

Optimal utilization of seafood side-streams through the design of new holistic process lines

# D1.2

# Consumer's barriers and motives









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History of changes D1.2			
Version	Date	Change	Page
1.2	25.03.21	<ul> <li>Added one author</li> <li>1 Deliverable Description is rewritten</li> <li>3.1 Development of the questionnaire has been rewritten</li> <li>3.2 Conducting the questionnaire: changes made in the text</li> <li>4.1 Results from the questionnaire: changes made in the text</li> <li>5 Conclusion: one sentence is added</li> </ul>	<ul> <li>Front page</li> <li>3</li> <li>4</li> <li>5</li> <li>6</li> <li>35</li> </ul>



### Executive Summary

The aim of this study was to investigate consumer barriers and motives for products with ingredients from seafood side-stream. Based on the consumer answers, it can be concluded that the main barriers and motives are the eating quality and that they want to be informed about the origin of the ingredients and raw material. Thus, by developing technologies that can ensure that foods containing ingredients from seafood side-streams are of high eating quality and by providing the requested information the most relevant barriers can be overcome, and consumers will be motivated to buy such products. Furthermore, a clean label is a motive for the consumer to buy the product. Likewise, the consumers also want to know about the environmental impact of the production of the food product.

### 1 Deliverable Description

The aim of this report is to present the preliminary data obtained from the developed consumer questionnaire. The developed consumer questionnaire aimed to investigate consumer barriers and motives for products with ingredients from seafood side-stream. Nowadays, many consumers also look at the process and the coefficient of utilization of the whole raw material when they decide which type of product they want to buy. Therefore, the consumers' barriers and motives for using ingredients from side-streams in (sea)food production is very important to understand.

This deliverable will only reports the main conclusions, which can be drawn from the preliminary data. The full and detailed data treatment, discussions and state-of-the art will be published in scientific journals.

### 2 How the deliverable relates to the objective of WP1

The main objective of WP1 is:

• to identify hurdles and bottlenecks that prevent exploitation of side-streams and by-catches as exemplified by the selected cases in WaSeaBi.

Sub-objectives are to:

- describe and chemically **characterize** the side-streams generation in fisheries, aquaculture and aquatic processing industries and by-catches in the fisheries.
- detect current **hurdles and bottlenecks** that prevent the implementation of valorisation solutions in the participating companies.
- map consumer knowledge and **consumer barriers and motives** for using ingredients from side-streams in food production.



This deliverable is related to the main objective by investigating the third sub-objectives to get knowledge about consumer barriers and motives for using ingredients from side-streams in food production.

The outputs of this analysis will be used in WP3, 4 and 5.

### 3 Development of the consumer questionnaire

### 3.1 Development of the questionnaire

The consumer questionnaire was developed based on the literature study done in milestone - M1 "Enough knowledge to setup the questionnaires for the industry and the consumer test." The results from the EU project SEAFOODPlus, with focus on the motives and barriers for using ingredients or new developed food products from seafood side-streams were included in M1. The final questionnaire was tested and translated to Swedish, Spanish, and Danish. As an addition, it was also made available in Italian and French.

### 3.1.1 The structure of the questionnaire

As an introduction, it was stated that the questionnaire is part of a project about producing ingredients and new products from side-streams/by-product from the seafood industry. With a link to WaSeaBi homepage.

The first part is related to who is responsible for shopping food and for how many people, where the food is bought and what is important when buying food. Also, about responsibility to prepare the food at home and how frequently they eat seafood at home or at restaurants.

The second part is linked to what is influencing when buying food products and their attitudes towards new products produced from side-streams or containing ingredients produced from side-streams, environment, health, food composition, price, Fair Trade etc.

Similarly, from where they get most of the information about different food products and to what extent they trust the information, as well as how easy it is to understand.

For "ready to eat" products, the questions are about the information on the labels, i.e., if it contains the important information for them.

There are questions on willingness to pay more for a food product with a better environmental footprint; followed by some statements where the consumer is asked to state if it is true or false.



The questionnaire ends with demographic questions.

