC group all agreed that products like the proposed concept would be valuable for consumers.

Willingness to consume

Belgium: The opinions are mixed: some participants would definitely not consume or buy it, others are willing to try the products out of curiosity. Some participants require the product to be as tasteful, require information about the product and are concerned about the higher price.

Hungary: The participants agreed that they would try it but some of them highlighted (especially in group 1) that they would be more willing to buy it if it is produced under well know brand or if they could try it in promotions.

Italy: Participants in the HFC group are positive towards the concept, and would like to try it (because it is ready-to-eat, because of the flavour or the high vitamin D content etc.). In the LFC group only 2 participants were open, although not explicitly keen to try it.

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"PART3: I do not agree, because if you find a product that is consumed and increases the pleasure for example of children and elderly, why not? A simple example about my children; when they wanted to eat fish, they ate only Findus fish sticks. This was a good product for their growth. Then if you do not want to buy the product with added value, you are free not to buy it."

Willingness to pay

Belgium: Two participants are willing to pay more, the other participants have some condition: it needs to be tasteful, would like to try it first, would prefer to hear the experience of others. Other participants are sceptical about adding omega-3, because they are convinced the product is already healthy.

Hungary: Participants in both group agreed that the price of the new product is an important factor if they can try it or not. Other important aspects are the appearance and taste.

Italy: Participants of the high frequency consumer group are willing to pay more but they need guarantees and taste is also important. HFC Three participants said that they would be willing to buy such product (because of the genuine flavour, vitamin D content and because it's ready-to-eat). All participants would be willing to pay for it, although someone asked for something ensuring that it is the best product and has certain characteristics.

Nobody in LFC group explicitly said to be willing to pay more for such products. One said that the quality/price relationship should be assessed.

PR technique_4 Which one from the following statements fits better to this product concept?

Table 8. Fitting statements to the product concept according to participants.

		Belgium		**Hungary**		**Italy**	
Subject	Claim	HFC	LFC	HFC	LFC	HFC	LFC
Vitamin D	Vitamin D contributes to the maintenance of normal bones.	1	3	8	2	3	0
	Vitamin D contributes to the normal function of the immune system.	4	1	0	3	2	0
	Vitamin D contributes to the maintenance of normal teeth.	0	0	0	1	1	1
	Vitamin D has a role in the process of cell division.	1	1	0	1	2	6
	Vitamin D contributes to the maintenance of normal muscle function.	0	0	0	1	2	1
Omega 3 DHA	DHA contributes to maintenance of normal brain function	3	7	4	4	4	0
	ALA contributes to the maintenance of normal blood cholesterol levels.	2	0	4	4	2	3
	DHA contributes to the maintenance of normal vision	1	0	0	0	0	0
Iodine content	Iodine contributes to the normal production of thyroid hormones and normal thyroid function.	5	4	7	3	4	2
	Iodine contributes to normal cognitive function.	0	1	0	3	3	3
	Iodine contributes to normal functioning of the nervous system.	1	1	1	2	1	5
	Iodine contributes to normal (energy-yielding) metabolism.	0	1	0	0	0	0

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Belgium: In HFC Group, only one participant thinks Vitamin D contributes to the maintenance of bones, while in the case of LFC Group, 3 participants noted that vitamin D contributes to the maintenance of bones..

For Omega 3/DHA all participants of the LFC group agreed Omega-3 has a positive effect on brain functions, while in the HFC group only half of the participants associated with normal brain function.

Iodine content was mainly associated with the thyroid function and thyroid hormones in both groups and one participant of the LFC group associates it with the functioning of the nervous system. The associations with normal functioning of the nervous system was made by one participant in the HFC group and by one in the LFC group.

Hungary: In HFC Group, all participants think Vitamin D contributes to the maintenance of bones, while in the case of LFC Group, the answers are divided.

Half of both groups think Omega 3/DHA has a positive effect on brain functions, while the other half thinks that it helps in the maintenance of blood cholesterol levels.

Seven out of eight participants associate Iodine content with the thyroid function and thyroid hormones, and one associate it with the functioning of the nervous system. In the case of LFC Group, the answers are divided between thyroid, cognitive functions and the functioning of the nervous system.

Italy: In LFC Group, 6 over 8 participants think that Vitamin D contributes to normal absorption / utilisation of calcium and phosphorus, while in the case of HFC Group, the answers are more divided.

In the case of Omega 3/DHA opinions are various, referring to normal brain function, normal vision and normal blood cholesterol levels.

Most participants associate Iodine content with the thyroid function and thyroid hormones, but some (2 in LFC group and 3 in HFC group) associate it with the metabolism and one in both groups with normal cognitive function.

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5.1.5 Topic 5: Consumers' perceptions about labelling sustainability of seafood products

General labelling

Expected information and most important information cues

Belgium: The high frequency consumer group defines origin as the most important, next to origin they consider firmness, freshness, price, taste, 'rich in…' as expected information.

The low frequency consumer group expect information on origin, what is in it and label. Although two participants mention they do not have any knowledge about origin or to not pay attention to it. However, they were very interested to learn more about the MSC label.

Hungary: The two groups listed as the most important things were: origin, ingredient (processed ones), shelf life, free range, nutritional content, etc.

Italy: High frequency consumer group: origin, fish feed, price, nutritional value, traceability. Low frequency consumer group: farmed or wild caught, date , origin. One participant mentioned that he would like a kind of QR-code where he finds a detailed story of the product.

Figure 5. Expected information when purchasing seafood products.

Seafood origin

Importance of origin and preference of origin

All participants of all regions perceive origin as an important factor.

PR_5 technique: the participant divides the seas/oceans/countries into preferred groups.

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Table 9. Preferred origin in terms of seas, oceans, countries of provenance.

Preferred							
HFC				**LFC**			
	BE	HU	IT		BE	HU	IT
North Sea	6	4	6	Noth Sea	5	5	4
Mediterranean Sea	4	3	8	Mediterranean Sea	3	1	8
Barents Sea	5	0	0	Barents Sea	3	1	1
Baltic Sea	2	6	2	Baltic Sea	0	3	0
Black Sea	1	2	0	Black Sea	0	0	0
Bay of Biscay	3	0	0	Bay of Biscay	0	0	1
Kattegat	3	0	0	Kattegat	0	0	0
Skaggerak	3	0	0	Skaggerak	1	0	0
Wadden Sea	5	0	0	Wadden Sea	0	0	0
Irish Sea	5	3	1	Irish Sea	1	2	5
Celtic Sea	4	1	0	Celtic Sea	0	0	3
Lake Victoria	2	1	0	Lake Victoria	0	1	0
NE Atlantic Ocean	5	4	3	NE Atlantic Ocean	5	1	4
NW Atlantic Ocean	4	3	4	NW Atlantic Ocean	4	0	4
Pacific Ocean	1	3	1	Pacific Ocean	0	0	0
Indian Ocean	0	0	0	Indian Ocean	0	0	0
Alaska	4	6	1	Alaska	3	6	3
Iceland	6	5	1	Iceland	2	2	3
Norway	5	6	5	Norway	4	5	5
Canada	4	3	0	Canada	3	5	2
Scotland	4	2	1	Scotland	1	2	5
Western Europe	4	1	0	Western Europe	1	1	0
South Africa	1	0	0	South Africa	0	0	1
Uganda	1	0	0	Uganda	0	0	0
Kenya	0	1	0	Kenya	0	0	0
Tanzania	0	1	0	Tanzania	0	0	0
Maldives	0	1	0	Maldives	0	0	0
Japan	1	2	0	Japan	1	3	0
China	1	2	0	China	0	1	0
South America	0	0	0	South America	0	1	2

PR_5 technique: the participant divides the seas/oceans/countries into non-preferred groups.

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Table 10. Non-preferred origin in terms of seas, oceans, countries of provenance.

Non-preferred							
HFC				**LFC**			
	BE	HU	IT		BE	HU	IT
North Sea	0	2	0	North Sea	0	0	1
Mediterranean Sea	2	1	0	Mediterranean Sea	0	0	0
Barents Sea	0	0	0	Barents Sea	0	0	1
Baltic Sea	1	0	0	Baltic Sea	0	0	6
Black Sea	3	2	1	Black Sea	0	2	2
Bay of Biscay	0	0	0	Bay of Biscay	0	0	1
Kattegat	1	0	0	Kattegat	0	1	1
Skaggerak	0	0	0	Skaggerak	0	0	1
Wadden Sea	0	0	0	Wadden Sea	0	1	1
Irish Sea	0	1	0	Irish Sea	0	0	0
Celtic Sea	1	0	0	Celtic Sea	0	1	2
Lake Victoria	3	2	1	Lake Victoria	1	0	4
NE Atlantic Ocean	1	1	0	NE Atlantic Ocean	0	0	1
NW Atlantic Ocean	1	1	0	NW Atlantic Ocean	0	0	0
Pacific Ocean	3	1	3	Pacific Ocean	2	1	1
Indian Ocean	5	4	3	Indian Ocean	2	0	1
Alaska	1	0	0	Alaska	1	0	0
Iceland	0	0	0	Iceland	1	0	0
Norway	1	0	0	Norway	0	0	0
Canada	1	1	0	Canada	1	0	0
Scotland	0	3	0	Scotland	0	0	0
Western Europe	0	3	0	Western Europe	0	0	0
South Africa	4	4	0	South Africa	3	4	4
Uganda	5	5	1	Uganda	3	4	3
Kenya	6	5	0	Kenya	4	5	3
Tanzania	6	4	1	Tanzania	3	3	3
Maldives	5	2	0	Maldives	2	0	0
Japan	4	2	2	Japan	3	0	3
China	5	4	4	China	1	3	6
South America	5	5	2	South America	3	1	1

Belgium: Both groups have a preference towards northern seas and countries like North Sea, the Altantic Ocean, Barents Sea, Wadden Sea, Irish Sea, Iceland,and Norway.

For the non-preferred sea, oceans and countries the observed trend is that African countries (such as Kenia and Tanzania, Uganda), Asian seas and countries (such as Indian Ocean, Maldives, China, Japan) do not have the preference. It can be notes that participants preferred in general the seas, oceans and countries which are close in distance, this is congruent with the focus group discussion results where participants mentioned their preference for local and more close-by products.

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Hungary: The answers given here correlate with the information gathered during the conversation. It is clear that both groups have a preference towards northern seas and countries like Alaska, the Baltic Sea and Norway, while African countries like Kenya, Tanzania and Uganda are clearly not preferred. China and Japan got mixed results in terms of preference.

Based on the conversation China is not preferred, because they do not believe in quality. One participant mentioned reject Japan, because of animal welfare reason.

Italy: The answers given here correlate with the information gathered during the conversation. It is clear that both groups have a preference towards the Mediterranean Sea, followed by Northern seas like North Sea and Norway, and Atlantic Ocean. Some variability was observed between the 2 groups anyway.

In LFC group non-preferred seas resulted to be: Baltic Sea, Lake Victoria, China, South Africa, Japan, Uganda, Tanzania and Kenya (scored 3 or more). In the HFC group the main non preferred seas are: China, Indian and Pacific Ocean, Japan and South America.

The observed trend is the non-preference towards African seas and China and Japan. In the first group also Baltic Sea scored a lot.

Information about quality and transparency

Belgium: Participants do not consider a QR-code as positive, because it would not be easy accessible (don't like to go shopping with smartphone).

Hungary: They think the producer should keep the EU legal requirement, but they have doubt the data, information is truth worthy.

Italy: The high frequency consumer group agree that labels should be printed, easily readable and complete. This opinion was also shared in the low frequency consumer group, however some participants believed a QR-code would be more handy and containing more information.

Seafood sustainability

Importance/role of sustainability

Belgium: Some critical remarks on the MSC label. Some participants do not trust this label, others don't know the label at all (LFC).

Hungary HFC: important, but do not fully trust the label information. Also the perception there is too much information on the package (which makes in unreadable).

Italy: for most participants sustainability does not play a role or just a little role when purchasing seafood. Only two participants in the low frequency consumer group think it is important.

Decision making sustainability

Belgium: Some critical remarks on the MSC label. Some participants do not trust this label, others don't know the label at all (LFC).

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Hungary: Most of the participants did not take too much attention on sustainability. Sustainability is linked to the quotas, fishing methods.

More than half of HFC Group believes that the key for the sustainability of seafood products is: setting quotas and having regulations on fishing. The remaining people said that fish should be kept in clean water, in their natural habitat, or at least provide proper conditions in fish-farming.

Since the participants in LFC Group rarely purchase and eat seafood products, they have difficulties in understanding the topic of the question, and they can't grasp the concept. Because of this, they couldn't directly give answer to this question."

Italy: In LFC group, participants have different attitudes towards sustainability; some of them do not give importance to it when purchasing seafood, whilst some others do. Criteria to understand whether a product is sustainable are: fish size, fishing methods, for example.

HFC Group agreed that there is insufficient information about sustainability. 5 participants said that it does not play any role when buying seafood and 3 of them said that it plays a little or marginal role. Someone mentioned that fishing some big fish like tuna is not sustainable and knows that some fishing methods damage the seabed.

"PART132: maybe it would be good to have a label or mark on the package about sustainability, saying it comes from… If you see that a product has this label and another doesn't have it, you can infer that the second is not sustainable."

Figure 6. Perceived aspects for decision making based on answers of Belgium and Italian participants.

Preference farmed or wild seafood products

Hungary: must feed the population, but it might have a big environment impact,

"PART822: The Earth's population has increased significantly in the past 20 years, and people must be fed. If fish wasn't farmed like cattles or chickens, the shelves would be empty. By fishing wild fish, we undertake a huge quantity of environmental damage."

The opinion between wild and farm fish was not unique, somebody prefer the farm fish because the whole process can be controlled eg. water, etc., not like in sea/ocean. Somebody linked the freshness etc. to sea, ocean.

Italy: preference for wild fish, because of taste. Although the perception is that farmed fish is more controlled, has a better traceability. They also believe that wild fish is not sustainable in the long run.

LFC: Preference between farmed and wild are also mixed: 5 over 8 prefer wild due to taste and the others choose farmed for traceability, controls, sustainability issues. 2 participants give importance to fishing methods.

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HFC: All participants prefer wild fish.

Importance fishing methods

Belgium: All participants say the fishing method is important. They mention the type of nets, electric fishing, fish-friendly nets. However, they mention that they only pay attention to it by chance, are not really looking for it or will not ask it in the shop.

Hungary: In the high frequency consumer group the perception is that the average consumer is not affected by the type of fishing method.

"PART721: I think the average customer is not affected by whether the fish was caught with deep-sea fishing or surface fishing."

In the low consumer group one participants considered it as an important factor.

"PART822: Yes, this is important, lots of fish die that otherwise don't get eaten, but get caught in the net. Millions of sharks are killed like this every year"

Italy: Most participants do not give importance to fishing method. Two participants would pay attention to it if they had the information (HFC). In the LFC two participants think it is important. Fishing methods are important for 4 participants but aren't for the other 4 in HFC group.

Knowledge of sustainability label and purchase of products with sustainability label

PR_6a technique

Would you be willing to pay more for seafood products that are produced in a sustainable way? Why? For which aspects?

Table 11. Willingness to pay more for seafood products that are produced in a sustainable way.

Willingness to pay more	Yes			No		
	BE	HU	IT	BE	HU	IT
HFC	7	4	8	0	4	0
LFC	7	1	6	0	7	2

Belgium: All participants in both groups are willing to pay more for seafood products produced in a sustainable way.

Hungary: Half of HFC Group would pay more for seafood products that are produced in a sustainable way, while in the case of LFC Group, seven out of eight participants claimed that they would not pay extra money for it.

Italy: 6 over 8 participants in LFC group 1 are willing to pay more for products produced in a sustainable way, whilst in HFC group all of them are.

Aspects mentioned in LFC group are: better use of the sea, quality, environmental protection, better human health, better nutritional knowledge, feed type, proximity, fishing method, safety, animal welfare, fewer emissions. Aspects mentioned in HFC group are: territory protection, species preservation, seasonality, workers' salary and safety, fuel consumption, pollution, wastes, vulnerability, economy, workers' environment, seafood safety, quality, processing conditions.

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PR_6b technique

Do you know the ASC or MSC label? What is the meaning of these labels? Do you buy seafood products with this label? Why?

Table 12. Knowledge of sustainability labels

Knowledge label	HFC						LFC					
	Yes			No			Yes			No		
	BE	HU	IT	BE	HU	IT	BE	HU	IT	BE	HU	IT
MSC	4	1	2	2	7	6	3	0	1	4	8	7
ASC	2	0	6	4	8	7	1	0	0	6	8	8

Belgium: In the HFC group 4 participants knew the MSC label, whereas the ASC label was known by two participants in this group. In the LFC group 3 participants knew the MSC label and only one participant knew the ASC label. Generally, it is noticed the ASC label is less known by the Belgian consumers.

Hungary: In Group 1, only one participant had seen the MSC logo before but claimed that it has no meaning to him. Also none of them had seen the ASC logo.

In the case of Group 2, no participants had seen the MSC logo, neither the ASC logo. However, one participant claimed that these logos suggest that the product had undergone some kind of inspection, which ensures the high quality.

Italy: In both groups there is a limited knowledge of these labels.

Responsibility for sustainability

Belgium: Two participants mention the EU as responsible. Also the government, worldwide responsibility and the consumers' responsibility are mentioned.

Hungary: Mainly the producers and government (the "system"/legislation) were mentioned. It was mentioned in Group 2 that they, "the consumers" are less responsible.

Italy: more trust in public authorities.

In LFC group a ministerial organism was suggested, but integrated in a network because it is not possible to deal with such a complex issue on your own.

HFC Group suggested the health ministry or a dedicated entity, public authority or a committee.

Desirability to improve sustainability

Belgium: Participants agree it is desirable to improve sustainability of seafood products because it is better for humans and the environment, more control is needed (pollution of the sea), quality, more safe.

Hungary: *"PART321: It would be important. And better quality"*

Italy: All participants agree it is desirable for the environment, for our health and also for the economy and for the consumption.

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LFC All agreed that it is desirable to improve sustainability controlling pollutants, water quality etc.

HFC They all agreed that improving sustainability is desirable for the environment and human health but economic factors may pose a barrier.

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Possibility to improve sustainability

Belgium: *"PART711 I think it is possible but you have to do it on a large scale. The EU indeed, but even broader than that. It does not make sense that you do that as a small area or as a country because yes ... it is not that those fish stay in one area. If you say: that part of the North Sea we think about it, but we will overfished the other area. That does not make any sense"*

Hungary: fishing quotas, regulations for the producers, but also the willingness of the consumer to pay more.

Italy: *"PART431: Yes, although it is difficult, by not polluting the sea and finding alternative sources of energy"*

PR_7 technique Complete the sentence:

"The best thinkable way to improve the sustainability of seafood products is..."