### 3.2 Conducting the questionnaire

The questionnaire was setup in SurveyXact and the access to the questionnaire is a link that was uploaded to different social media and further spread by sharing the link.

Based on the M1, the aim was to have 50-100 consumers from Spain, Sweden and Denmark to fill out the questionnaire, but even more if possible. Both AZTI, Chalmers and DTU spread the link through social media (LinkedIn and twitter) and by the social network of the sustainability area (twitter and Facebook) and its members. The questionnairie was also directly sent to colleages, friends and famillies to get a reflection from a wider range of people.

AZTI included it on it webpage (<u>https://www.azti.es/por-una-cadena-de-valor-pesquera-mas-sostenible-cuestionario/</u>) and Chalmers to a maritime cluster, which is an association working on marine related topics. They also helped to spread the questionnaire among an audience who might be interested.

Link to the questionnaire is as follows:

https://www.survey-xact.dk/LinkCollector?key=RSWZ8TAPSN9J

It is relevant to mention that the link to the consumer questionnaire will be kept open during the whole project period.



### 4 Discussion and results

### 4.1 Results from the questionnaire

In this section, the results from each question are given, which represents the answers of all participants (392 consumers: 73 % female and 26 % male). According to the results found, 90 % of the consumers that have answered the questionnaire are responsible for 50 % or more of the food shopping in their household. 73 % of the consumers are female, 56 % answer that they have a varied diet and more than 50 % are eating seafood. 67 % of the consumers have a medium to long education or medium to higher education. The main movers for new types of ingredients will be in this consumer group.

On the other hand, when the consumers buy food, the most relevant for them is the eating quality (e.g., appearance, taste, odour, and texture) followed by the price and the origin of the product. The origin of both ingredients and raw material is also important for the consumers. When asking about clean label, 31 % answer that it is very important and 32 that it is fairly important. For 86 % of the consumers, it is important to know the composition of the food product. 38 % states that they think about the environmental impact when they buy food products. In the question, "Would you buy a food product, e.g., a meat pâté, where one of the ingredients was from seafood?" 19 % answer "Yes, definitely" and 26 "Yes, to some extent".

The following graphs depict main results obtained via the consumers' questionnaire:



1. To what extent are you responsible for food shopping in your household?



### 3. Think of last week; how many meals did you consume at home per day (in average)?



### 4. How often do you buy your food at the Supermarket?



Never Less than 1 time each half year 1-5 times per half year 1 time per month 2-3 times per month 1 time per week
 3-4 times per week



# 5. How often do you buy your food at a specialty shop (e.g. local markets or private farmers/breeder)?



Never Less than 1 time each half year 1-5 times per half year 1 time per month 2-3 times per month 1 time per week 2 times per week
 3-4 times per week Each or nearly each day



# 6. When you buy food products, which of the following aspects are the most important for you?

(Multiple answers possible)





7. To what extent are you responsible for cooking and preparing the food in your household?



Never Less than 1 time each half year 1-5 times per half year 1 time per month 2-3 times per month 1 time per week 2 times per week
 3-4 times per week Each or nearly each day

### 8. How frequently do you eat seafood at home or at restaurants?



Never Less than 1 time each half year 1-5 times per half year 1 time per month 2-3 times per month 1 time per week
 3-4 times per week



# 9. When you buy food products you are more influenced by: (Select max 3 options)



### 10. State to what extent you agree in the following statements:



i. I often search for new products



ii. It is important that the food products are produced in an environment and sustainable manner



Totally disagree 2 3 Neutral 5 6 Totally agree









### iv. I am very aware about the origin of the food products that I buy









### vii. It is important for me to know the composition of the food I buy







### viii I look first at the quality of the product, then at the price

### ix. It is important that the packaging is environment friendly







### x. I always read the label with the information on the content





### xi. I only look at the pictures







# 11. From where do you get most of the information about different food products? (select max 3 options)





12. How much do you trust the following information accompanying food products?

i. The information that must be shown by law or regulation (e.g. nutritional claim, list of ingredients, net quantity, storage conditions, allergen information)



ii. Information certified by independent bodies (e.g. ecolabels, organic or bio claim)



iii. The information provided by the brand or seller (e.g. production methods)





13. Do you find the information accompanying food products you buy is clear and easy to understand?





14. Would you buy a food product e.g. a meat pâté, where one of the ingredients was from seafood?

Yes definitely

15. How important or not is it to find the following information on labels of food products and "ready to eat" products? (one answer per line)

i. The origin of the raw material (e.g. vegetable or animal source, geographical)



(One answer only)





ii. The origin of the ingredients (e.g. vegetable or animal source, geographical)

### iii. How the product is produced







### iv. If some of the proteins come from other sources such as seafood

v. Sustainability and ethical labels (e.g. fair trade, carbon footprint, rainforest alliance)





vi. Carbon footprint of the product (gr CO2 eq./gr), including information on how the product is transported (e.g. airplane, ship, lorry)



📕 Very important 📕 Fairly important 📕 Neutral 📕 Not very important 📕 Not at all important 📕 Don't know



### vii. Nutritional information



# viii. The price

📕 Very important 📕 Fairly important 📕 Neutral 📕 Not very important 📕 Not at all important 📕 Don't know

### ix. If the ingredients are organic







📕 Very important 📕 Fairly important 📕 Neutral 📕 Not very important 📕 Not at all important 📒 Don't know

### xi. Ethical keeping of animals







xiii. How sustainable the packaging material is





16. Are you willing to pay more for a food product with a better environmental footprint? (One answer only)



### 17. In your opinion, are the following statements true or false?



i. Protein always comes from animal sources





ii. There is flavour in the cooking water after cooking shrimps

iii. You can use the fish bone for producing ingredients





iv. In the future we shall use all food resources including by-product and wastes



v. Beer can contain fish protein traces







### vi. Food gelatine is obtained from Fish skin and scales

18. State to what extent you agree in the following statements:



i. Compared to an average person, I know a lot about food and how it is produced





### ii. My friends and family consider me as an expert on food

iii. I have a lot of knowledge of how to prepare different food for the different meals







### iv. I have a lot of knowledge of how to evaluate the quality of food

### 19 Do you work in the food sector?





### 20. Your diet; which type is it?



### 21 Gender



### 23 Country of residence:



### Other

- Bolivia
- United States of America



- Norway
- Germany
- US
- Turkey
- Latvia
- Greece
- Iran
- Ireland
- Belgium
- Japan
- UK
- Switzerland
- Mexico

### 24 Completed education? (the latter of your educations)



### 25 Household income? (One answer only)





### 5 Conclusion

Based on the consumer answers received to date, it can be concluded that the main consumer barriers and motives are linked to the eating quality and that they want to be informed about the origin of the ingredients and raw material used. Therefore, by developing technologies that can ensure that foods containing ingredients from seafood side-streams are of high eating quality and by providing the requested information, consumer barriers can be overcome, as well as the consumers will be motivated to buy such products. Furthermore, a clean label is a motive for the consumer. Likewise, the consumer also wants to know about the environmental impacts of the food products.

Finally, the full and detailed data treatment, discussions and state-of-the art will be later published in scientific journals.


# 6 Appendix

The full questionnaire:

**Consumer questionnaire** 

#### Introduction:

The purpose of this survey is to gain knowledge about yours and other consumer opinion on producing ingredients and new products from by-product from the seafood industry.

The knowledge obtained in this survey will be used in a European project. More information about it can be found on www.Waseabi.eu website. We want to assure you that your answers and details will remain confidential.

#### How to fill in the questionnaire:

For each of the following questions please mark your response. For most of the questions, a scale is given to the answers. Try to find the point on the scale that suits you best.

We really appreciate your input!

Please answer the following questions.