Table 13. Free word association on the best thinkable way to improve the sustainability of seafood products.

Sustainability of seafood products		
Belgium	HFC	LFC
Control, regulation, quotas	5	4
Importance of local seafood products (origin)	3	1
Tackle pollution	0	2
Improve conditions for fishermen (higher price, income)	0	2
Increase consumers' awareness	0	1
Hungary	HFC	LFC
Set quotas and regulations	5	/
Keep fish in clean or natural water	3	/
Italy	HFC	LFC
protect the ecosystem	1	
change "fishing" method	1	
avoid any kind of sea pollution, as much as possible, by using alternative energy sources already existent	1	
include this issue in wider policy of environment protection	1	
more control from the beginning to the end	1	
create massive fishing systems with no negative impact on the environment and processing methods (for processed products) that do not cause negative conditions for the individual (worker), for the environment and for the economy of the country	1	
improve knowledge and strengthen controls whilst maintaining tradition with innovation		1
protection of seas, rivers, lakes. Fight against pollution!		1
creating a ministerial organisation working on sustainability of seafood through institution networking		1
rising public awareness. Finding sustainability indices		1
care for the environment and sector operators		1

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control the seafood chain from the beginning to the end (caught or farmed seafood), including water monitoring. So network		1

Belgium: In both groups it is believed that the key to more sustainable seafood are more controls, regulations and quotas. In the HFC group it is also believe that origin is an important aspect to improve sustainability. In the LFC group tackling pollution and improve the conditions for fishermen are also perceived as important.

Hungary: More than half of Group 1 believes that the key for the sustainability of seafood products is: setting quotas and having regulations on fishing. The remaining people said that fish should be kept in clean water, in their natural habitat, or at least provide proper conditions in fish-farming.

Since the participants in Group 2 rarely purchase and eat seafood products, they have difficulties in understanding the topic of the question, and they can't grasp the concept. Because of this, they couldn't directly give answer to this question.

Italy: in general, the participants highlighted 2 key points, which are strictly connected: one is the environmental protection and sustainability (e.g. fishing methods, no pollution, energy sources, social and economic aspects) and the other is the political action (e.g. controls and monitoring, institutions, networking, raising public awareness).

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5.1.6 Topic 6: Natural resources in fish feed

Knowledge of natural components in food and knowledge of natural components in seafood

Belgium: In general the high frequency consumer group does not know, there was a lot of doubt and guessing such as vitamins, minerals, iodine, calcium, pigment.

Also the low frequency consumer group guessed: salt, sugar, avocado, beetroot, ginger, omega-3, selenium, magnesium.

Hungary: herbs, vitamin-rich rosehips, vitamins, omega-3, spirulina, corn.

"PART622: They should be extracted from things that fish eat anyway in a natural way, so it could be given to them, and it wouldn't be as bad as giving puffed stuff to them."

Italy: no knowledge.

Advantages or disadvantages of natural components in seafood

Belgium:

"PART711 I do have my reservations about the extent to which that has effect. 1. How much is in the fish food? 2. How much does the fish eat and absorb of it, 3. How much of it retains in the meat of the fish? And 4. How much is your intake as a person. I think that is almost minimal"

"PART111 In the long run we only will have cultivated things, and we become resistant to nothing and we only add and add ... eventually something will happen that we have nothing left. I think: "nature works well". Why should we add so many things that are healthy on themselves."

Hungary:

"PART421: It is said that fish contains this vitamin. Why do we have to add more of it then? Why isn't the natural quantity enough? Why do we have to add more?

"PART521: If these components and vitamins are incorporated into the meat of the fish, then it is ok."

Advantages:

"PART522: What we listed before. Omega 3, so there would be more of it."

"PART622: I think giving plus things to fish is not that bad, we all take vitamins, medicines… Those substances that we can't get from food, we should get it externally"

Disadvantages:

"PART322: Another example of interfering with nature and its processes."

"PART522: The question is, how it is present in the meat of the fish. Fruit or pills, what do you use to take it in… It's present in its meat in that form. "

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"PART422: Doesn't matter where they are farmed, they get lots of different feed, and then they get fished."

"PART822: Now it's large-scale."

"PART522: There are sanctions to prevent this."

"PART622: Everything related to fishing should be regulated better."

Italy:

Advantages:

"PART731: If animal feed are enriched positively this should have a positive impact on the fish we eat. So, following the logic, it should be like that. However, I do not really know what it could be added to support human health."

"PART332: in my opinion yes if it helps having a healthier animal. It is a food like anything else."

"PART532: verifying the carry-over between feed and fish… verifying quality, safety of the final product, potential bioaccumulation of any positive or negative substance."

Disadvantages:

"PART831: I think yes, there could be disadvantages. I am not sure that adding a natural component is always a positive thing. You (referring to the Moderator) have made before the example of "fish flour" added to the animal feed. As you said, if that is too much, it can be hurting for the animals. So it should be controlled."

"PART731: Another disadvantage could be the price of the product. Indeed, I could spend more for a product enriched with natural components. Maybe not everyone could afford it or not everyone would be willing to pay an higher price."

"PART632: no, I am really selective, I am sceptical. It's true that it must be monitored but how could a fish react if it has received such addition? It's not a natural thing, because you are giving to it something more that it cannot find in its natural environment"

"PART632: I make an example. Fish is rich in omega 3, because fish eat them from algae. Farmed fish do not eat from algae, so you add it in the feed. But if in the feed you put it three times in order to make them have more in the flesh, it's not natural and what is the effect in the end?"

Attitude towards natural components in seafood

Belgium: In general: much doubtful faces on this subject

"PART111 I think: if Europe thinks those additions are so important, and that it is healthier for everyone, then they have to make it obligated. If it's really healthy, it has to be on the market. And anything that is not healthy, they just have to remove it."

"PART612 but why?"

"PART712 yes why?!"

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"PART112 I always wonder: is that really natural ...? usually it says "enriched" but where does that come from? I think that is easily chemically imitated"

Hungary

The participants agreed that giving natural component is a positive thing, but it is equivocal. The reasons were because people think that the producers added something else and keep it secret, what didn't they add? Or what else got into it and producers didn't tell us?

The 1st group was very suspicious about feeding fish. The participants had ideas about her household practice. They do not find real value of the different feeds. To sum up the most of the participants had fear, do not trust in feeding.

Italy:

HFC Group:

Participants were not aware of natural components in feeds. The drawbacks of using them were: it may be harmful for the fish (so controls are needed) and the price of the final product could be higher.

Nevertheless all of them showed a positive attitude towards the use of natural components in feed.

In the high frequency consumer group most of the participants share a positive attitude towards this.

"PART731: Yes, I would spend more for it. But, I would always take into consideration the taste of the product. However, the problem is, again, that not everyone could afford it."

LFC Group:

Five participants were positive towards natural components in feed, if this helps having healthier animals/products. Two of them stressed the importance of verifying the carry-over between feed and fish, verifying quality, and safety of the final product and make controls. One participant was against the use of natural components in fish feed. She was sceptical about the fish reaction after receiving such feed additions (something which is not naturally found in its natural environment, for type or concentration, which may have negative effects on the fish or on the human being).

The attitudes in the low frequency consumer group are more mixed:

"PART632: yes, because if the feed was comparable to something found in nature I would accept it. Like with bread, which is made with flour with high gluten content: why don't we digest it? because it contains too much gluten. If we are used to a certain content of something, if then we increase it too much, we cannot tolerate it"

"MODERATOR: what do the others think?"

"PART732: I am positive towards this because we have sufficient knowledge to use them for positive purposes. And I totally trust scientific knowledge"

"PART832: yes, the principle of farming is to give something enriched and positive so I am in favour"

"PART532: I am positive, like humans who take vitamins in the morning…"

"PART132: if it is useful for seafood health and if the proper controls are made, I am in favour"

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5.2 Consumer surveys

Sample characteristics

A total of 400 participants were included in the consumer surveys in Belgium and Hungary each, and 403 participants were included in the consumer survey in Italy, thus yielding a total sample size of 1203. Key characteristics of the study sample are presented in the tables below.

[S1] Gender	Total	BE	HU	IT
	n=1203	n=400	n=400	n=403
Male	566 (47.0%)	200 (50%)	187 (46,8%)	179 (44,4%)
Female	637 (53.0%)	200 (50%)	213 (53,2%)	224 (55,6%)

[S2] Age	Total	BE	HU	IT
	n=1203	n=400	n=400	n=403
Age (Mean ± SD)	41.64 ± 13.31	42.13 ±13.52	42.06 ±13.45	40.78 ±13.45
Minimum	18	18	18	18
Maximum	65	65	65	65

[S3] Education level	Total	BE	HU	IT
	n=1203	n=400	n=400	n=403
Primary education	27 (2.2%)	14 (3.5%)	12 (3%)	1 (0.2%)
Secondary education	566 (47.0%)	169 (42.3%)	229 (57.3%)	168 (41.7%)
Higher education (with exclusion of university)	306 (25.4%)	159 (39.8%)	101 (25.3%)	46 (11.4%)
University	304 (25.3%)	58 (14.5%)	58 (14.5%)	188 (46.7%)

[S4] Daily occupation	Total	BE	HU	IT
	n=1203	n=400	n=400	n=403
Paid job (≥24 hours a week)	758 (63.0%)	236 (59.0%)	280 (70.0%)	242 (60.0%)
Homemaker	77 (6.4%)	28 (7.0%)	20 (5.0%)	29 (7.2%)
Student	100 (8.3%)	35 (8.8%)	19 (4.8%)	46 (11.4%)
Retired	96 (8.0%)	34 (8.5%)	47 (11.8%)	15 (3.7%)
Unemployed	60 (5.0%)	27 (6.8%)	17 (4.3%)	16 (4.0%)
Other	112 (9.3%)	40 (10.0%)	17 (4.3%)	55 (13.6%)

[S5] Link with food production	Total	BE	HU	IT
	n=1203	n=400	n=400	n=403
Yes	284 (23.6%)	57 (14.2%)	59 (14.8%)	168 (41.7%)
No	919 (76.4%)	343 (85.8%)	341 (85.3%)	235 (58.3%)

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[S6] Income (self-assessed)	Total	BE	HU	IT
Total	n=1203	n=400	n=400	n=403
Living very comfortably on present income- manage very well	61 (5.1%)	27 (6.8%)	3 (0.8%)	31 (7.7%)
Living comfortably on present income – manage quite well	350 (29.1%)	121 (30.3%)	76 (19.0%)	153 (38.0%)
Coping on present income – get by alright	518 (43.1%)	164 (41.0%)	197 (49.3%)	157 (39.0%)
Finding it difficult on present income – some financial difficulties	206 (17.1%)	65 (16.3%)	97 (24.3%)	44 (10.9%)
Finding it very difficult on present income – severe financial difficulties	47 (3.9%)	17 (4.3%)	22 (5.5%)	8 (2.0%)
Don't want to tell / Don't know	21 (1.7%)	6 (1.5%)	5 (1.3%)	10 (2.5%)

[S7] Living area	Total	BE	HU	IT
	n=1203	n=400	n=400	n=403
A big city	292 (24.3%)	64 (16%)	172 (43.0%)	56 (13.9%)
The suburbs or outskirts of a big city	173 (14.4%)	123 (30.8%)	22 (5.5%)	28 (6.9%)
A town or a small city	492 (40.9%)	148 (37.0%)	140 (35.0%)	204 (50.6%)
A country village	244 (20.3%)	65 (16.3%)	66 (16.5%)	113 (28.0%)
Don't know	2 (0.2%)	0 (0.0%)	0 (0.0%)	2 (0.5%)

[S8] Distance to coastal area	Total	BE	HU	IT
	n=1203	n=400	n=400	n=403
1. less than 5 kilometers	81 (6.7%)	16 (4.0%)	0 (0.0%)	65 (16.1%)
2. 5-10 kilometers	31 (2.6%)	4 (1.0%)	0 (0.0%)	27 (6.7%)
3. 11-20 kilometers	44 (3.7%)	21 (5.3%)	0 (0.0%)	23 (5.7%)
4. more than 20 kilometers	647 (53.8%)	359 (89.8%)	0 (0.0%)	288 (71.5%)
5. not applicable	400 (33.3%)	0 (0.0%)	400 (100%)	0 (0.0%)

[S9] Household size (persons)	Total	BE	HU	IT
	n=1203	n=400	n=400	n=403
1	183 (15.2%)	79 (19.8%)	56 (14.0%)	48 (11.9%)
2	350 (29.1%)	131 (32.8%)	124 (31.0%)	95 (23.6%)
3	301 (25.0%)	86 (21.5%)	102 (25.5%)	113 (28.0%)
4	269 (22.4%)	80 (20.0%)	82 (20.5%)	107 (26.6%)
5	70 (5.8%)	16(4.0%)	25 (6.3%)	29 (7.2%)
6	18 (1.5%)	5(1.3%)	6 (1.5%)	7 (1.7%)
7 or more	12 (1.0%)	3 (0.8%)	5 (1.3%)	4 (1.0%)

[S10] Children under 12 yrs.	Total	BE	HU	IT
	n=1203	n=400	n=400	n=403
Yes	324 (26.9%)	103 (25.8%)	126 (31.5%)	95 (23.6%)
No	879 (73.1%)	297 (74.3%)	274 (68.5%)	308 (76.4%)

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[S10A] Age distribution of household members							
	0-3y	4-6y	7-9y	10-12y	13-17y	18-59y	60+y
	n=910 (75.6%)	n=887 (73.7%)	n=882 (73.3%)	n=885 (73.6%)	n=899 (74.7%)	n=1174 (97.6%)	n=933 (77.3%)
0	778 (64.7%)	774 (64.3%)	771 (64.1%)	774 (64.3%)	754 (62.7%)	85 (7.1%)	660 (54.9%)
1	114 (9.5%)	99 (8.2%)	96 (8.0%)	96 (8.0%)	116 (9.6%)	290(24.1%)	158(13.1%)
2	18 (1.5%)	13 (1.1%)	15 (1.2%)	14 (1.2%)	27 (2.2%)	555(46.1%)	103 (8.6%)
≥3	0 (0.0%)	1 (0.1%)	0 (0.0%)	1 (0.1%)	2 (0.2%)	244(20.3%)	12 (1.0%)

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5.2.1 Seafood consumption frequency

Q1. Seafood consumption frequency: general

How often do you eat seafood (assuming that a portion of seafood per meal is about 150-200 g)?		
n=1203	Frequency	Percentage
Daily	7	0.6
5-6 times a week	11	0.9
3-4 times a week	86	7.1
2 times a week	303	25.2
Once a week	381	31.7
Less frequently	415	34.5

Q2. Seafood consumption frequency: seafood products

How often did you eat the following seafood on average in the last year?											
n=1203 Freq %	Daily	5-6 times a week	3-4 times a week	2 times a week	Once a week	2-3 times a month	Once a month	1-5 times every 6 months	Less freq-uently	Never	I have never heard of this seafood
Bib	5	3	3	17	42	53	70	76	200	396	338
	0.4	0.2	0.2	1.4	3.5	4.4	5.8	6.3	16.6	32.9	28.1
Blue whiting	2	5	1	6	12	17	34	55	177	399	495
	0.2	0.4	0.1	0.5	1.0	1.4	2.8	4.6	14.7	33.2	41.1
Common carp	2	2	6	2	38	47	65	146	251	569	75
	0.2	0.2	0.5	0.2	3.2	3.9	5.4	12.1	20.9	47.3	6.2
Common dab	1	1	2	4	10	15	39	80	169	534	348
	0.1	0.1	0.2	0.3	0.8	1.2	3.2	6.7	14.0	44.4	28.9
Flounder (European)	1	1	3	4	6	19	24	58	162	573	352
	0.1	0.1	0.2	0.3	0.5	1.6	2.0	4.8	13.5	47.6	29.3
Herring	2	2	6	14	37	68	110	179	358	392	35
	0.2	0.2	0.5	1.2	3.1	5.7	9.1	14.9	29.8	32.6	2.9
Mackerel (Horse. chub and Atlantic)	3	0	7	18	62	119	124	207	278	336	49
	0.2	0.0	0.6	1.5	5.2	9.9	10.3	17.2	23.1	27.9	4.1
Blue Mussels	1	1	4	4	24	60	112	267	223	413	94
	0.1	0.1	0.3	0.3	2.0	5.0	9.3	22.2	18.5	34.3	7.8
Salmon	6	4	13	34	147	175	183	197	192	235	17
	0.5	0.3	1.1	2.8	12.2	14.5	15.2	16.4	16.0	19.5	1.4

How often did you eat the following seafood on average in the last year?											
	Daily	5-6 times a week	3-4 times a week	2 times a week	Once a week	2-3 times a month	Once a month	1-5 times every 6 months	Less freq-uently	Never	I have never heard of this seafood
Salmon (pâté)	4	0	5	5	21	36	54	73	249	696	60
	0.3	0	0.4	0.4	1.7	3.0	4.5	6.1	20.7	57.9	5.0

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Salmon (smoked)	4	2	11	26	81	155	209	207	210	274	24
	0.3	0.2	0.9	2.2	6.7	12.9	17.4	17.2	17.5	22.8	2.0
Seabream (gilthead)	5	0	7	17	84	103	97	142	196	398	154
	0.4	0	0.6	1.4	7.0	8.6	8.1	11.8	16.3	33.1	12.8
Sole (lemon)	3	0	7	8	39	49	78	140	202	490	187
	0.2	0.0	0.6	0.7	3.2	4.1	6.5	11.6	16.8	40.7	15.5
Sprat (European)	2	4	7	9	21	35	42	95	206	409	373
	0.2	0.3	0.6	0.7	1.7	2.9	3.5	7.9	17.1	34.0	31.0
Whiting	3	4	4	4	10	20	27	73	160	479	419
	0.2	0.3	0.3	0.3	0.8	1.7	2.2	6.1	13.3	39.8	34.8
Other … (n=767)	4	2	20	45	79	98	106	125	104	150	34
	0.3	0.2	1.7	3.7	6.6	8.1	8.8	10.4	8.6	12.5	2.8

Q3. Seafood consumption frequency: seafood type purchase

How often do you consume seafood products which you purchased as…?

n=1203	Daily	Several times a week	Once a week	Several times a month	Once a month	1-5 times every 6 months	Less freq-uently	Never
Fresh	15	64	211	186	175	212	243	97
	1.2	5.3	17.5	15.5	14.5	17.6	20.2	8.1
Frozen	5	51	137	272	209	239	200	90
	0.4	4.2	11.4	22.6	17.4	19.9	16.6	7.5
Smoked	7	15	88	197	225	199	261	211
	0.6	1.2	7.3	16.4	18.7	16.5	21.7	17.5
Salted	4	7	24	52	86	124	372	534
	0.3	0.6	2.0	4.3	7.1	10.3	30.9	44.4
Dried	2	4	9	23	48	96	308	713
	0.2	0.3	0.7	1.9	4.0	8.0	25.6	59.3
Pickled/ in brine	2	8	22	42	66	139	312	612
	0.2	0.7	1.8	3.5	5.5	11.6	25.9	50.9
Canned	7	64	100	238	189	228	202	175
	0.6	5.3	8.3	19.8	15.7	19.0	16.8	14.5

How often do you consume seafood products which you purchased as…?