### 1. To what extent are you responsible for food shopping in your household?





# 2 Number of people for whom you buy food products?

Adults \_\_\_\_\_

### 3. Think of last week; how many meals did you consume at home per day (in average)?

- (1) 🛛 🖵 One
- (2) 🛛 🖵 One-two
- (3) All meals

### 4. How often do you buy your food at the Supermarket?

- (1) Dever
- (2) Less than 1 time each half year
- (3) 1-5 times per half year
- (4)  $\Box$  1 time per month
- (5) **Q** 2-3 times per month
- (6)  $\Box$  1 time per week
- (7)  $\Box$  2 times per week
- (8) 3-4 times per week
- (9) Each or nearly each day

# 5. How often do you buy your food at a specialty shop (e.g. local markets or private farmers/breeder)?

- (1) **D** Never
- (2)  $\Box$  Less than 1 time each half year
- (3)  $\Box$  1-5 times per half year
- (4)  $\Box$  1 time per month
- (5) 2-3 times per month
- (6)  $\Box$  1 time per week
- (7)  $\Box$  2 times per week
- (8) **3**-4 times per week
- (9)  $\Box$  Each or nearly each day



# 6. When you buy food products, which of the following aspects are the most important for you?

# (Multiple answers possible)

- (1)  $\square$  How easy and quick it is to prepare
- (2)  $\Box$  The origin of the product
- (3) The type of ingredients
- (4) The products shelf-life
- (5) The calories content and health properties
- (6) The product's eating quality (appearance, taste, odour and texture)
- (7)  $\Box$  The price of the product
- (8) The brand or quality labels
- (9) The environmental impact
- (10) **D** Social or ethical impact
- (11) **D** Other
- (12) 🛛 None
- (13) Don't know

# 7. To what extent are you responsible for cooking and preparing the food in your household?

- (1) 🛛 Never
- (2) Less than 1 time each half year
- (3) 1-5 times per half year
- (4)  $\Box$  1 time per month
- (5) 2-3 times per month
- (6)  $\Box$  1 time per week
- (7)  $\Box$  2 times per week
- (8)  $\Box$  3-4 times per week
- (9) Each or nearly each day

### 8. How frequently do you eat seafood at home or at restaurants?

- (1) **D** Never
- (2)  $\Box$  Less than 1 time each half year
- (3) 1-5 times per half year
- (4) 1 time per month
- (5) 2-3 times per month



- (6)  $\Box$  1 time per week
- (7)  $\Box$  2 times per week
- (8)  $\Box$  3-4 times per week
- (9) Each or nearly each day

# 9. When you buy food products you are more influenced by: (Select max 3 options)

- (1) DPrice
- (2) 🛛 🗖 Mood
- (3) 🛛 Hunger
- (4) **D** Religion
- (5) **D** Previous experience

# 10. State to what extent you agree in the following statements:

	Totally disagree			Neutral			Totally agree
i. I often search for new products	(1) 🗖	(2) 🗖	(3) 🗖	(4) 🗖	(5) 🗖	(6) 🗖	(7)
ii. It is important that the food products are produced in an environment and sustainable manner	(1)	(2)	(3)	(4)	(5) 🗖	(6) 🗖	(7)
iii. Health is very important to me	(1)	(2)	(3) 🗖	(4)	(5) 🗖	(6)	(7)
iv. I am very aware about the origin of the food products that I buy	(1)	(2)	(3)	(4)	(5)	(6) 🗖	(7)
v. I care about the farmers' integrity	(1)	(2)	(3)	(4)	(5) 🗖	(6) 🗖	(7)
vi. I appreciate to cook my own food	(1)	(2)	(3)	(4)	(5) 🗖	(6)	(7)
vii. It is important for me to know the composition of the food I buy	(1)	(2)	(3)	(4)	(5)	(6)	(7)
viii I look first at the quality of the product, then at the price	(1)	(2)	(3)	(4)	(5)	(6)	(7)
ix. It is important that the packaging is environment friendly	(1) 🗖	(2) 🗖	(3)	(4)	(5) 🗖	(6) 🗖	(7)



	Totally disagree			Neutral			Totally agree
x. I always read the label with the information on the content	(1)	(2)	(3)	(4)	(5)	(6)	(7)
xi. I only look at the pictures	(1)	(2)	(3)	(4)	(5)	(6)	(7)
xii. I look for the Fair Trade label	(1) 🗖	(2) 🗖	(3)	(4)	(5)	(6)	(7)

# 11. From where do you get most of the information about different food products? (select max 3 options)

- (1) Friends and family
- (2) **D** Television, books and magazines
- (3) Internet/social media
- (4) Dublic institutions
- (5) Investmental organisations (NGOs)
- (6) Government Store employee
- (7) Scientific publications (papers/ books)
- (8) Doctors or nutritionist TV/social media
- (9) Health/food/nutrition bloggers
- (10) **D** Other
- (11) DNone
- (12) 🔲 Don't know

# 12. How much do you trust the following information accompanying food products?

	Completely trust	Tend to trust	Neutral	Tend not to I trust	Do not trust at all	Don't know
i. The information that must be shown by law or regulation (e.g. nutritional claim, list of ingredients, net quantity, storage conditions, allergen information)	(1) 🗖	(2)	(3) 🗖	(4)	(5) 🗖	(6) 🗖



	Completely trust	Tend to trust	Neutral	Tend not to trust	Do not trust at all	Don't know
<ul><li>ii. Information</li><li>certified by independent bodies</li><li>(e.g. ecolabels, organic or bio claim)</li></ul>	(1)	(2)	(3)	(4)	(5) 🗖	(6) 🗖
iii. The information provided by the brand or seller (e.g. production methods)	(1) 🗖	(2)	(3)	(4)	(5) 🗖	(6)

# 13. Do you find the information accompanying food products you buy is clear and easy to understand?

# (One answer only)

- (1) **U** Yes definitely
- (2) **D** Yes, to some extent
- (3) Deutral
- (4) DNo, no really
- (5) 🛛 No, not at all
- (6) 🛛 🗖 Don't know

# 14. Would you buy a food product e.g. a meat pâté, where one of the ingredients was from seafood?

# (One answer only)

- (1) **D** Yes definitely
- (2)  $\Box$  Yes, to some extent
- (3) 🛛 Neutral
- (4) DNo, no really
- (5) **D** No, not at all
- (6) Don't know



# 15. How important or not is it to find the following information on labels of food products and "ready to eat" products? (one answer per line)

(	por	Very important	Fairly important	Neutral	Not very important	Not at all important	Don't know
	The origin of the e.g. vegetable or , geographical)	(1) 🗖	(2)	(3)	(4)	(5) 🗖	(6) 🗖
•	The origin of the g. vegetable or , geographical)	(1) 🗖	(2)	(3) 🗖	(4)	(5) 🗖	(6) 🗖
iii. is produced	How the product	(1)	(2)	(3)	(4)	(5) 🗖	(6) 🗖
iv. proteins come sources such a		(1) 🗖	(2)	(3) 🗖	(4)	(5) 🗖	(6) 🗖
v. ethical labels ( carbon footprin alliance)		(1) 🗖	(2) 🗖	(3)	(4)	(5) 🗖	(6) 🗖
		(1)	(2)	(3)	(4) 🗖	(5) 🗖	(6) 🗖
vii. information	Nutritional	(1)	(2)	(3)	(4)	(5)	(6) 🗖
viii.	The price	(1) 🗖	(2)	(3)	(4)	(5) 🗖	(6)
ix. are organic	If the ingredients	(1)	(2)	(3)	(4)	(5)	(6) 🗖
x. related to heal etc.)	Information th (e.g. allergies,	(1) 🗖	(2)	(3)	(4)	(5) 🗖	(6) 🗖
xi. animals	Ethical keeping of	(1) 🗖	(2)	(3)	(4)	(5) 🗖	(6) 🗖
xii. of additives)	Clean label (free	(1)	(2)	(3)	(4)	(5) 🗖	(6) 🗖
xiii. the packaging	How sustainable material is	(1)	(2)	(3)	(4)	(5)	(6) 🗖



# 16. Are you willing to pay more for a food product with a better environmental footprint? (One answer only)

- (1) **U** Yes, definitely
- (2)  $\Box$  Yes, to some extent
- (3) I No, not really
- (4) DNo, not at all
- (5) I do not know