Please mark only one answer in each row
n=1203

	Daily	Several times a week	Once a week	Several times a month	Once a month	1-5 times every 6 months	Less freq-uently	Never
Breaded	2	25	61	156	195	226	264	274
	0.2	2.1	5.1	13.0	16.2	18.8	21.9	22.8
Spread	4	14	28	76	72	124	266	619
	0.3	1.2	2.3	6.3	6.0	10.3	22.1	51.5

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Ready-to eat meal	6	22	33	80	126	160	299	477
	0.5	1.8	2.7	6.7	10.5	13.3	24.9	39.7

Q4a. Seafood consumption frequency: place

How often do you eat seafood …? n=1203	Daily	5-6 times a week	3-4 times a week	2 times a week	Once a week	2-3 times a month	Once a month	1-5 times every 6 months	Less freq-uently	Never
At home	15	9	67	244	300	197	124	164	70	13
	1.2	0.7	5.6	20.3	24.9	16.4	10.3	13.6	5.8	1.1
Out-of-home (e.g. restaurant. canteen)	1	2	13	37	106	144	202	289	296	113
	0.1	0.2	1.1	3.1	8.8	12.0	16.8	24.0	24.6	9.4

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Q4b. Seafood consumption frequency: place of purchase

How often do you buy or obtain seafood from …?	Daily	5-6 times a week	3-4 times a week	2 times a week	Once a week	2-3 times a month	Once a month	1-5 times every 6 months	Less frequently	Never
Grocery store, super or hyper-market	15	8	25	99	262	210	205	194	131	54
	1.2	0.7	2.1	8.2	21.8	17.5	17.0	16.1	10.9	4.5
Local street market	2	4	8	20	81	65	69	150	296	508
	0.2	0.3	0.7	1.7	6.7	5.4	5.7	12.5	24.6	42.2
Fish farm or harbour or auction or fisherman	2	4	6	14	33	29	37	82	266	730
	0.2	0.3	0.5	1.2	2.7	2.4	3.1	6.8	22.1	60.7
Own catch	1	2	3	7	9	19	26	54	145	937
	0.1	0.2	0.2	0.6	0.7	1.6	2.2	4.5	12.1	77.9
Fish monger or fish monger stall in a market hall or a specialist store	1	3	5	29	76	64	87	149	288	501
	0.1	0.2	0.4	2.4	6.3	5.3	7.2	12.4	23.9	41.6
Restaurant	1	4	6	14	72	84	197	294	325	206
	0.1	0.3	0.5	1.2	6.0	7.0	16.4	24.4	27.0	17.1
Canteen	3	2	8	22	61	38	54	98	206	711
	0.2	0.2	0.7	1.8	5.1	3.2	4.5	8.1	17.1	59.1

5.2.2 Seafood consumption frequency: children (n=267) (Participants with children 4-12y)

Q5 Seafood consumption frequency: children: different

Do your child(ren) eat the same type of seafood and at the same frequency as you?	Freq.	%
Yes. the same type and at the same frequency	152	12.6
Not at the same frequency, but same type	58	4.8
Not the same type, but at the same frequency	16	1.3
No. not the same type or same frequency	41	3.4

Q5a1 Seafood consumption frequency: children: different frequency

Indicate how your child(ren)s' seafood consumption frequency is different than yours?	Freq.	%
More frequently	33	2.7
Less frequently	57	4.7
My (all) child(ren) do(es) not eat seafood	7	0.6
Other	2	0.2

Q5a2 Seafood consumption frequency: children: different type

Indicate why your child(ren)s' type of seafood consumption is different than yours?	Freq.	%
I believe another type of seafood is better for the nutritional needs of my child(ren)	4	0.3
I choose types of seafood that do not contain bones for my child(ren)	13	1.1
My child(ren) prefer other types of seafood products	20	1.7

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My child(ren) eat seafood at school or somewhere else	19	1.6

Q5b Seafood consumption frequency: children: seafood type purchase

My child(ren) consume seafood products which are purchased as…	Freq.	%.
Fresh	58	4.8
Frozen	56	4.7
Smoked	17	1.4
Salted	6	0.5
Dried	5	0.4
Pickled/ in brine	6	0.5
Canned	30	2.5
Breaded	48	4.0
Spread	13	1.1
Ready-to eat meal	18	1.5

Q5c Seafood consumption frequency: children: place

How often do your children eat seafood …? n=266	Daily	5-6 times a week	3-4 times a week	2 times a week	Once a week	2-3 times a month	Once a month	1-5 times every 6 months	Less freq-uently	Never	Not applicable
At home	3	0	11	45	59	39	40	39	23	4	3
	0.2	0.0	0.9	3.7	4.9	3.2	3.3	3.2	1.9	0.3	0.2
At school	0	1	2	18	39	27	27	18	24	87	23
	0	0.1	0.2	1.5	3.2	2.2	2.2	1.5	2.0	7.2	1.9
Out-of-home (e.g. restaurant. not school canteen)	0	0	1	2	16	16	40	47	72	65	7
	0.0	0.0	0.1	0.2	1.3	1.3	3.3	3.9	6.0	5.4	0.6

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5.2.3 Seafood consumption frequency: pregnancy (n=239) (Female with children OR pregnant)

Q6 Seafood consumption frequency: during pregnancy: change

Did your consumption of seafood changed during pregnancy in type and/or frequency? n=239	Freq.	%
Yes. change in type and frequency	58	4.8
Change in frequency, but not in type	31	2.6
Change in type, but not in frequency	17	1.4
No. no change in type or in frequency	133	11.1

Q6a1 Seafood consumption frequency: during pregnancy: change frequency

Indicate how your seafood consumption frequency changed during pregnancy in comparison to your seafood consumption before pregnancy? n=89	Freq.	%
More frequently	42	3.5
Less frequently	33	2.7
I did not eat seafood during pregnancy	13	1.1
Other	1	.1

Q6a2 Seafood consumption frequency: during pregnancy: change type

Indicate how the type seafood consumption changed during pregnancy in comparison to your seafood consumption before pregnancy? n=89	Freq.	%
No raw seafood (e.g. sushi)	48	4.0
No smoked seafood products	28	2.3
No seafood products which might contain high mercury level	38	3.2
Other	4	0.3

Q6b Seafood consumption frequency: during pregnancy: seafood purchase type

During pregnancy I mostly consumed seafood products purchased as…	Freq.	%.
Fresh	48	4.0
Frozen	46	3.8
Smoked	4	0.3
Salted	3	0.2
Dried	4	0.3
Pickled/ in brine	5	0.4
Canned	29	2.4
Breaded	22	1.8
Spread	9	0.7
Ready-to eat meal	8	0.7

5.2.4 General attitudes and perceptions towards seafood products

Q7a_1 General preference towards seafood products: preference wild/farmed

Please indicate your preference for wild versus farmed seafood products

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n=1203	Freq.	%
1 Preference for wild	230	19.1
2	88	7.3
3	119	9.9
4 Neutral	617	51.3
5	67	5.6
6	26	2.2
7 Preference for farmed	56	4.7

Q7b General attitudes towards seafood products

In the following we would like you to think about how you feel when you eat seafood. Please indicate for each row which word best describes how you feel.
N=1203

*When I think about eating **seafood products**, I feel...*

	1	2	3	4 Neutral	5	6	7	
Bad	18	16	24	286	181	269	409	Good
	1.5	1.3	2.0	23.8	15.0	22.4	34.0	
Unsatisfied	27	19	29	260	200	289	379	Satisfied
	2.2	1.6	2.4	21.6	16.6	24.0	31.5	
Unpleasant	28	23	38	259	186	279	390	Pleasant
	2.3	1.9	3.2	21.5	15.5	23.2	32.4	
Negative	31	19	35	272	190	276	380	Positive
	2.6	1.6	2.9	22.6	15.8	22.9	31.6	

*When I think about eating **farmed fish (e.g. farmed salmon)**, I feel...*

	1	2	3	4 Neutral	5	6	7	
Bad	30	39	97	455	208	197	177	Good
	2.5	3.2	8.1	37.8	17.3	16.4	14.7	
Unsatisfied	37	44	76	443	228	197	178	Satisfied
	3.1	3.7	6.3	36.8	19.0	16.4	14.8	
Unpleasant	38	42	83	450	209	197	182	Pleasant
	3.2	3.5	6.9	37.5	17.4	16.4	15.2	
Negative	43	43	91	449	200	202	174	Positive
	3.6	3.6	7.6	37.4	16.6	16.8	14.5	

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*When I think about eating **wild fish (e.g. wild salmon),** I feel...*

	1	2	3	4 Neutral	5	6	7	
Bad	21	17	45	364	177	231	347	Good
	1.7	1.4	3.7	30.3	14.7	19.2	28.9	
Unsatisfied	25	23	36	361	182	236	340	Satisfied
	2.1	1.9	3.0	30.0	15.1	19.6	28.3	
Unpleasant	26	19	46	359	184	234	334	Pleasant
	2.2	1.6	3.8	29.9	15.3	19.5	27.8	
Negative	30	20	44	378	172	234	325	Positive
	2.5	1.7	3.7	31.4	14.3	19.5	27.0	

*When I think about eating **processed seafood products (e.g. smoked salmon),** I feel...*

	1	2	3	4 Neutral	5	6	7	
Bad	24	21	54	440	240	227	197	Good
	2.0	1.7	4.5	36.6	20.0	18.9	16.4	
Unsatisfied	26	23	47	425	234	249	199	Satisfied
	2.2	1.9	3.9	35.3	19.5	20.7	16.5	
Unpleasant	27	21	54	432	211	245	213	Pleasant
	2.2	1.7	4.5	35.9	17.5	20.4	17.7	
Negative	31	25	49	452	222	232	192	Positive
	2.6	2.1	4.1	37.6	18.5	19.3	16.0	

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Q8 Perception of seafood

Please indicate to which degree you agree or disagree with the statements.
7-point Likert scale from 1= Totally disagree to 7= Totally agree. n=1203
According to me **fresh (non-processed) *seafood* products** are…

	Mean	SD
… healthy	5.53	1.547
…of high quality	5.29	1.465
…safe	4.89	1.435
…nutritious	5.50	1.457
…affordable	3.97	1.582
…tasteful	5.45	1.492
...safer than meat	4.42	1.476
…safer than processed seafood products	4.56	1.531

According to me ***processed seafood products (e.g. smoked salmon) are***…

	Mean	SD
… healthy	4.65	1.409
…of high quality	4.67	1.381
…safe	4.76	1.382
…nutritious	4.83	1.405
…affordable	4.16	1.420
…tasteful	4.98	1.435
...safer than meat	4.26	1.329
...safer than fresh (non-processed) seafood products	3.98	1.505

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5.2.5 Health

Q9 General health interest

7-point Likert scale from 1= Totally disagree to 7= Totally agree. n=1203	Mean	SD
The healthiness of food has little impact on my food choices	3.36	1.795
I am very particular about the healthiness of food I eat	4.90	1.481
I eat what I like and I do not worry much about the healthiness of food	3.53	1.680
I always follow a healthy and balanced diet	4.48	1.379
It is important for me that my daily diet contains a lot of nutrients such as vitamins and minerals	4.94	1.387
The healthiness of snacks makes no difference to me	3.59	1.684
I do not avoid foods, even if they may raise the risk of certain health problems	3.47	1.651

Q10 Perceived health benefits of seafood products for target groups

7-point Likert scale from 1= Totally disagree to 7= Totally agree. n=1203	Mean	SD
Eating seafood products is good for my health	5.54	1.442
Eating seafood products helps to grow up healthy	5.48	1.398
Eating seafood products allows me to live healthy	5.44	1.383
Fatty seafood products (e.g. salmon, herring,…) rich in omega-3 fatty acids lower risk of coronary heart diseases	5.43	1.404
Fatty seafood products are important in the prevention of some chronic diseases	5.18	1.412
High maternal seafood products consumption during pregnancy improves fetal development.	4.62	1.326
High maternal seafood products consumption during breastfeeding improves infant's development.	4.63	1.305
High intake of seafood products during childhood improves child's developmental skills	4.91	1.293
High intake of seafood products from 60+ improves health and well-being of elderly	5.07	1.360

5.2.6 Sustainability

Q11 Familiarity with ecolabel/origin/seasonality

On average, how often do you intentionally eat/buy seafood… n=1203	Never	Rarely	Sometimes	Frequently	Always
…with an ecolabel (e.g. MSC, ASC, FoS or POPA label).	198	239	450	247	69
	16.5	19.9	37.4	20.5	5.7
…taking into account origin (harvesting area).	138	214	355	340	156
	11.5	17.8	29.5	28.3	13.0
…taking into account seasonality*.	200	233	373	294	103
	16.6	19.4	31.0	24.4	8.6

* *Taking into account seasonality means that you take into account that the seafood species has a mature size in that particular season.*

Q12 Intention to consume seafood with an ecolabel/origin/seasonality

Please indicate how likely you are… n=1203	Very unlikely 1	2	3	Neutral 4	5	6	Very likely 7
…. to eat/buy seafood with an ecolabel (e.g. MSC, ASC, FoS or POPA label) during the next week.	176	89	75	440	199	123	101
	14.6	7.4	6.2	36.6	16.5	10.2	8.4
	137	70	68	403	220	133	172

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… to eat/buy seafood taking into account origin (harvesting area) during the next week.	11.4	5.8	5.7	33.5	18.3	11.1	14.3
… to eat/buy seafood taking into account seasonality during the next week.	167 13.9	73 6.1	78 6.5	430 35.7	197 16.4	130 10.8	128 10.6

Q13 Perceived consumer effectiveness on sustainability

7-point Likert scale from 1= Totally disagree to 7= Totally agree.

n=1203	Mean	SD
One person alone can do very little for the sustainability of seafood	3.85	1.757
Efforts concerning the sustainability by one person are useless as long as other people do not want to do something	3.85	1.792
Refusing of unsustainable seafood products is a good way to change the production system and production offer	4.83	1.448
An individual person can make a difference for the sustainability of seafood by carefully selecting seafood products	4.80	1.473

5.2.7 Information

Q14 Information needs

Please indicate to what extent you are interested in the following information (on the package, on the supermarket shelf or on the product label) when purchasing seafood products?

	Not interested			Neutral			Very interested
	1	2	3	4	5	6	7
Eco-labelling schemes (e.g. MSC, ASC)	204	63	77	363	246	156	94
	17.0	5.2	6.4	30.2	20.4	13.0	7.8
Safety guarantee	233	36	31	234	277	242	150
	19.4	3.0	2.6	19.5	23.0	20.1	12.5
Quality mark	213	22	37	226	281	276	148
	17.7	1.8	3.1	18.8	23.4	22.9	12.3
Batch number for product identification	220	64	115	388	204	151	61
	18.3	5.3	9.6	32.3	17.0	12.6	5.1
Environmental information	196	36	58	292	304	220	97
	16.3	3.0	4.8	24.3	25.3	18.3	8.1
Animal welfare	209	29	49	305	275	211	125
	17.4	2.4	4.1	25.4	22.9	17.5	10.4
Wild / farmed	223	25	43	358	228	217	109
	18.5	2.1	3.6	29.8	19.0	18.0	9.1
Harvesting method/ fishing gear (e.g. longlines, trawls) used to catch the product	229	66	86	417	205	136	64
	19.0	5.5	7.1	34.7	17.0	11.3	5.3
Sustainability	192	23	47	296	285	262	98
	16.0	1.9	3.9	24.6	23.7	21.8	8.1
Date of catch or production	222	19	35	225	240	256	206
	18.5	1.6	2.9	18.7	20.0	21.3	17.1
Origin/ area of catch or production	242	35	49	273	253	236	115
	20.1	2.9	4.1	22.7	21.0	19.6	9.6
Shelf life (use by or best before)	347	9	15	136	119	228	349
	28.8	0.7	1.2	11.3	9.9	19.0	29.0
Feed used during farming	216	53	96	365	239	147	87
	18.0	4.4	8.0	30.3	19.9	12.2	7.2

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Use of genetically modified feed	261	44	72	308	181	175	162
	21.7	3.7	6.0	25.6	15.0	14.5	13.5
Additives used	257	32	51	246	207	225	185
	21.4	2.7	4.2	20.4	17.2	18.7	15.4
Contaminant levels	291	26	47	209	191	227	212
	24.2	2.2	3.9	17.4	15.9	18.9	17.6
Nutrients in enriched seafood products	216	33	45	303	206	242	158
	18.0	2.7	3.7	25.2	17.1	20.1	13.1
Reduced (-25%) salt content	215	49	59	354	226	190	110
	17.9	4.1	4.9	29.4	18.8	15.8	9.1
Suitable for children	267	49	37	304	169	189	188
	22.2	4.1	3.1	25.3	14.0	15.7	15.6
Suitable for pregnant women	285	42	46	367	139	163	161
	23.7	3.5	3.8	30.5	11.6	13.5	13.4
Suitable for elderly	263	44	40	345	165	167	179
	21.9	3.7	3.3	28.7	13.7	13.9	14.9

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5.2.8 Eco-innovative solutions

Q15 Domain specific innovations (DSI-scale)

7-point Likert scale from 1= Totally disagree to 7= Totally agree n=1203	Mean	SD
I buy new foods before other people do	3.56	1.526
In general, I am among the first in my circle of friends to buy new foods	3.55	1.598
Compared to my friends I buy more new foods	3.72	1.587
Even though new foods are available in the store, I do not buy them	3.66	1.429
In general, I am the last in my circle of friends to know the trademarks of new foods	3.61	1.466
I will not buy new foods, if I have not tasted them yet	3.67	1.590

Q16 Attitudes, purchase intention, WTP and tendency to experiment towards eco-innovative seafood products

Eco-innovative seafood products

In the following we would like you to think about how you feel when you eat seafood.
Please indicate for each row which word best describes how you feel.

*When I think about **seafood products which are adjusted during production via adding natural components such as microalgae, macroalgae and seaweed, into the seafood feed**, I feel...*

	1	2	3	4 Neutral	5	6	7	
Bad	37	41	94	527	196	164	144	Good
	3.1	3.4	7.8	43.8	16.3	13.6	12.0	
Unsatisfied	39	41	76	552	198	162	135	Satisfied
	3.2	3.4	6.3	45.9	16.5	13.5	11.2	
Unpleasant	40	44	84	575	174	164	122	Pleasant
	3.3	3.7	7.0	47.8	14.5	13.6	10.1	
Negative	43	41	87	550	181	175	125	Positive
	3.6	3.4	7.2	45.8	15.1	14.6	10.4	

*When I think about **seafood products which are adjusted during processing on nutritional, functional and appearance level**, I feel...*

	1	2	3	4 Neutral	5	6	7	
Bad	61	70	170	502	186	129	83	Good
	5.1	5.8	14.2	41.8	15.5	10.7	6.9	
Unsatisfied	61	70	160	514	202	121	75	Satisfied
	5.1	5.8	13.3	42.7	16.8	10.1	6.2	
Unpleasant	60	77	146	532	193	119	74	Pleasant
	5.0	6.4	12.2	44.3	16.1	9.9	6.2	
Negative	64	72	152	527	186	123	76	Positive
	5.3	6.0	12.7	43.9	15.5	10.3	6.3	

*When I think about **seafood products which are specifically produced or processed for improving health or to better respond to my nutritional needs**, I feel...*

	1	2	3	4 Neutral	5	6	7	
Bad	25	23	69	393	264	232	197	Good
	2.1	1.9	5.7	32.7	21.9	19.3	16.4	
Unsatisfied	27	24	68	419	242	227	194	Satisfied

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	2.2	2.0	5.7	34.9	20.1	18.9	16.2	
Unpleasant	26	27	71	437	247	217	175	Pleasant
	2.2	2.3	5.9	36.4	20.6	18.1	14.6	
Negative	26	26	71	410	244	227	198	Positive
	2.2	2.2	5.9	34.1	20.3	18.9	16.5	
*When I think about eating **seafood products enriched with Selenium, Iodine and Omega-3 fatty acids** , I feel...*								
	1	2	3	4	5	6	7	
				Neutral				
Bad	48	38	89	407	238	205	178	Good
	4.0	3.2	7.4	33.8	19.8	17.0	14.8	
Unsatisfied	52	32	92	436	226	201	163	Satisfied
	4.3	2.7	7.7	36.3	18.8	16.7	13.6	
Unpleasant	49	36	91	463	214	191	156	Pleasant
	4.1	3.0	7.6	38.6	17.8	15.9	13.0	
Negative	49	36	87	435	221	204	169	Positive
	4.1	3.0	7.2	36.2	18.4	17.0	14.1	
*When I think about eating **processed seafood products with a 25% reduced salt content**, I feel...*								
	1	2	3	4	5	6	7	
				Neutral				
Bad	23	24	62	476	255	196	167	Good
	1.9	2.0	5.2	39.6	21.2	16.3	13.9	
Unsatisfied	24	23	68	488	243	205	151	Satisfied
	2.0	1.9	5.7	40.6	20.2	17.1	12.6	
Unpleasant	23	23	64	519	260	170	142	Pleasant
	1.9	1.9	5.3	43.2	21.6	14.2	11.8	
Negative	26	20	59	492	245	206	154	Positive
	2.2	1.7	4.9	40.9	20.4	17.1	12.8	
*When I think about eating **smoked salmon with 25% reduced salt content,** I feel...*								
	1	2	3	4	5	6	7	
				Neutral				
Bad	27	19	54	475	266	200	162	Good
	2.2	1.6	4.5	39.5	22.1	16.6	13.5	
Unsatisfied	25	22	50	501	258	191	155	Satisfied
	2.1	1.8	4.2	41.7	21.5	15.9	12.9	
Unpleasant	25	24	55	522	251	182	143	Pleasant
	2.1	2.0	4.6	43.4	20.9	15.1	11.9	
Negative	25	24	48	492	251	203	159	Positive
	2.1	2.0	4.0	40.9	20.9	16.9	13.2	
*When I think about eating **salmon pâté with 25% reduced salt content,** I feel...*								
	1	2	3	4	5	6	7	
				Neutral				
Bad	43	33	70	605	193	139	120	Good
	3.6	2.7	5.8	50.3	16.0	11.6	10.0	
Unsatisfied	42	32	61	623	181	150	113	Satisfied
	3.5	2.7	5.1	51.8	15.1	12.5	9.4	
Unpleasant	45	33	63	621	195	135	110	Pleasant
	3.7	2.7	5.2	51.7	16.2	11.2	9.2	
Negative	45	33	53	628	186	135	120	Positive
	3.8	2.8	4.4	52.3	15.5	11.3	10.0	

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*When I think about **seafood products which are especially made for children to respond better to their nutritional needs (e.g. Vitamin D), are functionally improved (e.g. no bones) and have an attractive appearance for children**, I feel...*

	1	2	3	4 Neutral	5	6	7	
Bad	28	29	55	406	230	224	231	Good
	2.3	2.4	4.6	33.7	19.1	18.6	19.2	
Unsatisfied	26	29	51	422	213	226	235	Satisfied
	2.2	2.4	4.2	35.1	17.7	18.8	19.6	
Unpleasant	24	31	48	442	207	226	223	Pleasant
	2.0	2.6	4.0	36.8	17.2	18.8	18.6	
Negative	27	26	48	406	221	237	236	Positive
	2.2	2.2	4.0	33.8	18.4	19.7	19.7	

*When I think about **seafood products which are especially made for pregnant women to respond better to their nutritional needs (e.g. Omega-3) and have an attractive and appealing appearance for pregnant women**, I feel...*

	1	2	3	4 Neutral	5	6	7	
Bad	28	27	49	483	222	196	198	Good
	2.3	2.2	4.1	40.1	18.5	16.3	16.5	
Unsatisfied	28	27	47	506	208	190	196	Satisfied
	2.3	2.2	3.9	42.1	17.3	15.8	16.3	
Unpleasant	28	26	46	517	204	185	195	Pleasant
	2.3	2.2	3.8	43.0	17.0	15.4	16.2	
Negative	31	24	45	493	199	202	207	Positive
	2.6	2.0	3.7	41.0	16.6	16.8	17.2	

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*When I think about **seafood products which are especially made for elderly to respond better to their nutritional needs (salt-reduced), are functionally improved (e.g. no bones, easy to chew) and have an appealing and attractive appearance for elderly**, I feel...*

	1	2	3	4 Neutral	5	6	7	
Bad	23	23	37	435	242	220	223	Good
	1.9	1.9	3.1	36.2	20.1	18.3	18.5	
Unsatisfied	23	23	40	447	234	216	219	Satisfied
	1.9	1.9	3.3	37.2	19.5	18.0	18.2	
Unpleasant	23	23	43	473	219	208	213	Pleasant
	1.9	1.9	3.6	39.4	18.2	17.3	17.7	
Negative	28	23	36	435	228	223	229	Positive
	2.3	1.9	3.0	36.2	19.0	18.6	19.1	

Q16b Purchase intention towards eco-innovative seafood products

7-point Likert scale from 1= Totally disagree to 7= Totally agree.

Enriched seafood products (n=1203)	Mean	SD
I would consider to buy **seafood products enriched with Selenium, Iodine and Omega-3 fatty acids**	4.54	1.520
I would consider to buy **salmon enriched with Selenium, Iodine and Omega-3 fatty acids**	4.50	1.531
I would consider to buy **carp enriched with Selenium, Iodine and Omega-3 fatty acids**	4.18	1.584
I would consider to buy **seabream enriched with Selenium, Iodine and Omega-3 fatty acids**	4.25	1.557

Seafood products with 25% reduced salt content (n=1203)	Mean	SD
I would consider to buy processed seafood products which have **25% reduced salt content**	4.70	1.482
I would consider to buy **smoked salmon with 25% reduced salt content**	4.64	1.533
I would consider to buy **salmon pâté with 25% reduced salt content**	4.36	1.609

Seafood products adjusted for children, pregnant women and elderly	Mean	SD
I would consider to buy seafood products which are **adjusted for children** (e.g. Fish sausage with vegetables) (n=447)	4.69	1.664
I would consider to buy seafood products which are **adjusted for pregnant women** (e.g. Fish roulade) (n=178)	4.62	1.663
I would consider to buy seafood products which are **adjusted for elderly** (e.g. Fish balls with vegetables and sauce) (n=389)	4.53	1.775

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Q16c Willingness to pay towards eco-innovative seafood products

Please indicate how much you are willing to pay for the following adjusted seafood products.

	-10%	=	+10%	+20%	+30%	+40%	+50%
Enriched seafood products							
Seafood products **enriched with Selenium, Iodine and Omega-3 fatty acids**	101	507	351	153	65	9	17
	8.4	42.1	29.2	12.7	5.4	0.7	1.4
Salmon enriched with Selenium, Iodine and Omega-3 fatty acids	103	515	334	159	58	16	18
	8.6	42.8	27.8	13.2	4.8	1.3	1.5
Carp enriched with Selenium, Iodine and Omega-3 fatty acids	121	594	274	136	56	6	16
	10.1	49.4	22.8	11.3	4.7	0.5	1.3
Seabream enriched with Selenium, Iodine and Omega-3 fatty acids	120	570	299	130	49	18	17
	10.0	47.4	24.9	10.8	4.1	1.5	1.4
Seafood products with 25% reduced salt content							
Seafood products which have **25% reduced salt content**	112	565	303	133	58	15	17
	9.3	47.0	25.2	11.1	4.8	1.2	1.4
Smoked salmon with 25% reduced salt content	116	556	299	136	61	20	15
	9.6	46.2	24.9	11.3	5.1	1.7	1.2
Salmon pâté with 25% reduced salt content	139	623	249	106	53	21	12
	11.6	51.8	20.7	8.8	4.4	1.7	1.0
Seafood products adjusted for children, pregnant women and elderly							
Seafood products which are **adjusted for children** (e.g. Fish sausage with vegetables) (n=454)	33	191	95	88	25	10	12
	2.7	15.9	7.9	7.3	2.1	0.8	1.0
Seafood products which are **adjusted for pregnant women** (e.g. Fish roulade) (n=187)	9	94	29	27	12	3	13
	0.7	7.8	2.4	2.2	1.0	0.2	1.1
Seafood products which are **adjusted for elderly** (e.g. Fish balls with vegetables and sauce) (n=397)	38	194	86	43	23	6	7
	3.2	16.1	7.1	3.6	1.9	0.5	0.6

Q16d Tendency to experiment with eco-innovative seafood products

I would be willing to buy an adjusted seafood product when it is…
7-point Likert scale from 1= Totally disagree to 7= Totally agree.

	Mean	SD
1. …healthier	5.20	1.551
2. …of high quality	5.25	1.517

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3.	…safer	5.33	1.507
4.	…more nutritious	5.22	1.516
5.	…more affordable	5.15	1.640
6.	…more tasteful	5.16	1.563
7.	...in promotion	5.01	1.590
8.	… more sustainable	5.17	1.496
9.	...recommended by family or friends	4.73	1.524
10.	…better fits my nutritional needs	5.22	1.488
11.	…better fits nutritional needs of my family	5.13	1.552

Summary of key findings of the consumer survey

- One third of the study sample adhere to the dietary recommendation of eating seafood at least twice a week. One third eats seafood once a week, while another third eats seafood less than weekly.
- The sample covers a wide variety of consumption of different seafood species, seafood product types and places of purchase.
- Distinct profiles were identified with respect to seafood consumption by young children and pregnant women.
- Half of the study participants had no specific preference for wild vs. farmed fish. Among those who expressed a specific preference, wild fish was most preferred.
- Consumer perceptions of fresh and processed seafood products were generally favourable.
- In a similar vein, perceptions as well as purchase intentions of eco-innovative seafood products were overall favourable.

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5.3 Experimental auctions

Sample characteristics

[S1] Gender	Total	BE	HU	IT
WP1 Products				
	n=271	n=42	n=119	n=110
Male	115 (42.4%)	16 (38.1%)	53 (44.5%)	46 (41.4%)
Female	156 (57.6%)	26 (61.9%)	66 (55.5%)	64 (57.7%)
WP 2 Products for adults				
	n=185	n=60	n=62	n=62
Male	79 (43.2%)	21 (35.0%)	27 (43.5%)	31 (49.2%)
Female	104 (56.8%)	38 (63.3%)	35 (56.5%)	31 (49.2%)
WP2 Products for children				
	n=160	n=36	n=60	n=62
Male	72 (45.6%)	9 (24.3%)	32 (53.3%)	31 (49.2%)
Female	86 (54.4%)	27 (73.0%)	28 (46.7%)	31 (49.2%)
WP2 Products for pregnant women				
	n=172	n=50	n=61	n=61
Male	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)
Female	172 (100.0%)	50 (100.0%)	61 (100.0%)	61 (100.0%)
WP2 Products for seniors				
	n=183	n=51	n=64	n=68
Male	65 (35.5%)	15 (29.4%)	27 (42.2%)	23 (31.5%)
Female	118 (64.5%)	36 (70.6%)	37 (57.8%)	45 (61.6%)

[S2] Age	Total	BE	HU	IT
WP1 Products for adults in general				
	n= 272	n=41	n=119	n=110
Age (Mean ± SD)	42.39 ± 15.39	53.17 ± 14.21	43.37 ± 13.69	37.32 ± 15.38
Minimum	18	22	18	20
Maximum	77	77	66	72
WP 2 Products for adults in general				
	n=182	n=60	n=62	n=60
Age (Mean ± SD)	46.20 ± 11.34	52.68 ± 7.86	43.87 ± 14.16	42.12 ± 7.73
Minimum	21	31	21	24
Maximum	84	84	66	61
WP2 Products for children				
	n=156	n=36	n=60	n=60
Age (Mean ± SD)	41.41 ± 7.26	40.22 ± 6.80	41.42 ± 7.05	42.12 ± 7.73
Minimum	24	28	25	24
Maximum	61	59	58	61

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WP2 Products for pregnant women				
	n=172	n=50	n=61	n=61
Age (Mean ± SD)	30.77 ± 8.38	26.42 ± 5.09	25.18 ± 5.87	29.92 ± 10.40
Minimum	19	19	20	20
Maximum	55	40	40	55
WP2 Products for seniors				
	n=180	n=51	n=64	n=65
Age (Mean ± SD)	61.98 ± 6.83	67.20 ± 5.36	59.66 ± 6.26	60.17 ± 6.24
Minimum	50	58	50	50
Maximum	78	78	75	75

[S3] Education level	Total	BE	HU	IT
	n=972	n=240	n=366	n=366
Primary education or lower	18 (1.8%)	6 (2.5%)	5 (1.4%)	7 (1.9%)
Secondary education	419 (42.9%)	72 (30.0%)	207 (56.6%)	140 (37.7%)
Higher education (except univ.)	331 (33.9%)	87 (36.3%)	113 (30.9%)	131 (35.3%)
University	204 (20.9%)	75 (31.3%)	41 (11.2%)	88 (23.7%)

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[S4] Daily occupation	Total	BE	HU	IT
	n=963	n=240	n=366	n=357
Paid job (24 h a week or more)	593 (60.7%)	118 (49.2%)	288 (78.7%)	187 (50.4%)
Working at home	24 (2.5%)	9 (3.8%)	1 (0.3%)	14 (3.8%)
Student	112 (11.5%)	21 (8.8%)	18 (4.9%)	73 (19.7%)
Retired	150 (15.4%)	66 (27.5%)	48 (13.1%)	36 (9.7%)
Unemployed	22 (2.3%)	7 (2.9%)	5 (1.4%)	10 (2.7%)
Other	62 (6.3%)	19 (7.9%)	6 (1.6%)	37 (10.0%)

[S5] Link with food production	Total	BE	HU	IT
	n=971	n=240	n=366	n=365
Yes	169 (17.3%)	38 (15.8%)	2 (0.5%)	129 (34.8%)
No	802 (82.1%)	202 (84.2%)	364 (99.5%)	236 (63.6%)

[S6] Financial situation	Total	BE	HU	IT
	n=971	n=240	n=366	n=365
Living very comfortably on present income- manage very well	110 (11.3%)	35 (14.6%)	31 (8.5%)	44 (11.9%)
Living comfortably on present income – manage quite well	440 (45.0%)	110 (45.8%)	179 (48.9%)	151 (40.7%)
Coping on present income – get by alright	348 (35.6%)	74 (30.8%)	135 (36.9%)	139 (37.5%)
Finding it difficult on present income – some financial difficulties	50 (5.1%)	12 (5.0%)	14 (3.8%)	24 (6.5%)
Finding it very difficult on present income – severe financial difficulties	2 (0.2%)	2 (0.8%)	0 (0.0%)	0 (0.0%)
Don’t want to tell / Don’t know	21 (2.1%)	7 (2.9%)	7 (1.9%)	7 (1.9%)

[S7] Living area	Total	BE	HU	IT
	n=972	n=240	n=366	n=371
A big city	439 (44.9%)	90 (37.5%)	331 (90.4%)	18 (4.9%)
The suburbs or outskirts of a big city	133 (13.6%)	80 (33.3%)	24 (6.6%)	29 (7.8%)
A town or a small city	288 (29.5%)	45 (18.8%)	9 (2.5%)	234 (63.1%)
A country village	108 (11.1%)	22 (9.2%)	1 (0.3%)	85 (22.9%)
Don’t know	4 (0.4%)	3 (1.3%)	1 (0.3%)	0 (0.0%)

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[S8] Coastal area (only BE and IT)	Total	BE	HU	IT
	n=965	n=237	n=366	n=362
Less than 5 kilometers	40 (4.1%)	24 (10.0%)	0 (0.0%)	16 (4.3%)
5-10 kilometers	10 (1.0%)	6 (2.5%)	0 (0.0%)	4 (1.1%)
11-20 kilometers	16 (1.6%)	8 (3.3%)	0 (0.0%)	8 (2.2%)
More than 20 kilometers	533 (54.6%)	199 (82.9%)	0 (0.0%)	334 (90.0%)
Not applicable	366 (37.5%)	0 (0.0%)	366 (100.0%)	362 (97.6%)

[S9] Household size	Total	BE	HU	IT
	n=971	n=240	n=366	n=365
1	134 (13.7%)	48 (20.0%)	60 (16.4%)	26 (7.0%)
2	303 (31.0%)	94 (39.2%)	138 (37.7%)	71 (19.1%)
3	225 (23.0%)	30 (12.5%)	106 (29.0%)	89 (24.0%)
4	221 (22.6%)	41 (17.1%)	43 (11.7%)	137 (36.9%)
5	70 (7.2%)	20 (8.3%)	12 (3.3%)	38 (10.2%)
6	14 (1.4%)	4 (1.7%)	7 (1.9%)	3 (0.8%)
7 or more	4 (0.4%)	3 (1.3%)	0 (0.0%)	1 (0.3%)

[S10] Household characteristics			
Percentages (%) (including missing values, thus the total is not 100%)	Yes, me personally	Yes, household member(s)	No, nobody
Are you, or is anyone in your household, of poor health?	1.9	5.1	91.4
Do you, or does anyone in your household, have a chronic disease?	6.7	5.6	86.5
Do you, or does anyone in your household, needs to avoid salt?	4.5	8.6	85.8
Are you, or is anyone in your household, pregnant?	0.4	0.7	97.6
Do you, or anyone in your household have the wish to be pregnant (in the future)?	14.6	10.6	73.4
Are you, or anyone else in your household, responsible for food purchase?	69.5	3.7	Shared responsibility: 26.2

Examples of additional sample characteristics from the experimental auctions based on WP1 Products for adults in general such as general health interest, domain specific innovation scale (DSI-scale), attitude towards seafood consumption, and purchase intention towards eco-innovative seafood products are in ANNEX V.

5.3.1 Seafood consumption frequency

[P2] Seafood consumption frequency: portion of 150-200 g	BE	HU	IT
Percentage (%)	n=240	n=366	n=364
Daily	0.4	0.3	0.3

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5-6 times a week	0.8	3.6	0.3
3-4 times a week	9.6	13.1	10.7
2 times a week	33.8	27.3	39.0
Once a week	33.3	42.1	37.9
Less frequently	22.1	13.7	11.8

5.3.2 Place of seafood purchase

[P3] Seafood consumption frequency: place of purchase (n = 903 – 970)

Percentage (%)	Daily	5-6 times a week	3-4 times a week	2 times a week	Once a week	2-3 times a month	Once a month	1-5 times every 6 months	Less freq-uently	Never
Grocery store, Supermarket or hypermarket	0.9	1.3	3.1	14.3	33.3	18.6	11.6	6.4	5.7	4.8
Local street market	0.0	0.4	1.3	2.5	9.4	6.3	12.1	9.7	18.8	39.3
Fish farm or harbour or auction or from fisherman	0.0	0.2	0	1.1	2.7	1.1	3.3	6.9	17.1	67.7
Own catch	0.1	0.3	1.1	2.9	6.9	5.8	12.8	18.6	24.6	26.9
Fish monger or monger stall in a market hall or a specialist store	0.0	0.2	0.5	1.8	7.1	8.7	23.0	29.3	17.9	11.4
Restaurant	0.0	0.4	1.2	2.0	6.0	7.9	9.9	10.4	13.7	48.5
Canteen	0.9	1.3	3.1	14.3	33.3	18.6	11.6	6.4	5.7	4.8

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5.3.3 Familiarity with seafood

WP1 Products for adults in general

[P4] Do you know the following seafood?					
Percentage (%)	Yes, I consume it regularly	Yes, I consume it sometimes	Yes, I consume it rarely	Yes, but I never consumed it	No, I have never heard of this seafood
Common carp (n = 270)	22.5	20.0	21.5	30.4	5.6
Rainbow trout (n = 272)	15.8	31.3	33.8	11.4	7.7
Seabream (gilthead) (n = 271)	24.7	31.7	14.0	17.7	11.9

WP2 Products for adults in general

[P4] How often do you eat / prepare the following products?						
Percentage (%)	5-6 times a week	3-4 times a week	2 times a week	Once a week	Less frequently	Never
Smoked salmon (n = 182)	1.1	2.7	9.9	27.5	55.5	3.3
Salmon pâté (n = 181)	0.6	5.0	5.5	14.9	28.7	45.3

WP2 Products for children, pregnant women, seniors

[P4] How often do you eat / prepare fish ready-to-eat meal?						
Percentage (%)	5-6 times a week	3-4 times a week	2 times a week	Once a week	Less frequently	Never
Children (n = 158)	1.3	4.4	13.3	29.7	34.2	17.1
Pregnant wowen (n = 166)	2.4	5.4	8.4	18.7	48.1	16.9
Seniors (n = 186)	0.5	3.2	11.8	24.7	40.3	19.4

5.3.4 Willingness-to-pay for the conventional and eco-innovative solutions

All bids have been reported in the currency of EUR with the average exchange rate of 1 EUR = 340 HUF at the time of study. The superscripts $^{1-2}$ indicate significant differences between the conventional and the corresponding eco-innovative solutions at the 0.05 level based on Friedman's Two-way Analysis of Variance by Ranks. The superscripts $^{a-c}$ indicate significant differences across the three countries at the 0.05 level based on independent-samples Kruskal-Wallis tests.

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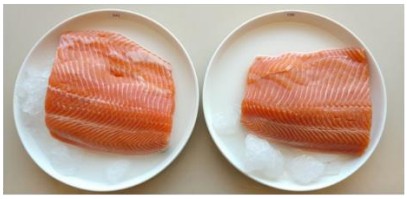
WP1 Products for adults in general

Visual evaluation: control bids

- WP1 products (visualization)



L: Conventional rainbow trout 842 (filet ± 1kg)

R: Fortified rainbow trout 199 (filet ± 1kg)

L: Conventional seabream 902 (whole fish ± 400g)

R: Fortified seabream 734 (whole fish ± 400g)

L: Conventional carp 246 (filet ± 150g)

R: Fortified carp 524 (filet ± 150g)

(EUR - Mean ± SD)	BE (n=35-42)	HU (n =118-119)	IT (n=110-111)
Fortified trout 199 (filet - 1kg)	10.21 ± 6.77^{b}	6.11 ± 3.45^{a}	14.86 ± 6.55^{c,1}
Conventional trout 842 (filet - 1kg)	9.68 ± 6.26^{b}	6.18 ± 3.56^{a}	14.88 ± 8.11^{c,2}
Fortified carp 524 (filet - 150g)	2.41 ± 2.61	1.61 ± 1.29	1.61 ± 1.11
Conventional carp 246 (filet - 150g)	2.47 ± 3.15	1.57 ± 1.30	1.64 ± 1.11
Fortified seabream 734 (whole fish - 400g)	5.35 ± 4.18^{b}	2.76 ± 1.84^{a}	6.09 ± 2.89^{b}
Conventional seabream 902 (whole fish - 400g)	5.54 ± 4.88^{b}	2.80 ± 1.79^{a}	5.98 ± 2.81^{c}

Informed bids

(EUR - Mean ± SD)	BE (n=35-42)	HU (n =118-119)	IT (n=109-111)
Fortified trout 199 (filet - 1kg)	10.38 ± 6.00^{b}	6.16 ± 3.48^{a,1}	14.64 ± 7.18^{c,2}
Conventional trout 842 (filet - 1kg)	9.96 ± 6.42^{b}	6.16 ± 4.47^{a,2}	13.48 ± 5.91^{c,1}
Fortified carp 524 (filet - 150g)	2.03 ± 2.89	1.71 ± 1.09	1.61 ± 1.11
Conventional carp 246 (filet - 150g)	1.63 ± 2.53^{a}	1.50 ± 0.91^{a,b}	1.64 ± 1.11^{b}
Fortified seabream 734 (whole fish - 400g)	4.76 ± 3.90^{b}	3.27 ± 2.13^{a,2}	6.09 ± 2.89^{c}
Conventional seabream 902 (whole fish - 400g)	4.81 ± 3.62^{b}	3.08 ± 1.88^{a,1}	5.98 ± 2.81^{c}

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Sensory bids

- WP1 products (sensory evaluation)

L: Conventional rainbow trout 842 (filet ± 1kg)

R: Fortified rainbow trout 199 (filet ± 1kg)

L: Conventional seabream 902 (whole fish ± 400g)

R: Fortified seabream 734 (whole fish ± 400g)

L: Conventional carp 246 (filet ± 150g)

R: Fortified carp 524 (filet ± 150g)

(EUR - Mean ± SD)	BE (n=35-42)	HU (n =118-119)	IT (n=109-111)
Fortified trout 199 (filet - 1kg)	10.60 ± 6.08^{b}	6.24 ± 3.91^{a}	13.15 ± 5.72^{b}
Conventional trout 842 (filet - 1kg)	9.93 ± 6.17^{b}	6.26 ± 4.59^{a}	13.62 ± 6.63^{c}
Fortified carp 524 (filet - 150g)	1.02 ± 1.60^{a}	1.47 ± 1.18^{b}	1.11 ± 1.03^{a,b}
Conventional carp 246 (filet - 150g)	0.92 ± 1.66^{a}	1.41 ± 1.11^{b}	1.10 ± 0.95^{b}
Fortified seabream 734 (whole fish - 400g)	4.37 ± 3.41^{b}	2.88 ± 2.03^{a}	6.09 ± 2.89^{c}
Conventional seabream 902 (whole fish - 400g)	4.43 ± 3.56^{b}	2.91 ± 2.08^{a}	5.98 ± 2.81^{c}

Reference price bids*

(EUR - Mean ± SD)	BE (n=35-42)	HU (n =119)	IT (n=109-111)
Fortified trout 199 (filet - 1kg)	14.30 ± 6.22^{c}	5.85 ± 1.76^{b}	3.76 ± 4.30^{a}
Fortified carp 524 (filet - 150g)	0.51 ± 0.75^{a}	2.03 ± 0.89^{b}	0.28 ± 0.35^{a}
Fortified seabream 734 (whole fish - 400g)	5.19 ± 2.99^{b}	4.18 ± 1.76^{a}	5.98 ± 2.81^{b}

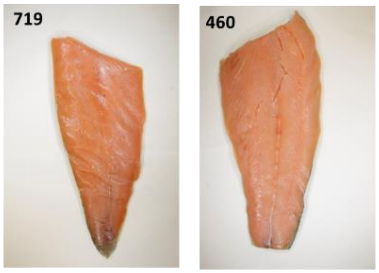
*Conventional trout 842 (1kg) = 18.95EUR in BE; 2000HUF (5.88 EUR) in HU; 12.67 EUR in IT; Conventional carp 246 (150g) = 1 EUR in BE; 390 HUF (1.15EUR) in HU; 0.53 EUR in IT; Conventional seabream 902 (400g) = 7.14 EUR in BE; 1600 HUF (4.17 EUR) in HU; 6.40 in IT

Grant agreement: 773400

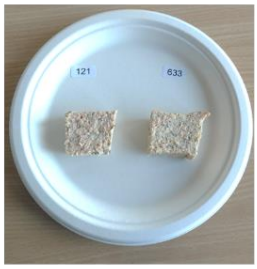
WP2 Products for adults in general

Visual evaluation: control bids

- WP2.1 products (visualization; and sensory evaluation for salmon pâté)



L: Conventional smoked salmon 719 (filet - 1kg)
R: 25% Salt reduced smoked salmon 460 (filet - 1kg)
Only visualization



L: Conventional salmon pâté 121 (250g)
R: 25% Salt reduced salmon pâté 633 (250g)

(EUR - Mean ± SD)	BE (n=61)	HU (n =62)	IT (n=53-58)
25% Salt reduced smoked salmon 460 (filet - 1kg)	9.33 ± 12.35^{a}	14.64 ± 11.12^{b}	6.83 ± 5.20^{a,2}
Conventional smoked salmon 719 (filet - 1kg)	9.09 ± 13.84^{a}	14.04 ± 11.38^{b}	6.29 ± 5.25^{a,1}
25% Salt reduced salmon pâté 633 (250g)	2.30 ± 1.48	2.85 ± 1.84	4.13 ± 9.27
Conventional salmon pâté 121 (250g)	2.38 ± 2.44	2.83 ± 1.78	2.98 ± 2.65

Informed bids

(EUR - Mean ± SD)	BE (n=61)	HU (n =62)	IT (n=53-58)
25% Salt reduced smoked salmon 460 (filet - 1kg)	10.18 ± 14.50^{a,2}	15.29 ± 11.45^{b,2}	6.35 ± 5.00^{a,2}
Conventional smoked salmon 719 (filet - 1kg)	8.67 ± 13.64^{a,1}	14.70 ± 11.60^{b,1}	5.82 ± 5.42^{a,1}
25% Salt reduced salmon pâté 633 (250g)	2.58 ± 2.89^{a}	3.45 ± 2.72^{a}	3.31 ± 2.99^{a,b}
Conventional salmon pâté 121 (250g)	2.19 ± 2.47^{a}	3.24 ± 2.43^{b}	2.90 ± 2.93^{a,b}

Sensory bids

(EUR - Mean ± SD)	BE (n =61)	HU (n =62)	IT (n=53-58)
25% Salt reduced salmon pâté 633 (250g)	2.27 ± 2.86^{a}	3.06 ± 2.17^{b}	3.52 ± 3.25^{b}
Conventional salmon pâté 121 (250g)	2.44 ± 2.89^{a}	3.06 ± 1.88^{b}	3.20 ± 2.82^{a,b}

Reference price bids*

(EUR - Mean ± SD)	BE (n=61)	HU (n =62)	IT (n=53-58)
25% Salt reduced smoked salmon 460 (filet - 1kg)	15.60 ± 16.33^{a}	40.14 ± 18.69^{b}	43.41 ±22.42^{b}
25% Salt reduced salmon pâté 633 (250g)	2.98 ± 2.96^{a}	6.35 ± 2.30^{b}	6.27 ± 2.28^{b}

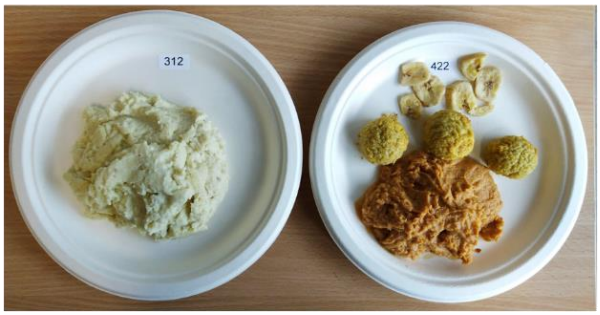
*Conventional smoked salmon 719 (1kg) = 53.98 EUR; conventional salmon pâté 121 (250g) = 7.00 EUR

Grant agreement: 773400

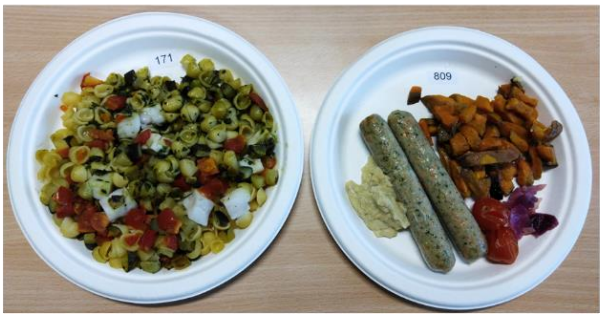
WP2 Products (ready meals) for children

Visual evaluation: control bids

- WP2.2 products (visualization and sensory evaluation)



L: Control meal 1 for children (312)
R: Tailor-made meal 1 for children (422)



L: Control meal 2 for children (171)
R: Tailor-made meal 2 for children (809)

(EUR - Mean ± SD)	BE (n=37)	HU (n=60)	IT (n=53-59)
Tailor-made meal 1 for children 422 (1 meal)	$1.15 \pm 1.28^{a,2}$	$1.83 \pm 1.08^{a,2}$	$3.18 \pm 2.41^{b,2}$
Control meal 1 for children 312 (1 meal)	$0.62 \pm 0.93^{a,1}$	$1.43 \pm 1.06^{b,1}$	$2.71 \pm 2.56^{b,1}$
Tailor-made meal 2 for children 809 (1 meal)	$1.23 \pm 1.16^{a,1}$	$1.94 \pm 1.20^{a,2}$	3.19 ± 2.72^{b}
Control meal 2 for children 171 (1 meal)	$1.88 \pm 1.26^{a,b,2}$	$1.86 \pm 1.11^{a,1}$	3.33 ± 3.19^{b}

Informed bids

(EUR - Mean ± SD)	BE (n=37)	HU (n=60)	IT (n=53-59)
Tailor-made meal 1 for children 422 (1 meal)	1.10 ± 1.15^{a}	$1.94 \pm 0.95^{b,2}$	$4.12 \pm 3.89^{c,2}$
Control meal 1 for children 312 (1 meal)	1.21 ± 1.37^{a}	$1.67 \pm 0.90^{a,b,1}$	$3.25 \pm 3.79^{b,1}$
Tailor-made meal 2 for children 809 (1 meal)	1.31 ± 1.36^{a}	$2.05 \pm 0.95^{a,2}$	$4.02 \pm 3.13^{b,2}$
Control meal 2 for children 171 (1 meal)	1.40 ± 1.20^{a}	$1.98 \pm 0.96^{a,b,1}$	$3.29 \pm 3.30^{b,1}$

Sensory bids

(EUR - Mean ± SD)	BE (n=37)	HU (n=60)	IT (n=53-59)
Tailor-made meal 1 for children 422 (1 meal)	$0.71 \pm 0.89^{a,1}$	1.73 ± 1.14^{b}	3.93 ± 6.92^{c}
Control meal 1 for children 312 (1 meal)	$1.49 \pm 1.35^{a,2}$	1.71 ± 1.01^{a}	3.04 ± 2.63^{b}
Tailor-made meal 2 for children 809 (1 meal)	$0.87 \pm 1.17^{a,1}$	1.98 ± 1.12^{b}	3.15 ± 2.53^{b}
Control meal 2 for children 171 (1 meal)	$1.63 \pm 1.22^{a,2}$	$2.01 \pm 1.13^{a,b}$	3.07 ± 2.53^{b}

Reference price bids*

(EUR - Mean ± SD)	BE (n=37)	HU (n=60)	IT (n=53-59)
Tailor-made meal 1 for children 422 (1 meal)	0.94 ± 1.11^{a}	2.27 ± 1.05^{b}	3.86 ± 3.12^{c}
Tailor-made meal 2 for children 809 (1 meal)	1.11 ± 1.37^{a}	2.30 ± 0.92^{b}	3.35 ± 1.73^{c}

*Control meal 1 for children 312 (1 meal) = 2.90 EUR; Control meal 2 for children 171 (1 meal) = 2.90 EUR

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WP2 Products (ready meals) for pregnant women

Visual evaluation: control bids

- WP2.2 products (visualization and sensory evaluation)

L: Control meal 1 for pregnant women (312)
R: Tailor-made meal 1 for pregnant women(422)

L: Control meal 2 for pregnant women (171)
R: Tailor-made meal 2 for pregnant women (809)

(EUR - Mean ± SD)	BE (n=50)	HU (n=61)	IT (n=61)
Tailor-made meal 1 for pregnant women 422 (1 meal)	2.21 ± 1.97^{a,1}	2.17 ± 1.04^{a}	4.80 ± 2.15^{b}
Control meal 1 for pregnant women 312 (1 meal)	2.69 ± 1.81^{a,2}	2.21 ± 0.92^{a}	4.94 ± 2.33^{b}
Tailor-made meal 2 for pregnant women 809 (1 meal)	1.99 ± 1.97^{a,1}	1.99 ± 0.97^{a,1}	4.00 ± 1.97^{b,1}
Control meal 2 for pregnant women 171 (1 meal)	2.83 ± 1.98^{a,2}	2.33 ± 1.10^{a,2}	4.55 ± 1.75^{b,2}

Informed bids

BE (n=50)	BE (n=50)	HU (n=61)	IT (n=61)
Tailor-made meal 1 for pregnant women 422 (1 meal)	2.38 ± 1.80^{a}	2.06 ± 0.96^{a}	4.69 ± 2.22^{b}
Control meal 1 for pregnant women 312 (1 meal)	3.12 ± 1.81^{b}	2.12 ± 0.84^{a}	4.78 ± 2.44^{c}
Tailor-made meal 2 for pregnant women 809 (1 meal)	1.71 ± 2.02^{a}	2.12 ± 1.07^{a}	3.94 ± 2.12^{b}
Control meal 2 for pregnant women 171 (1 meal)	1.66 ± 2.01^{a}	2.08 ± 0.88^{a}	4.13 ± 1.77^{b}

Sensory bids

(EUR - Mean ± SD)	BE (n=50)	HU (n=61)	IT (n=61)
Tailor-made meal 1 for pregnant women 422 (1 meal)	1.45 ± 1.53^{a,1}	1.53 ± 1.12^{a,1}	3.20 ± 2.03^{b,1}
Control meal 1 for pregnant women 312 (1 meal)	3.40 ± 2.02^{b,2}	2.29 ± 1.06^{a,2}	5.22 ± 2.55^{c,2}
Tailor-made meal 2 for pregnant women 809 (1 meal)	1.21 ± 1.75^{a}	1.58 0.98^{a,1}	2.93 ± 2.05^{b,1}
Control meal 2 for pregnant women 171 (1 meal)	1.02 ± 1.72^{a}	1.76 ± 1.09^{b,2}	3.40 ± 2.23^{c,2}

Reference price bids*

(EUR - Mean ± SD)	BE (n=50)	HU (n=61)	IT (n=61)
Tailor-made meal 1 for pregnant women 422 (1 meal)	2.28 ± 2.11^{a}	2.65 ± 1.64^{a,b}	3.16 ± 1.82^{b}
Tailor-made meal 2 for pregnant women 809 (1 meal)	2.10 ± 2.04^{a}	2.57 ± 1.55^{a,b}	2.97 ± 1.77^{b}

*Control meal 1 for pregnant women 312 (1 meal) = 5.50 EUR; Control meal 2 for pregnant women 171 (1 meal) = 4.95 EUR

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WP2 Products (ready meals) for seniors

Visual evaluation: control bids

- WP2.2 products (visualization and sensory evaluation)

L: Control meal 1 for seniors (312)
R: Tailor-made meal 1 for seniors (422)

L: Control meal 2 for seniors (171)
R: Tailor-made meal 2 for seniors (809)

(EUR - Mean ± SD)	BE (n=51)	HU (n = 64)	IT (n=69-73)
Tailor-made meal 1 for seniors 422 (1 meal)	$1.19 \pm 1.32^{a,1}$	1.90 ± 1.52^{a}	$4.28 \pm 2.06^{b,1}$
Control meal 1 for seniors 312 (1 meal)	$1.64 \pm 1.46^{a,2}$	1.97 ± 1.40^{a}	$4.74 \pm 1.99^{b,2}$
Tailor-made meal 2 for seniors 809 (1 meal)	1.08 ± 1.16^{a}	1.65 ± 1.27^{a}	4.00 ± 2.06^{b}
Control meal 2 for seniors 171 (1 meal)	1.21 ± 1.27^{a}	1.65 ± 1.11^{a}	4.32 ± 2.21^{b}

Informed bids

(EUR - Mean ± SD)	BE (n=51)	HU (n = 64)	IT (n=69-73)
Tailor-made meal 1 for seniors 422 (1 meal)	$1.49 \pm 1.71^{a,1}$	2.00 ± 1.46^{a}	4.31 ± 1.97^{b}
Control meal 1 for seniors 312 (1 meal)	$1.98 \pm 1.75^{a,2}$	2.09 ± 1.75^{a}	4.15 ± 1.94^{b}
Tailor-made meal 2 for seniors 809 (1 meal)	1.50 ± 1.49^{a}	$1.81 \pm 1.18^{a,1}$	4.03 ± 2.16^{b}
Control meal 2 for seniors 171 (1 meal)	1.44 ± 1.33^{a}	$1.74 \pm 1.10^{a,2}$	3.77 ± 2.35^{b}

Sensory bids

(EUR - Mean ± SD)	BE (n=51)	HU (n = 64)	IT (n=69-73)
Tailor-made meal 1 for seniors 422 (1 meal)	$0.99 \pm 1.41^{a,1}$	$1.73 \pm 1.21^{b,1}$	3.49 ± 2.23^{c}
Control meal 1 for seniors 312 (1 meal)	$1.92 \pm 1.63^{a,2}$	$2.07 \pm 1.33^{a,2}$	4.00 ± 2.08^{b}
Tailor-made meal 2 for seniors 809 (1 meal)	1.10 ± 1.34^{a}	1.73 ± 0.93^{b}	$3.82 \pm 2.25^{c,2}$
Control meal 2 for seniors 171 (1 meal)	1.14 ± 1.25^{a}	1.77 ± 1.23^{b}	$3.06 \pm 2.23^{c,1}$

Reference price bids*

(EUR - Mean ± SD)	BE (n=51)	HU (n = 64)	IT (n=69-73)
Tailor-made meal 1 for seniors 422 (1 meal)	1.37 ± 1.43^{a}	2.18 ± 1.16^{b}	3.06 ± 1.87^{c}
Tailor-made meal 2 for seniors 809 (1 meal)	1.61 ± 1.48^{a}	2.33 ± 1.08^{a}	3.41 ± 1.70^{b}

*Control meal 1 for seniors 312 (1 meal) = 3.63 EUR; Control meal 2 for seniors 171 (1 meal) = 3.75 EUR

5.3.5 Reasons for submitting a zero bid

For all tested products, the primary reason for a zero bid was dislike of the taste of the product (except for smoked salmon, which was only evaluated based on visualization). The look of the product emerged as another possible reason for a zero bid, especially for the products / ready meals targeted at seniors. An example of a result table based on the WP1 product for adults in general is provided in Annex V.

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5.3.6 Liking based on sensory evaluation of seafood products

The superscripts [a – d] indicate significant differences between the conventional and the corresponding eco-innovative solutions, or between the four meals at the 0.05 level based on Friedman's Two-way Analysis of Variance by Ranks. Results are reported using mean ± SD on a 9-point-scale.

WP1 Products for adults in general

- Fortified trout 199 (n = 263): 7.05 ± 1.46
- Conventional trout 842 (n = 263): 6.96 ± 1.50
- Fortified carp 524 (n = 268): 4.86 ± 2.42
- Conventional carp 246 (n = 262): 4.98 ± 2.30
- Fortified seabream 734 (n = 266): 6.88 ± 1.52
- Conventional seabream 902 (n = 262): 6.85 ± 1.66

WP2 Products for adults in general

- 25% Salt reduced salmon pâté 633 (n = 181) 6.34 ± 1.61
- Conventional salmon pâté 121 (n = 179) 6.26 ± 1.78

Note: For smoked salmon, only visualization was performed.

WP2 Products for children

- Tailor-made meal 1 for children 422 (n = 159) 6.21 ± 2.12^{c}
- Control meal 1 for children 312 (n = 160) 4.90 ± 2.11^{a}
- Tailor-made meal 2 for children 809 (n = 158) 5.22 ± 2.25^{b,c}
- Control meal 2 for children 171 (n = 156) 5.73 ± 2.10^{a,b}

WP2 Products for pregnant women

- Tailor-made meal 1 for pregnant women 422 (n = 170) 6.76 ± 1.46^{d}
- Control meal 1 for pregnant women 312 (n = 169) 4.09 ± 2.12^{b}
- Tailor-made meal 2 for pregnant women 809 (n = 170) 3.98 ± 2.20^{a}
- Control meal 2 for pregnant women 171 (n = 171) 5.03 ± 2.25^{c}

WP2 Products for seniors

- Tailor-made meal 1 for seniors 422 (n = 183) 6.03 ± 1.99^{c}
- Control meal 1 for seniors 312 (n = 183) 4.82 ± 2.11^{a}
- Tailor-made meal 2 for seniors 809 (n = 185) 5.49 ± 2.07^{b}
- Control meal 2 for seniors 171 (n = 187) 4.82 ± 2.26^{b}

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5.3.7 Sensory attributes

WP1 Products for adults in general (Top 3 selected attributes out of 22 – 23 attributes)

- Fortified trout 199 (Pink colour; Boiled odour; Fishy taste)
- Conventional trout 842 (Pink colour; Fishy odour; Fishy taste)
- Fortified carp 524 (Pale colour; Fishy taste; Soft)
- Conventional carp 246 (Pale colour; Fishy taste; Soft)
- Fortified seabream 734 (Fishy odour; Fishy taste; Soft)
- Conventional seabream 902 (Fishy odour; Fishy taste; Soft)

WP2 Products for adults in general (Top 3 selected attributes out of 28 attributes)

- 25% Salt reduced salmon pâté 633 (Pale colour; Weak odour; Weak taste)
- Conventional salmon pâté 121 (Pale colour; Pink colour; Weak odour)

WP2 Products for children (Top 3 selected attributes out of 21 attributes)

- Tailor-made meal 1 for children 422 (Weak odour; Weak taste; Dry)
- Control meal 1 for children 312 (Intense/Strong taste; Soft; Pasty)
- Tailor-made meal 2 for children 809 (Appealing; Weak odour; Soft)
- Control meal 2 for children 171 (Appealing; Weak odour; Soft)

WP2 Products for pregnant women (Top 3 selected attributes out of 21 attributes)

- Tailor-made meal 1 for pregnant women 422 (Weak odour; Weak taste; Dry)
- Control meal 1 for pregnant women 312 (Appealing; Weak odour; Soft)
- Tailor-made meal 2 for pregnant women 809 (Intense/Strong taste; Salty; Soft)
- Control meal 2 for pregnant women 171 (Weak odour; Soft; Pasty)

WP2 Products for seniors (Top 3 selected attributes out of 21 attributes)

- Tailor-made meal 1 for seniors 422 (Weak odour; Weak taste; Dry)
- Control meal 1 for seniors 312 (Appealing; Weak odour; Weak taste)
- Tailor-made meal 2 for seniors 809 (Fishy odour; Intense/Strong taste; Pasty)
- Control meal 2 for seniors 171 (Weak odour; Fishy odour; Juicy)

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5.3.8 Motives for the bids for the eco-innovative products

The superscripts [a – d] indicate significant differences between aspects at the 0.05 level based on Friedman's Two-way Analysis of Variance by Ranks.

WP1 Products for adults in general

[Q1] In general, what was the most important aspect on which your bid was based? (7-point-Likert scale)	n	Mean	SD
Biofortified Rainbow trout (Rainbow trout 199)			
… portion size	262	3.85[a]	2.09
… taste	263	5.90[c]	1.53
… information	260	4.82[b]	1.78
… visual aspects	260	5.40[b,c]	1.48
… other	129	3.88[a]	1.93
Biofortified carp (carp 524)			
… portion size	266	3.63[a]	1.99
… taste	269	5.59[c]	1.93
… information	265	4.62[b]	1.86
… visual aspects	266	5.04[b,c]	1.74
… other	132	3.94[a]	1.91
Biofortified seabream (seabream 734)			
… portion size	268	3.91[a]	2.11
… taste	269	6.03[c]	1.48
… information	265	5.02[b]	1.71
… visual aspects	266	5.30[b,c]	1.60
… other	129	3.98[a]	1.95

WP2 Products for adults in general

[Q1] In general, what was the most important aspect on which your bid was based? (7-point-Likert scale)	n	Mean	SD
25% Salt reduced smoked salmon 460			
… portion size	182	3.92[a]	2.06
… taste	162	4.54[b]	2.05
… information	180	5.14[b,c]	1.53
… visual aspects	180	5.32[c]	1.63
25% Salt reduced salmon pâté 633			
… portion size	184	3.71[a]	2.07
… taste	184	5.37[c]	1.86
… information	183	5.10[b,c]	1.66
… visual aspects	182	4.73[b]	1.83

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WP2 Products for children

[Q1] In general, what was the most important aspect on which your bid was based? (7-point-Likert scale)	n	Mean	SD
Tailor-made meal 1 for children 422			
… portion size	160	4.05[a]	1.96
… taste	157	5.35[c]	1.80
… information	155	4.59[a,b]	1.79
… visual aspects	156	4.99[b,c]	1.80
Tailor-made meal 2 for children 809			
… portion size	160	4.24[a]	1.85
… taste	157	5.38[b]	1.86
… information	156	4.73[b]	1.82
… visual aspects	156	5.19[b]	1.86

WP2 Products for pregnant women

[Q1] In general, what was the most important aspect on which your bid was based? (7-point-Likert scale)	n	Mean	SD
Tailor-made meal 1 for pregnant women 422			
… portion size	169	3.66[a]	1.80
… taste	169	5.93[c]	1.81
… information	170	4.44[b]	1.71
… visual aspects	169	5.33[c]	1.57
Tailor-made meal 2 for pregnant women 809			
… portion size	169	3.59[a]	1.78
… taste	170	5.85[d]	1.87
… information	169	4.23[b]	1.78
… visual aspects	170	5.28[c]	1.69

WP2 Products for seniors

[Q1] In general, what was the most important aspect on which your bid was based? (7-point-Likert scale)	n	Mean	SD
Tailor-made meal 1 for seniors 422			
… portion size	172	4.04[a]	1.87
… taste	181	5.07[b]	2.12
… information	174	4.80[b]	1.74
… visual aspects	168	4.66[b]	1.97
Tailor-made meal 2 for seniors 809			
… portion size	170	4.12[a]	1.90
… taste	181	5.17[b]	1.89
… information	170	4.69[a,b]	1.70
… visual aspects	170	4.66[a,b]	1.99

5.3.9 Comparison between eco-innovative and conventional products

WP1 Products for adults in general

[Q1] Compared to the conventional product: (7-point-Likert scale)	n	Mean	SD

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Biofortified Rainbow trout (Rainbow trout 199) is			
… healthier	261	5.07[c]	1.72
…of higher quality	260	4.84[c]	1.79
…safer	258	4.17[b]	1.78
…more nutritious	258	4.98[c]	1.65
…more affordable	258	3.53[a]	1.72
…more tasteful	260	4.41[b]	1.99
Biofortified carp (carp 524) is			
… healthier	268	4.71[b]	1.81
…of higher quality	265	4.46[b]	1.81
…safer	266	4.04[a]	1.77
…more nutritious	267	4.71[b]	1.72
…more affordable	265	3.71[a]	1.83
…more tasteful	266	3.92[a]	2.08
Biofortified seabream (seabream 734) is			
… healthier	267	5.05[c]	1.72
…of higher quality	267	4.90[c]	1.76
…safer	265	4.35[b]	1.73
…more nutritious	265	5.02[c]	1.70
…more affordable	263	3.59[a]	1.79
…more tasteful	260	4.50[b]	2.00

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WP2 Products for adults in general

[Q2] Compared to the conventional product: (7-point-Likert scale)	n	Mean	SD
25% Salt reduced smoked salmon 460 is			
… healthier	184	5.45[d]	1.79
…of higher quality	182	4.77[c]	1.62
…safer	180	4.39[b,c]	1.57
…more nutritious	180	4.10[b]	1.74
…more affordable	181	3.36[a]	1.54
…more tasteful	174	4.07[b]	1.76
25% Salt reduced salmon pâté 633 is			
… healthier	185	5.32[d]	1.78
…of higher quality	182	4.78[c]	1.74
…safer	182	4.20[b]	1.68
…more nutritious	180	4.05[b]	1.74
…more affordable	181	3.44[a]	1.55
…more tasteful	181	4.03[b]	2.04

WP2 Products for children

[Q2] Compared to the conventional product: (7-point-Likert scale)	n	Mean	SD
Tailor-made meal 1 for children 422 is			
… healthier	160	4.91[d]	1.68
…of higher quality	157	4.66[c]	1.59
…safer	156	4.44[b,c]	1.65
…more nutritious	155	4.84[c,d]	1.54
…more affordable	156	3.96[a,b]	1.56
…more tasteful	155	3.72[a]	1.96
Tailor-made meal 2 for children 809 is			
… healthier	160	4.74[b,c]	1.68
…of higher quality	158	4.54[a,b]	1.66
…safer	155	4.41[a,b]	1.67
…more nutritious	155	4.99[c]	1.44
…more affordable	154	4.00[a]	1.60
…more tasteful	156	4.10[a]	2.09

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WP2 Products for pregnant women

[Q2] Compared to the conventional product: (7-point-Likert scale)	n	Mean	SD
Tailor-made meal 1 for pregnant women 422 is			
… healthier	171	4.74[c]	1.68
…of higher quality	169	4.03[b]	1.76
…safer	171	3.91[b]	1.59
…more nutritious	170	4.54[c]	1.62
…more affordable	171	3.48[b]	1.57
…more tasteful	171	2.89[a]	2.08
Tailor-made meal 2 for pregnant women 809 is			
… healthier	171	4.94[c]	1.68
…of higher quality	170	4.16[b]	1.78
…safer	171	3.99[a,b]	1.54
…more nutritious	171	4.54[b,c]	1.63
…more affordable	171	3.68[a]	1.58
…more tasteful	170	3.34[a]	2.22

WP2 Products for seniors

[Q2] Compared to the conventional product: (7-point-Likert scale)	n	Mean	SD
Tailor-made meal 1 for seniors 422 is			
… healthier	178	4.67[b,c]	1.82
…of higher quality	173	4.10[a]	1.86
…safer	170	4.28[a,b]	1.63
…more nutritious	172	4.80[c]	1.77
…more affordable	171	3.92[a]	1.66
…more tasteful	177	3.38[a]	2.02
Tailor-made meal 2 for seniors 809 is			
… healthier	178	4.38[c]	1.74
…of higher quality	173	4.25[b]	1.83
…safer	175	4.11[b]	1.68
…more nutritious	174	4.61[c]	1.72
…more affordable	176	3.64[a]	1.60
…more tasteful	179	3.91[a,b]	2.06

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5.4 Synthesis based on the focus groups, consumer survey and experimental auctions

Three phrases of studies (focus group discussions, surveys and experimental auctions) were conducted to assess consumers' initial reactions, attitudes and the behavioural intentions towards the eco-innovative seafood solutions in T4.1. In general, consumers expressed favourable attitudes towards seafood consumption, and tended to agree that seafood products are healthy, nutritious and tasteful. A potential negative aspect of seafood products pertains to the price.

A minority of consumers showed scepticism towards the eco-innovative seafood products, although the attitude was overall positive. Nevertheless, the positive attitude was not necessarily translated into a higher willingness-to-pay (WTP) for the eco-innovative seafood products. Country-wise differences were observed in the WTP. Compared to the conventional seafood products, most eco-innovative seafood products did not receive a higher WTP in the bidding rounds, except for the 25% salt reduced smoked salmon after information exposure, and the tailor-made meal 1 for children after visual evaluation. Eventual low bids were mainly reasoned by the taste and the appearance (visual aspect) of the seafood products. While liking for the fortified fish and salt-reduced salmon pâté did not differ from that of the conventional products, the eco-innovative meals tailored for the target groups received a higher liking score than the conventional meals based on sensory evaluation, except for the tailor-made meal 2 for pregnant women. Overall, most of the eco-innovative seafood products were acceptable to consumers and perceived to be healthier and more nutritious compared to the conventional seafood products.

6. Conclusions

The objectives of the Task 4.1 have been achieved despite substantial challenges in organising live experimental auctions and sensory tasting owing to Covid-19. Consumer acceptance of the eco-innovative seafood solutions and products were assessed through focus group discussions, consumer surveys, and experimental auctions combined with sensory tasting. Consumers expressed both interests as well as some doubts about the eco-innovative seafood solutions. Sensory attributes, particularly the taste of the products played an important role in shaping consumers' liking and willingness-to-pay for the products. Insights related to specific sensory attributes for product improvement were outlined. Based on consumers' reactions, attitudes and behavioural intentions in terms of willingness-to-pay, it can be concluded that most of the eco-innovative seafood products were acceptable to consumers.

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Annex I – Ethics approvals

AI.1. Focus group discussions (BE, HU, IT)

Afz: Commissie voor Medische Ethiek

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	2018/0759	22-jun-18	Zie "CC"

BETREFT

Advies voor monocentrische studie met als titel:
Consumers' acceptance, sensory perception and preferences of solutions: Qualitative data collection of consumers' reactions, opinions, beliefs and expectations in relation to the eco-innovative solutions.

Belgisch Registratienummer: B670201836636

* Adviesaanvraagformulier (versie 1, dd. 22/05/2018) (volledig ontvangen dd. 24/05/2018)
* Begeleidende brief dd. 22/05/2018
* Diverse
  - PR techniques for focus group(E.)
  - TOPIC GUIDE (consumers) E.
  - Bewijs financiering EC H2020
* Protocol SEAFODtomorrow WP4 (E.)
* Antwoord onderzoeker dd. 20/06/2018 (ontv. 21/06/2018) op opmerkingen EC dd. 19/06/2018
* (Patiënten)informatie- en toestemmingsformulier dd. 20/06/2018

Advies werd gevraagd door:
Prof. dr. X. GELLYNCK ; Hoofdonderzoeker

**BOVENVERMELDE DOCUMENTEN WERDEN DOOR HET ETHISCH COMITÉ BEOORDEELD.
ER WERD EEN POSITIEF ADVIES GEGEVEN OVER DIT PROTOCOL OP 22/06/2018. INDIEN DE STUDIE NIET WORDT OPGESTART VOOR 22/06/2019, VERVALT HET ADVIES EN MOET HET PROJECT TERUG INGEDIEND WORDEN.**
Vooraleer het onderzoek te starten dient contact te worden genomen met Bimetra Clinics (09/332 05 00).

**THE ABOVE MENTIONED DOCUMENTS HAVE BEEN REVIEWED BY THE ETHICS COMMITTEE.
A POSITIVE ADVICE WAS GIVEN FOR THIS PROTOCOL ON 22/06/2018. IN CASE THIS STUDY IS NOT STARTED BY 22/06/2019, THIS ADVICE WILL BE NO LONGER VALID AND THE PROJECT MUST BE RESUBMITTED.**
Before initiating the study, please contact Bimetra Clinics (09/332 05 00).

**DIT ADVIES WORDT OPGENOMEN IN HET VERSLAG VAN DE VERGADERING VAN HET ETHISCH COMITE VAN 21/08/2018
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- *Het Ethisch Comité werkt volgens 'ICH Good Clinical Practice' - regels*
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- *Het Ethisch Comité benadrukt dat het de promotor is die garant dient te staan voor de conformiteit van de anderstalige informatie- en toestemmingsformulieren met de nederlandstalige documenten.*
- *Geen enkele onderzoeker betrokken bij deze studie is lid van het Ethisch Comité.*
- *Alle leden van het Ethisch Comité hebben dit project beoordeeld. (De ledenlijst is bijgevoegd)*

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Grant agreement: 773400

AI.2. Consumer surveys (BE, HU, IT)

Afz: Commissie voor Medische Ethiek

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Prof. dr. Ir. Wim VERBEKE
Coupure Links 653
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COMMISSIE VOOR MEDISCHE ETHIEK

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	2019/1049	27-aug-19	Zie "CC"

BETREFT

Advies voor monocentrische studie met als titel:
Consumers' acceptance, sensory perception and preferences of solutions: Quantitative data collection of consumers' seafood consumption and attitudes towards eco-innovative solutions (consumer survey).

Belgisch Registratienummer: B670201940648

Fase (Phase): NVT/NA

* Adviesaanvraagformulier
  (Craft versie ontvangen dd 10/07/2019) Versie 1
* Begeleidende brief dd. 28/06/2019
* (patiënten)- informatie en toestemmingsformulier
  NL, ENG
* Diverse
  - Consumer survey ENG
  - Beschrijving WP4
  - Grant Agreement Data Sheet

Advies werd gevraagd door:
Prof. dr. Ir. W. VERBEKE ; Hoofdonderzoeker

BOVENVERMELDE DOCUMENTEN WERDEN DOOR HET ETHISCH COMITÉ BEOORDEELD.
ER WERD EEN POSITIEF ADVIES GEGEVEN OVER DIT PROTOCOL OP 14/08/2019. INDIEN DE STUDIE NIET WORDT OPGESTART VOOR 13/08/2020, VERVALT HET ADVIES EN MOET HET PROJECT TERUG INGEDIEND WORDEN.
Vooraleer het onderzoek te starten dient contact te worden genomen met Bimetra Clinics (09/332 05 00).

THE ABOVE MENTIONED DOCUMENTS HAVE BEEN REVIEWED BY THE ETHICS COMMITTEE.
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AI.3. Experimental auctions (BE, HU, IT)

Afz.: Commissie voor Medische Ethiek

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Ons kenmerk	Uw kenmerk	datum	pagina
2019/1412		18-nov-19	1/2

Betreft :

Advies voor monocentrische studie met als titel:
Consumers' acceptance, sensory perception and preferences of solutions: Quantitative data collection of consumers' seafood consumption and attitudes towards eco-innovative solutions (consumer experimental auctions with consumer sensory evaluation).
(Horizon2020 Project SEAFOODTOMORROW T4.1)

Belgisch Registratienummer: B670201941488

* Begeleidende brief dd. 20/09/2019
* (Patiënten) Informatie- en toestemmingsformulier
  - WP1
  - WP2 T2.1
  - WP2 T2.2
* Overeenkomst : Grant data sheet
* Diverse
  - Experimental design products WP1
  - Experimental design products WP2 T2.1
  - Experimental design products WP2 T2.2
  - Description of WP4
* Antwoord onderzoekers via mail van Yung Hung ontvangen op 6/11/2019 in antwoord op opmerkingen EC dd. 21/10/2019
* Advieesaanvraagformulier dd. 24/10/2019, (Definitieve versie ontvangen op 6/11/2019)
* Begeleidende brief dd. 22/10/2019, met het antwoord op opmerkingen
* Vragenlijsten
  - SEAFOOD TOMMORROW T4.1 Instructies en vragenlijst WP1
  - SEAFOOD TOMMORROW T4.1 Instructies en vragenlijst WP2 T2.1
  - SEAFOOD TOMMORROW T4.1 Instructies en vragenlijst WP2 T2.2
* Informatie- en toestemmingsformulier : (versie 1) dd. 22Okt2019

Advies werd gevraagd door:
Prof. dr. ir. W. VERBEKE ; Hoofdonderzoeker

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Pagina
2/2

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* *Alle leden van het Ethisch Comité hebben dit project beoordeeld. (De ledenlijst is bijgevoegd)*
* *The Ethics Committee is organized and operates according to the 'ICH Good Clinical Practice' rules.*
* *The Ethics Committee stresses that approval of a study does not mean that the Committee accepts responsibility for it. Moreover, please keep in mind that your opinion as investigator is presented in the publications, reports to the government, etc., that are a result of this research.*
* *In the framework of 'Good Clinical Practice', the pharmaceutical company and the authorities have the right to inspect the original data. The investigators have to assure that the privacy of the subjects is respected.*
* *The Ethics Committee stresses that it is the responsibility of the promotor to guarantee the conformity of the non-dutch informed consent forms with the dutch documents.*
* *None of the investigators involved in this study is a member of the Ethics Committee.*
* *All members of the Ethics Committee have reviewed this project. (The list of the members is enclosed)*

Namens het Ethisch Comité / On behalf of the Ethics Committee

Prof. dr. D. MATTHYS
Voorzitter / Chairman

CC: De heer T. VERSCHOORE - UZ Gent - Bimetra Clinics
FAGG - Research & Development; Victor Hortaplein 40, postbus 40 1060 Brussel

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Annex II – Focus group topic guide (Master English version)

TOPIC GUIDE
FOCUS GROUP DISCUSSIONS
CONSUMERS

Introduction	**5min**
Setting the participants at ease and explaining the purpose of the discussion	

- Introduction*:*

Setting the participants at ease. Offer coffee/water.
Explaining the purpose of the interview: research on innovation in seafood products.
Addressing the issue of confidentiality: video/audio recording only used for transcripts.
No names will be linked to real persons. Recording will be destroyed after transcribing.
Explaining the ground rules (no cell phones, listening to others, no interrupting,...)
Indicating working methods: 6 topics. No right or wrong answers!
Explaining, signing and collecting the informed consent (ethical approval).

START RECORDING

MODERATOR: *Ask the participants to fill in their name tags (first name only) and place these on the table in front of them. Good morning/afternoon/evening, my name is……., and I will conduct this group session on behalf of Campden BRI Hungary/Aeiforia/UGent. This institute coordinates the focus group investigations in Hungary/Italy/Belgium of a EU project that is focusing on innovations in seafood products.*
The group discussion is going to be recorded, both video and audio. This copy can only be used for research purposes: everything said here will be confidential. The information will remain anonymous. Recording will be destroyed after transcribing.
The discussion consist of 6 topics. There are no good or bad, right or wrong answers: we are interested in everybody's own view.
We would like everyone to be involved in the discussions. You can ask questions and react to each other's opinion. We would like you to express your opinions clearly and please talk one at a time.
Please switch off your cell phones.

- Warming up:

What is your name and your favourite food/seafood?

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Topic 1: Associations with seafood products	**10min**
Getting to know consumer associations related to seafood products	

- What is the first thing that comes into your mind when I say 'seafood products'?

The seafood products we are interested in are fresh seafood products (WP1) and processed seafood products (WP2) (such as fish balls, fish pate, fish soup (not for Hungary)).

- How often do you (and your family) consume seafood products?

- What is the role of seafood products as a constituent in the diet of yourself?

- What is the role of seafood products as a constituent in the diet of your family?

- What is the role of seafood products as a constituent in the diet of your country?

The moderator hands out the PR sheets and asks the participants to complete (written).
- **PR technique_1:** Positive/negative aspects of seafood products? Complete the sentence:
  "The good thing about seafood products is..."
  "The bad thing about seafood products is..."

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Topic 2: Consumers' eating habits and purchase	**15min**
Obtaining information about consumption and purchase	

A. About eating habits and purchase

- Which type of seafood products do you consume (fresh fish, ready to eat (frozen, canned, salted), prepacked or loose, …)? *(e.g. ready to eat are fish burgers, fish balls, fish soups)*

- Where do you consume seafood products? *(e.g. at home or out-of-home: restaurant, canteen,…)*

- Where do you usually purchase the seafood products?

B. Drivers

PR technique_2 Ranking exercise 1 for fresh seafood products (e.g. salmon fillet)

- What are the main drivers when purchasing fresh seafood products (e.g. salmon fillet)?

Moderator writes down the answers on the flipchart. The participants are given the time to think about drivers. When participants have difficulties in finding drivers after 5 minutes, give fixed drivers for ranking: price, type, nutritional benefits, degree of ready to eat, quality, origin, sustainability.

The moderator hands out the PR2 sheets and asks the participants to complete.

- Now rank the main top 5 drivers according to importance when purchasing fresh seafood products. And add **why** a driver is ranked at a specific position.

The participants should specify why (or why not) some drivers are more or less important. They should write down why a driver is ranked at a specific position.

PR technique_2 Ranking exercise 2 for processed seafood products (e.g. smoked salmon)

- What are the main drivers when purchasing processed seafood products (e.g. smoked salmon)?

Moderator writes down the answers on the flipchart. The participants are given the time to think about drivers. When participants have difficulties in finding drivers after 5 minutes, give fixed drivers for ranking: price, type, nutritional benefits, degree of ready to eat, quality, origin, sustainability.

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- Now rank the main top 5 drivers according to importance when purchasing processed seafood products. And add **why** a driver is ranked at a specific position.

The participants should specify why (or why not) some drivers are more or less important. They should write down why a driver is ranked at a specific position.

C. About tendency for experimentation

- Would you be willing to buy new types of seafood products in the market? Why (not)? Which new types?

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Topic 3: Healthiness of seafood products	**20min**
Obtaining insight into consumer perceptions of the healthiness of seafood products	

A. About the healthiness of seafood products

- Are seafood products (both fresh and processed) healthy?
- What types of seafood products are more (less) healthy according to you? Why?

Moderator writes down the answers on the flipchart.

- Are seafood products now more or less healthy compared to 20 years ago? Why?

B. About the possible influence on behaviour:

- In purchasing a seafood product, do health reasons play a role? To what degree?
- How do you decide whether a seafood product is healthy or not?

C. Nutritional benefits of the seafood products

- What makes the seafood products healthy?
Moderator leads the discussion and write answers on the flip chart.

Please explain the benefits of these attributes!
(If you do not know you can skip answering.)

- reduced in salt content
- rich in selenium
- rich in omega 3
- rich in DHA (Omega 3 fatty acid)
- rich in iodine
- rich in vitamin B12
- rich in vitamin D

D. Salt reduction in seafood products

- Does the salt content in seafood products play a role when purchasing a seafood product?
- Would you be willing to buy seafood products with reduced salt *(e.g. smoked salmon, fish pate)* Why (not)?

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Topic 4: Consumer perceptions related to healthier seafood products for target groups 30min

Obtaining insight into consumer perceptions of the healthiness of seafood products for target groups (children (8-12y), pregnant women, elderly (60+))

A. Target group: children (8-12y)

- Are seafood products healthy for children?

How do seafood products fit into a diet for children?
What types of seafood products are more (less) healthy for children according to you? Why?
What types of seafood products are more (less) suitable for children according to you? Why?
What are the benefits and drawbacks of eating seafood for children?

PR technique_3a Health benefits for children

Moderator hands out the PR3a sheets and asks the participants to write those ones that are really important for the children.
Which of these components in the seafood product support the health benefits of the children?

- reduced in salt content
- rich in selenium
- rich in omega 3
- rich in DHA
- rich in iodine
- rich in vitamin B12
- rich in vitamin D

B. Target group: pregnant women

- Are seafood products healthy for pregnant women?

How do seafood products fit into a diet for pregnant women?
What types of seafood products are more (less) healthy for pregnant women according to you? Why?
What types of seafood products are more (less) suitable for pregnant women according to you? Why?
What are the benefits and drawbacks of eating seafood for pregnant women?

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PR technique_3b Health benefits for pregnant women

Moderator hands out the PR3b sheets and asks the participants to write those ones that are really important for the pregnant women.
Which of these components in the seafood product support the health benefits of the pregnant women?

- reduced in salt content
- rich in selenium
- rich in omega 3
- rich in DHA
- rich in iodine
- rich in vitamin B12
- rich in vitamin D

C. Target group: elderly (60+)

- Are seafood products healthy for elderly?

How do seafood products fit into a diet for elderly?
What types of seafood products are more (less) healthy for elderly according to you? Why?
What types of seafood products are more (less) suitable for elderly according to you? Why?
What are the benefits and drawbacks of eating seafood for elderly?

PR technique_3c Health benefits for elderly

Moderator hands out the PR3c sheets and asks the participants to write those ones that are really important for the elderly.
Which of these components in the seafood product support the health benefits of the elderly?

- reduced in salt content
- rich in selenium
- rich in omega 3
- rich in DHA
- rich in iodine
- rich in vitamin B12
- rich in vitamin D

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D. About consumers evaluation

Concept telling

The moderator provides the concept description document as an example and let the participants read. Afterwards the questions below are asked with the example in mind.

MODERATOR: *Within the European project new seafood products will be developed, this concept is an example of one of the recipes that can be developed.*

- Would products aiming to improve health of children, pregnant women and elderly be valuable for the consumer? Why?
- Would you (or your children or family) like to consume such seafood products? Why?
- Would you be willing to pay more for seafood products that are aiming to improve health of these target groups (children, pregnant women, elderly)? Why (not)?

PR technique_4

Moderator hands out the PR4 sheets and asks to complete.
Which one from the following statements fits better to this product concept?

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Topic 5: Consumer perceptions about labelling sustainability of seafood products 25min

Obtaining consumer perceptions about labelling and sustainability

A. General labelling

- What kind of information do you expect to find on a fish package, in a fish market, fish store,… when purchasing a seafood product?
- What is the most important one according to you?

If less than 5 come up, the moderator can suggest: origin, nutritional information, quality label, method of fishing, price.

B. Origin

- How important is the origin of the seafood products you eat?
- From which origin (sea/ocean/county) do you prefer buying seafood products?

(Do you prefer seafood products from your local sea (Belgium: North Sea; Italy: Mediterranean Sea, Hungary: European seas)? From European seas? From other seas/oceans (Asia, America, Africa,…)?)

PR_5 technique: the participant divides the seas/oceans/countries into preferred and non-preferred groups.
The moderator hands out the PR5 sheets and asks the participants to complete (Participants are given a list of seas/oceans/countries as examples).

- How would you like to receive information about quality and transparency *(e.g. labels (paper or electronic), websites, reading materials/brochures, QR code)*?

C. Sustainability

- What do you think about sustainable seafood?

About the possible influence on behaviour:

- Which role does sustainability play when you buy seafood? *(if not on the list in topic 2)*
- How do you decide whether a seafood product is sustainable or not?
- Do you have a preference for farmed and wild fish? Why?
- Do you give importance to fishing methods *(e.g. with low environmental impact)* Why?
- Do you give importance to origin *(e.g. to avoid long transportation)*? Why?

PR_6a technique
The moderator hands out the PR6 sheets and asks the participants to complete.

- Would you be willing to pay more for seafood products that are produced in a sustainable way? Why? For which?
  *(e.g. **ecological**: fish stock, vulnerability, season, fishing pressure, discards, soil impact, fuel consumption, adaptations for sustainable fishing;*
  ***economical**: profitability total capital, fishing effort, financial stability;*
  ***social:** safety, animal welfare, salary/wage).*

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PR_6b technique

Moderator shows the labels

- Do you know the ASC or MSC label? What is the meaning of these labels?
- Do you buy seafood products with this label? Why?
- Who do you want to be responsible for the sustainability of seafood products?

About desirability and ways to improve the sustainability of seafood products

- Is it desirable to improve the sustainability of seafood products?
Why?
- Do you think it is possible to improve the sustainability of seafood products? How?

PR_7 technique

The moderator hands out the PR7 sheets and asks the participants to complete.

Complete the sentence:

"The best thinkable way to improve the sustainability of seafood products is..."

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Topic 6: Natural resources in fish feed	**10min**
Getting to know consumer perceptions on natural sources added to the feed of the seafood.	
The moderator explains: Some natural components in food can have a positive effect on human health. Those natural components can be derived from plants or other food products which are added to the feed of the seafood. - What kind of natural components in food do you know? - What kind of natural components in seafood do you know? - What are the advantages of natural components in seafood products? - What are the disadvantages of natural components in seafood products? - Are you positive/negative towards the use of natural components in seafood products? Why?	

END	**5min**
MODERATOR: *Is there anything that might be important related to the seafood products and hasn't been discussed?*	

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Annex III – Consumer survey outline

INFORMED CONSENT FORM
SOCIO-DEMOGRAPHICS
S1 Gender
S2 Age
S3 Education level
S4 Daily occupation
S5 Link with food production
S6 Income
S7 Living area
S8 Coastal area
S9 Household number
S10 Household ages
S11 Household characteristics
S12 Weight
S13 Height
S14 Country
S15 Region
SEAFOOD CONSUMPTION
Seafood consumption frequency
Q1. Seafood consumption frequency: general
Q2. Seafood consumption frequency: seafood products
Q3. Seafood consumption frequency: seafood type purchase
Q4a. Seafood consumption frequency: place
Q4b. Seafood consumption frequency: place of purchase
Seafood consumption frequency: children
Q5 Seafood consumption frequency: children: different
Q5a1 Seafood consumption frequency: children: different frequency
Q5a2 Seafood consumption frequency: children: different type
Q5b Seafood consumption frequency: children: seafood type purchase
Q5c Seafood consumption frequency: children: place
Seafood consumption frequency: during pregnancy
Q6 Seafood consumption frequency: during pregnancy: change
Q6a1 Seafood consumption frequency: during pregnancy: change frequency
Q6a2 Seafood consumption frequency: during pregnancy: change type
Q6b Seafood consumption frequency: during pregnancy: seafood purchase type
GENERAL ATTITUDES AND PERCEPTIONS OF SEAFOOD PRODUCTS
Q7a_1 General preference towards seafood products: preference wild/farmed
Q7b General attitudes towards seafood products
Q8 Perception of seafood
HEALTH

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Q9 General health interest
Q10 Perceived health benefits of seafood products for target groups
SUSTAINABILITY
Q11 Familiarity with ecolabel/origin/seasonality
Q12 Intention to consume seafood with an ecolabel/origin/seasonality
Q13 Perceived consumer effectiveness on sustainability
INFORMATION
Q14 Information needs
ECO-INNOVATIVE SOLUTIONS
Q15 Domain specific innovations (DSI-scale)
Q16 Attitudes, purchase intention, WTP and tendency to experiment towards eco-innovative seafood products
Q16a Attitudes towards eco-innovative seafood products
Q16b Purchase intention towards eco-innovative seafood products
Q16c Willingness to pay towards eco-innovative seafood products
Q16d Tendency to experiment with eco-innovative seafood products

Please contact UGent (Yung.Hung@UGent.be) for the full questionnaire

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Annex IV – Experimental auctions design

Example based on the test on WP1 products for adults in general (information about the other tests are available upon request)

Sensory evaluation

1) Conventional seafood product (salmon, carp, seabream)

2) SEAFOOD[TOMORROW] eco-innovative solution (fortified salmon, carp, seabream)

Sensory attributes list based on sensory evaluation WP3 T3.2

Odour: Boiled, fishy, muddy, acidy, milky

Colour: Pale, dark, cream, white, pink

Taste: Steamed, baked, fishy, muddy, acidy, milky, aftertaste, off-taste

Texture: Dry, juicy, firm, soft, bones

Calanche,J (2019): Odors: seaweedy & stale. Flavors: meaty & bitterness. Texture = dryness & softer

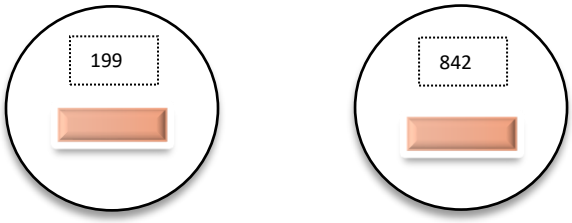
Randomization

⇨ Each product will be served separately (in order to keep the temperature of the product the same) on a round white plate.

⇨ Product codes: products are labelled with random 3-digit-number, participants of the TastInfo condition will not know which one is conventional or new when tasting. The participants of the InfoTaste condition will know which one is the conventional or new when tasting.

Fortified trout	199	Control trout	842
Fortified carp	524	Control carp	246
Fortified seabream	734	Control seabream	902

- e.g. trout: treatment 2, session D



⇨ Randomization: The sequence of presenting / tasting the seafood products is rotated to avoid order biases.

Treatment	Session	Seafood product 1		Seafood product 2		Seafood product 3	
1	**A**	Control trout	Fortified trout	Fortified carp	Control carp	Control seabream	Fortified seabream

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	B	Control carp	Fortified carp	Fortified seabream	Control seabream	Control trout	Fortified trout
	C	Control seabream	Fortified seabream	Fortified trout	Control trout	Control carp	Fortified carp
2	**D**	Fortified trout	Control trout	Control carp	Fortified carp	Fortified seabream	Control seabream
	E	Fortified carp	Control carp	Control seabream	Fortified seabream	Fortified trout	Control trout
	F	Fortified seabream	Control seabream	Control trout	Fortified trout	Fortified carp	Control carp

Information

Difference between the seafood products are:

⇨ **Conventional seafood product vs eco-innovative seafood product**

○ **Eco-innovative seafood product:** novel biofortified seafood product with enhanced levels of iodine, selenium and Omega-3 fatty acids.

- fortified feed via adding natural components such as microalgae, macroalgae and seaweed to the seafood feed to enrich Iodine ,Selenium and Omega-3 fatty acids levels in the seafood products
- to improve or to respond better to specific needs of the consumers
- % of daily recommended intake (DRI)

⇨ **Description for each seafood product: trout, carp, seabream**

○ **Trout**: Feed: 3% seaweed added to conventional feed enhance both iodine and selenium levels in the feed

- the SFT fortification feed (**SFT TROUT**) was identical to this control feed and only a minor change was introduced:
- 3% incorporation of Saccharina latissima, at the expenses of wheat in order to enhance both iodine and selenium levels in the feed (target for iodine 100 mg/kg; target for selenium 1.5 mg/kg)

○ **Carp**: Feed: 2.5% algae, 0.03% selenised yeast, 6.1 salmon oil added to conventional feed.

- In comparison to the CTRL feed, the SFT fortification feed (**SFT CARP**) introduces the following changes:
- A 50% reduction of fishmeal, by using two microalgae (Spirulina and Chlorella)
- The replacement of vegetable oils (soy and rapeseed oils) by a salmon by-products oil as a source of EPA and DHA.
- This salmon oil is not a typical fish oil. It is made from by-products of farmed salmon, which is fed with diets containing high levels of rapeseed oil. Therefore, this oil has a lower EPA+DHA content than traditional fish oils, also a lower price and its use contributes to the concept of a circular economy. This change should raise the levels of EPA and DHA in carp fillets.
- Supplemented with 0.541% macroalgae (Laminaria digitata) to enhance iodine level in the feed (target 20 mg/kg)
- Supplemented with 0.03% selenised-yeast to enhance selenium level in the feed (target 1.7 mg/kg)

- **Seabream**: Feed: Although the formulation of the commercial feed is not known, the SFT fortification feed (**SFT BREAM**) comprises the following concepts:

- A low level of fishmeal. Probably on the lower range of current commercial seabream feeds.
- Although constrained by cost, the use of sustainable ingredients such as microalgae was promoted. One of the microalgae (Schizochytrium) is rich in DHA and therefore it was used to reduce the levels of fish oil.
- Supplemented with 0.5% macroalgae (Laminaria digitata) to enhance iodine level in the feed (target 20 mg/kg)
- Supplemented with 0.03% selenised-yeast to enhance selenium level in the feed (target 0.9 mg/kg)

⇨ **Natural components:**

○ Macroalgae as a source on iodine

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- Yeast as a source of selenium
- Salmon by-products oil is a cost-effective source of EPA+DHA (Omega-3 fatty acids)

Target Group

- Males and females aged 18 to 65 years old
- Responsible for food purchases
- Who consume seafood products (+no allergy to products listed below or self-restrictions (e.g. vegetarian) EXCLUSIVE IF ALLERGY (Fish) OR SELF-RESTRICTION
- Healthy participants
- Representative on gender, age (age groups) and region (HU: West-Central-East; BE: Flanders; IT: North-Central-South)
- Variation in educational background

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Examination certificate of the experimental auction by the food safety authority of Belgium

During the course of the experimental auctions in Belgium (Feb. 2020), an unannounced inspection was done by the Belgian **Federal Agency for the Safety of the Food Chain** following a complaint filed by one of the previous auction participants who disagreed with the procedures followed (product labelling and the bidding procedure for products in a sensory panel). The inspection concluded that the complaint was unfounded; that all procedures were legitimate; the overall report concluded as favourable ('gunstig').

Federaal Agentschap voor de Veiligheid van de Voedselketen
Bestuur van de Controle
LCE Oost-Vlaanderen Vlaams-Brabant

www.favv.be

ON 0267.387.230

Gaston Crommenlaan 6/1000
9050 GENT
Tel. 09/210.13.00
Fax 09/210.13.20

e-mail : Info.OVB@favv.be

MISSIERAPPORT

	VEN
ID operator	2.151.761.688
Naam	Ugent-Coupure
Adres	Coupure Links 653
	9000 Gent

Controleur(s)

Naam	Voornaam	Legitimatienr	Verantwoordelijke
De Smet	Lela	2724	●

Missiegegevens (2724/00/00000548)

Bezoekdatum(s)	Beginuur	Einduur	Prestatiebonnummer
18-02-2020	09:55	10:52	-

Standaard controle

CONTEXT

Klacht betreffende etikettering en verkoop per opbod van producten in een smaakpanel.

VASTSTELLINGEN

Klacht ongegrond.
Op het einde kan er geboden worden op bepaalde producten. De veiling van de producten hoort bij het economisch aspect van het experiment/smaakpanel: "seafood tomorrow".
Producten worden niet effectief verkocht aan eindconsument.
Etikettering is niet verplicht als het product niet (verpakt of onverpakt) voor verkoop wordt aangeboden aan de consument.

Alle producten worden enkel gebruikt binnen het experiment. (zie bijgevoegd document)

Beoordeling controle ● Gunstig ○ Gunstig met opmerkingen ○ Ongunstig

Opmerking operator : Geen opmerking van operator

Opmerking controleur : Geen opmerking controleur

Gemaakt op 18-2-2020

Naam
De Smet Lela

Handtekening en stempel controleur

Naam operator of aanwezige persoon : Yung Hung

Functie : Doctoraatsstudent - UGent

Tekent voor kennisname :

De missie kan geconsulteerd worden via foodweb (www.favv.be/foodweb-nl)

2724/00/00000548 1/1

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Outline of the instruction to experimental auction participants and questionnaire

1. Questionnaire prior to auctions

- Hunger level
- Consumption frequency
- Place of seafood purchase
- Familiarity with the seafood (products)

2. Instructions for experimental auctions

3. Quiz to confirm the understanding

4. Training round with candy bars

5. Visual evaluation

6. Bid sheet visual evaluation

7. Information about the seafood products and bid sheet

8. Sensory evaluation of seafood products and bid sheet

9. Bid sheet reference price

10. Post-auctions questionnaire

- Reasons / motivations for the bids
- Attitudinal scales
- Reasons for zero bids
- Socio-demographic information

Please contact UGent (Yung.Hung@UGent.be) for the full questionnaire

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Annex V – Examples of additional sample characteristics from the experimental auction samples

Examples based on WP1 Products for adults in general

General health interest

Please indicate to which degree you agree or disagree with the statements.	n=269-272	
7-point Likert scale from 1= Totally disagree to 7= Totally agree	Mean	SD
The healthiness of food has little impact on my food choices	3.06	2.07
I am very particular about the healthiness of food I eat	5.35	1.71
I eat what I like and I do not worry much about the healthiness of food	3.14	1.84
I always follow a healthy and balanced diet	4.65	1.60
It is important for me that my daily diet contains a lot of nutrients such as vitamins and minerals	5.28	1.60
The healthiness of snacks makes no difference to me	3.02	1.89
I do not avoid foods, even if they may raise the risk of certain health problems	3.08	1.86

Domain specific innovations (DSI-scale)

Please indicate to which degree you agree or disagree with the statements.	n=263-271	
7-point Likert scale from 1= Totally disagree to 7= Totally agree	Mean	SD
I buy new foods before other people do	3.74	1.77
In general, I am among the first in my circle of friends to buy new foods	3.85	1.80
Compared to my friends I buy more new foods	4.06	1.82
Even though new foods are available in the store, I do not buy them	3.15	1.65
In general, I am the last in my circle of friends to know the trademarks of new foods	2.75	1.59
I will not buy new foods, if I have not tasted them yet	3.18	1.89

Attitude towards seafood consumption

[Q5] In the following we would like you to think about how you feel when you eat seafood.
Please indicate for each row which word best describes how you feel. Percentage (%)

*When I think about **biofortified Rainbow trout (Rainbow trout 199)**, I feel...* (n = 251-256)

	1	2	3	4 Neutral	5	6	7	
Bad	2.3	1.2	2.3	29.3	13.7	22.7	28.5	Good
Unsatisfied	3.5	3.1	4.7	21.6	16.4	27.7	23.0	Satisfied
Unpleasant	3.2	2.8	3.2	32.3	14.3	20.7	23.5	Pleasant
Negative	5.6	1.6	4.4	28.1	12.7	22.2	25.4	Positive

*When I think about **biofortified carp (Carp 524)**, I feel...* (n = 256-263)

	1	2	3	4 Neutral	5	6	7	
Bad	11.5	6.9	8.1	34.7	10.8	13.8	14.2	Good
Unsatisfied	14.8	9.5	9.9	21.3	11.8	19.0	13.7	Satisfied
Unpleasant	10.5	9.0	7.8	35.2	9.8	14.8	12.9	Pleasant
Negative	14.0	7.8	8.1	26.1	14.0	15.9	14.3	Positive

*When I think about **biofortified seabream (Seabream 734)**, I feel...* (n=254-264)

	1	2	3	4 Neutral	5	6	7	

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Bad	3.0	1.5	4.5	25.4	18.6	22.0	25.0	Good
Unsatisfied	2.7	1.9	8.0	20.3	16.1	25.7	25.3	Satisfied
Unpleasant	3.1	3.1	5.1	26.8	18.0	21.2	22.7	Pleasant
Negative	3.5	3.1	5.5	24.9	14.6	23.2	25.2	Positive

Purchase intention towards eco-innovative seafood products

[Q6] Please indicate to which degree you agree or disagree with the statements. (n = 256-270)

I would be willing to buy biofortified _____ when it is…

	biofortified rainbow trout		**biofortified carp**		**biofortified seabream**	
	Mean	SD	Mean	SD	Mean	SD
…healthier	5.63	1.49	4.76	2.08	5.61	1.60
…of high quality	5.79	1.37	4.89	2.03	5.82	1.44
…safer	5.53	1.47	4.67	2.05	5.46	1.61
…more nutritious	5.70	1.49	4.80	2.02	5.70	1.47
…more affordable	5.17	1.77	4.50	2.11	5.11	1.77
…more tasteful	5.84	1.52	5.15	2.01	5.83	1.56
...in promotion	5.30	1.64	4.38	1.98	5.32	1.69
… more sustainable	5.52	1.58	4.70	2.05	5.45	1.55
...recommended by family or friends	4.84	1.67	4.20	1.97	4.88	1.70
…better fits my nutritional needs	5.49	1.46	4.64	2.02	5.42	1.53
…better fits nutritional needs of my family	5.31	1.53	4.60	1.98	5.22	1.66
…if cooking suggestion is provided	4.51	1.88	4.08	2.01	4.54	1.93

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[Q7] In case you have **bid zero** in one of the rounds, please indicate the reason. (n=272)	
Percentage (%)	
7.0	I have bid zero in one of the rounds of **Rainbow trout**
The reason for my bid of zero for **Rainbow trout** was because…	
1.1	… I'm not interested in buying this type of fish
0.4	… I do not like the portion size
2.9	… I did not like the taste
0.7	… I do not believe the information
1.8	… I do not like how the fish looks
1.5	… I do not know how to prepare this type of fish
	…other, specify:
	_____
35.3	I have bid zero in one of the rounds of **Carp**
The reason for my bid of zero for **carp** was because…	
7.7	… I'm not interested in buying this type of fish
1.5	… I do not like the portion size
29.8	… I did not like the taste
0.7	… I do not believe the information
8.5	… I do not like how the fish looks
0.7	… I do not know how to prepare this type of fish
	…other, specify:
	_____
10.7	I have bid zero in one of the rounds of **Seabream**
The reason for my bid of zero for **seabream** was…	
3.3	… I'm not interested in buying this type of fish
0.7	… I do not like the portion size
5.5	… I did not like the taste
0.7	… I do not believe the information
2.9	… I do not like how the fish looks
1.5	… I do not know how to prepare this type of fish
	…other, specify:
	_____

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