# 17. In your opinion, are the following statements true or false?

		True	False
i. comes from a	Protein always animal sources	(1) 🗖	(2)
iii. the cooking v shrimps	There is flavour in vater after cooking	(1) 🗖	(2)
ii. fish bone for ingredients	You can use the producing	(1) 🗖	(2)
	In the future we food resources product and wastes	(1) 🗖	(2) 🗖
v. fish protein tı	Beer can contain aces	(1) 🗖	(2)
vi. obtained fror scales	Food gelatine is n Fish skin and	(1) 🗖	(2)

### Now a few questions about you:



### 18. State to what extent you agree in the following statements:

	Totally disagree			Neutral			Totally agree
i. Compared to an average person, I know a lot about food and how it is produced	(1) 🗖	(2)	(3) 🗖	(4)	(5) 🗖	(6) 🗖	(7)
ii. My friends and family consider me as an expert on food	(1) 🗖	(2)	(3)	(4) 🗖	(5)	(6) 🗖	(7)
iii. I have a lot of knowledge of how to prepare different food for the different meals	(1)	(2)	(3)	(4)	(5) 🗖	(6) 🗖	(7)
iv. I have a lot of knowledge of how to evaluate the quality of food	(1) 🗖	(2)	(3) 🗖	(4)	(5) 🗖	(6) 🗖	(7) 🗖

#### 19 Do you work in the food sector?

- (1) **U** Yes, please specify your job
- (2) 🛛 No

### 20. Your diet; which type is it?

- (1) **D** Mediterranean
- (2) Uegetarian
- (3) Descatarian
- (4) 🛛 🖵 Vegan
- (5) 🛛 Paleo
- (6) 🛛 🖬 Raw diet
- (7) Dased in proteins
- (8) **U** Varied diet
- (9) **D** Non diet in particular
- (10) **Other?**

# 21 Gender

(1) 🛛 Male



- (2) **D** Female
- (3) **D** Others
- (4)  $\Box$  Rather not to say

### 22 Age

## In which year are you born?

#### 23 Country of residence:

- (1) 🛛 Spain
- (2) Denmark
- (3) 🛛 Italy
- (4) General France
- (5) 🖸 Sweden
- (6) Other\_\_\_\_

### 24 Completed education? (the latter of your educations)

- (1)  $\Box$  Lower secondary
- (2) Upper secondary
- (3) Upper secondary with trainee
- (4) Short length higher education (up to 2 years)
- (5) Medium length higher education (2-4 years)
- (6) Long higher education (over 4 years)
- (7) Doctorate
- (8) 🛛 Other

# 25 Household income? (One answer only)

- (1) One income
- (2) Two income (or more)
- (3) 🛛 Other



We thank you a lot for taking the time to fill out the questionnaire!



#### Web new:

<b>4</b> 771	24 jul PRODUCCIÓN Y CONSUMO RESPONSABLES   VIDA SUBMARINA
MEMBER OF BASQUE RESEARCH & TECHNOLOGY ALLIANCE	Por una cadena de valor
	pesquera más sostenible. Cuestionario
MENÚ	A nivel mundial se estima que un tercio de toda la comida se desperdicia. Esta relación es aún mayor en el caso de la pesca y la acuicultura, en donde se calcula que el 70 % de los recursos acuáticos terminan como subproductos y se utilizan para fines de poco valor, como la alimentación animal, o directamente se eliminan.
(f) (y) (in)	El objetivo del proyecto <u>WaSeaBi</u> es promover un <b>uso más racional</b> de los recursos acuáticos, mediante productos y soluciones que incluyen, entre otros, el desarrollo de tecnologías de clasificación, soluciones de almacenamiento y herramientas de decisión que aseguren un sistema de suministro eficiente y sostenible para las bio- industrias, así como nuevos procesos de valorización de biomoléculas de origen marino. Pero todos estos desarrollos tienen que superar un último filtro: el del mercado y las personas consumidoras.

### Example Tweet @azti\_brta and @sostenibilidad:



News on facebook:



