



Deliverable Report

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Objective: The objective of this Deliverable was to generate a list of ideas for new product development. A combination of the market perceptions (*D28.1 Report with results of focus groups with consumers and experts regarding ideas for new products*), the technical limitations and the economical prospects efficiencies (*i.e.*, within a socio-techno-economic study), was used to generate a pool of ideas about potential products. Within this report the perspectives of scientists from different scientific areas were included in order to justify feasibility for potential products. The results of this report will be used together with *D28.3 Report on product and process solutions for each species based on technological, physical and sensory characteristics* to generate the actual physical products (*D28.4 Physical prototypes of new products from the selected species meagre, greater amberjack, wreckfish, pikeperch and grey mullet*), *i.e.* to process the fish.

Description: Deliverable 28.2 includes the methodology used for the screening of the ideas generated in D28.1, the criteria used in the screening process along with their justification, the screening process of the concepts, the final ranking and analysis of the selected concepts. Moreover, suggestions are presented for the feasibility of each product concept with respect to the available fish species and the diversification of ideas of D28.1 to generate a pool of ideas about potential products.



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1. Introduction

1.1. Background theory

Opportunity identification is crucial for a successful and cost effective new product development process. Such a practice is placed on the initial step of new product development and is constituted by two basic steps, generation of new product concepts and screening of those concepts (Rochford, 1991).

The first step, generation of product ideas for new product development, can be realised with a multitude of methods. Each of the used methods has its strengths and weaknesses. Focus groups are among the ten most common methods used for incorporating the consumer voice into new product development (Van Kleef et al., 2005). According to Van Kleef et al. (2005), new product development techniques can be considered as either product-driven or need-driven, with respect to the source of information that is used. Since in focus groups consumer needs are usually elicited using familiar stimuli, they are placed mainly in the product-driven category. Focus group methods can be used to create incremental new products (product repositioning or updating versions of existing products) for the optimization of existing products, which implement current consumer needs or desires.

Such a practice is important for companies, since it can give insights into how to keep up in with competitors and remain cost-efficient. Still, the limitation of focus groups lies in the fact that idea generation takes place within an existing framework of what is currently available on the market, since consumers' needs are elicited with familiar stimuli, and unfulfilled needs are left unanalysed.

Therefore, implementation of further steps in idea generation, such as the evaluation of the developed ideas by product development experts, can be proven really useful, since relying completely on focus group methods involves a risk of generating only "me too" ideas, which may not excite the consumers (Van Kleef et al., 2005). Experts can give insights concerning the potential success of the developed idea and give suggestions on how to enhance them, identify possible weak points and provide solutions regarding them.

The second step involves the screening process, with the purpose of identifying out of a large list of ideas those that are most likely to succeed and, therefore, should be undertaken to more expensive and extensive analysis (Rochford, 1991). The recommended approach for screening is a multistage screening process (Hamilton, 1974; Buijs, 1979; Cooper, 1983); firstly a coarser screen of the input collected in the generation of new product ideas step should be performed. Then, following the coarser screening, an evaluation of the remaining ideas with a finer screen should be performed. Qualitative methods are employed usually in the primary screening steps, while quantitative methods are employed during the later, finer screening steps (Rochford, 1991).

1.2. Overall objective

The overall objectives of this deliverable included:

1. Screening of ideas presented in *D28.1 Report with results of focus groups and experts regarding ideas for new products*, based on the market data of WP27 and Task 28.1, and using technical, economic and market assessment criteria, among others.
2. Generation of a pool of ideas for new product development, including feasible ideas delivered by D28.1, as well as newly generated ideas developed with respect to market perceptions (D28.1), technical limitations and economical prospect efficiencies (WP27).
3. Analysis of idea concepts regarding their strengths, limitations, competitiveness and the market/consumer segments they should be aimed at. Within the analysis, an evaluation of the feasibility of applying the developed concepts to DIVERSIFY fish species is given. Throughout the process, the ability of ideas to attract consumer demand and generate cash flow is emphasized, given that the objective is to boost the competitiveness of the aquaculture sector in terms of products and market.



2. Description of the methodology

Deliverable 28.1 consisted the basis for new product development by creating a primary list of concepts for new fish products (**Table 1**); idea generation for creating new product concepts was achieved within D28.1 by qualitative research with focus groups, of a semi-structured nature and interviews with experts in selected countries (UK, D, ES, F, I). The detailed methodology and results from this process were given in D28.1.

Moreover, additional ideas for new product concepts were generated, within the frame of the present deliverable, combining information of the market perceptions (D28.1), the technical limitations and the economical prospect efficiencies, which were included in the socio-techno-economic study of WP27.

For the screening process of concepts generated within D28.1 as well as D28.2 a quantitative screening (rating on a scale of 1 to 7) was conducted in the frames of the present deliverable. In order to perform the quantitative screening of this deliverable, a list of screening criteria that consisted the basis for concepts rating, was formulated independently to the idea generation process. To overcome the subjectivity, which lies in certain screening methods experts of different fields involved in the WP28 of DOW rated all concepts in the criteria corresponding to their expertise.

Finally, in order to create a list of feasible and potentially successful product concepts to be forwarded to later product development stages, concepts were ranked according to their total rating scores. Top rated concepts represent those who are deemed as having more potential of being successful in the market place, while the opposite applies for concepts that are found in the lower ranking places.

To provide valuable information for new product development and marketing, concepts were grouped according to their similarities, and a concept was analyzed in depth on a separate chapter to create an example of each group's characteristics. Moreover, a chapter of the current report was dedicated to the technical characteristics of DIVERSIFY fish species in order to explain and justify the suggested combinations between concepts and species.

2.1. New product concepts

Herein, the list of new product concepts is given (**Table 1**). The list includes product concepts derived by focus groups, which were conducted within the frames of D28.1, as well as their concept analysis, which is presented herein unaltered for the facilitation of the readers. Moreover, additional new product concepts generated within this deliverable are included in the list along with their concept analysis.

The additional product ideas were generated based on specific principles: 1. Using product ideas derived from D28.1, to generate new ideas that overcome weak points suggested therein by the experts of 28.1, 2. Using other existing products in the fish or meat market, and trying to assimilate the new fish species by adjusting their technical potentials to these products, and 3. Considering consumer needs and opinions for fish products and attempting to generate new products that potentially cover these needs.

The rationale behind generating additional concepts was to enhance the number of potential new product solutions for exploration, since generation of a significant number of ideas is crucial for a successful new product development (Rochford, 1991). Generation of concepts in D28.1 was based on “external sources of ideas”, since it used focus groups elicited information which is invaluable since it reveals abstract consumer needs and values, which determine consumer choice behaviour (Rochford, 1991). Taking advantage of this information, additional ideas can be created and translated into product design.

This led to the use of “internal sources of ideas” for the generation of new product concepts within this deliverable (Rochford, 1991). Keeping in mind the consumer insights provided by the focus groups, the evaluation of the feasibility of those ideas by the experts (D28.1), the available fish species as well as the market insights of WP27, additional ideas were generated by DIVERSIFY scientists that drafted this deliverable in order to provide a pool of alternative concepts for new product development.



Table 1: List of ideas and their concept's analysis; a short title and the origin of idea generation are given on the first column: focus groups derived concepts generated within D28.1 are marked with a FG next to the short title while additional concepts generated within D28.2 are marked with an AC next to the short title. In the second column a detailed analysis of the product is provided.

Title	Analysis of concepts
Idea 1: Frozen fish fillets with different recipes; AC	Frozen fish fillets divided in double portions; each packaging includes three or four 2-person portions from the same or different fish species packaged separately. The product is environmentally sustainable (containing ASC label). It is labelled as a premium product; the country of origin is EU. The product is included in transparent vacuum packed bags (one for each 2-persons' portion) made of recyclable material where fish fillets are laid; each bag can be divided easily from the other; each 2-portion bag has a different recipe from the others within the same package; a picture of the prepared dish is included on each 2-portion bag. It is created, based on the frozen fish fillet (D28.1) by removing seasoning or marinating but adding different fillets and recipes to create added value. The aim is to make it more attractive to traditional consumer that likes to be involved in cooking and to allow a longer shelf life.
Idea 2: Thin smoked fillets; AC	Fresh thin smoked fillets from the same (or different) fish species, which can be used as a starter or incorporated within a sandwich/salad. The product is sustainably produced (containing ASC label). It is labelled as a premium product; the country of origin is EU. The packaging is a plastic tray where the fillets are laid covered with a transparent plastic, which allows visibility of the fillets and vacuum pack or Modified Atmosphere (MAP) is used for shelf life prolongation. Ideas concerning the different uses of the fillets are included on the product's sleeve. This idea tries to assimilate classic smoked fillet products with the need of consumer for convenience.
Idea 3: Ready to eat meal: fish soup; AC	Fresh ready to eat fish soup made according to a traditional recipe; soup is accompanied by pieces of steam cooked fish provided separately within package. The product does not include additives. It can be heated easily on stove or microwave. The product is environmentally sustainable (containing ASC label). It is labelled as a premium product; the country of origin is EU. The soup (which contains broth) is provided in plastic cup which is sealed using modified atmosphere packaging (MAP); the fish pieces are provided on a separate transparent accompaniment (modified atmosphere/ vacuum packed), to allow product visibility, and placed over the soup cup; the packaging has the picture of the ready to eat meal on it. Ready to eat meals are generated in an attempt of improving / changing the idea 8 from D28.1 by creating other ready to eat meals utilizing fish without having the weaknesses pointed out by the experts in the aforementioned deliverable.
Idea 4: Ready to eat meal: salad with fish; AC	Fresh ready to eat salad, which includes fish as well as an accompanying sauce; fish and sauce are separately packed and included within the original package. The fish included is either a smoked fillet (provided in slices), or vinegar-cooked, or alternatively bottarga; thus, the dish can be eaten cold. The product is produced in an environmentally sustainable way (containing ASC label). It is labelled as a premium product; the country of origin is EU. The packaging (MAP) is composed by bowl where the salad is placed; The fish pieces and the sauce are provided in separate transparent accompanying packages incorporated with the original bowl package. A transparent lid exists on the top to allow product visibility and the packaging has the picture of the ready meal on it. Ready to eat meals are generated in an attempt of improving / changing idea 8 from D28.1 by creating other ready to eat meals utilizing fish without having the weaknesses pointed out by the experts in the aforementioned deliverable.
Idea 5: Ready to eat meal: fish risotto; AC	Risotto with vegetables accompanied by fish sauce with whole fish pieces. The pieces included in the sauce can be fish of different preparation methods such as cooked/ fried/steamed/ smoked, or pieces of bottarga that are not used as a separate product since they are not intact. The product does not include additives and can be heated easily on



	<p>stove or microwave. The product is sustainably produced (containing ASC label). It is labelled as a premium product; the country of origin is EU. The packaging (MAP) is composed by bowl where the risotto is placed; The sauce with fish pieces is provided in separate transparent accompaniment incorporated with the original bowl package. A transparent lid exists on the top to allow product visibility and the packaging has the picture of the ready meal on it. Ready to eat meals are generated in an attempt of improving / changing idea 8 from D28.1 by creating other ready to eat meals utilizing fish without having the weaknesses pointed out by the experts in the aforementioned deliverable.</p>
Idea 6: Fish burgers shaped as fish; AC	<p>Frozen fish burgers shaped as fish. The burgers are ready to cook and prepared with a mild seasoning and can be incorporated in a sandwich or prepared as a part of a meal. Among the advantages of this product is the absence of bones and the attractive shape for children. The product is produced in an environmentally sustainable way (containing ASC label). It is labelled as a premium product; the country of origin is EU. The product is included in a transparent vacuum-packed bag or in a plastic tray with transparent plastic on the top. Information on fish for educative purposes (children) and playful gifts (e.g. sticker) are included in the packaging. This idea was based on the idea of fish sausages and hamburgers that were discarded in D28.1 (not successful), by trying to improve its weaknesses. The comments of “good for kids”, but “not new” provided by the experts of D28.1, were used to improve the initial idea.</p>
Idea 7: Fish balls; AC	<p>Frozen fish balls which are ready to cook and can be prepared in various ways (frying/ oven/ etc.). The product is already seasoned, has no bones and can be used as a part of a meal. The product is environmentally sustainable (containing ASC label). It is labelled as a premium product; the country of origin is EU. The product is included in a transparent vacuum-packed bag or in a plastic tray with transparent plastic on the top. Recipes for dishes containing the fish balls are included in the packaging. This idea was based on the idea of fish sausages and hamburgers that were discarded in D28.1 (not successful), by trying to improve its weaknesses.</p>
Idea 8: Dried fish sticks with accompanying dip; AC	<p>Sticks that are made from dried fish, which are seasoned and are accompanied by a dip (vegetable dip etc.). The product is ready to eat and does not need any heating. The product is produced in an environmentally sustainable way (containing ASC label). It is labelled as a premium product; the country of origin is EU. The dried fish sticks are included in a long plastic cup; within the packaging in the upper part of the cup a compartment for the dip is included. For the preservation of both dip and sticks MAP is used; dip and steaks open using a different seal. Existing traditional products in oriental fish market was the initiation for this idea. Not something similar has been provided by the focus groups.</p>
Idea 9: Fish pate/spreads; AC	<p>Fish pate/ spreads prepared using different recipes. Can be used as starter or incorporated in a sandwich. The product is sustainably produced (containing ASC label). It is labelled as a premium product; the country of origin is EU. The product is included in a tube to facilitate use, extraction of right amount of product as well as prolong shelf life (only outer part of the product will come in contact with air in each use). This idea was an attempt to utilize raw materials that are considered of less value or losses to create added value. Consumer convenience and existence of similar non-fish products were considered. Not something similar has been provided by the focus groups.</p>
Idea 10: Fish broth in cubes; AC	<p>Frozen fish broth cubes to be used in cooking, in order to enhance the flavour of food. The product is sustainably produced (containing ASC label). It is labelled as a premium product; the country of origin is EU. The packaging resembles a plastic ice cube tray where the frozen broth is divided; on the packaging there are suggestions on the number of cubes needed for preparing specific food portions is provided. This idea was an attempt to utilize raw materials that are considered of less value or losses to create added value. The liquid fish (idea 3 of D28.1) was the concept of perceiving this idea, but not as a fresh product (to improve shelf life) and not as a drinkable product that was considered</p>



	as a bad idea by some of the D28.1 experts.
Idea 11: Fish powder/ seasoning; AC	Fish powder created by freeze-dried fish, which can be used instead of a broth or as seasoning in various dishes. The product can include only fish powder or fish powder can be combined with spices and/ or powder of freeze-dried vegetables to enhance the seasoning. The product is sustainably produced (containing ASC label). It is labelled as a premium product; the country of origin is EU. The packaging resembles the ones used for selling spices. This idea was an attempt to utilize raw materials that are considered of less value or losses to create added value. Not something similar has been provided by the focus groups.
Idea 12: Fish sauces; AC	Fresh-chilled fish sauces prepared with different traditional recipes. The product can be easily prepared in a microwave or stove. The product is environmentally sustainable (containing ASC label). It is labelled as a premium product; the country of origin is EU. The product is included in small vacuum packed plastic bags with easy opening when the product is sold in individual portions or in big plastic bags with a plastic mouth (to facilitate the extraction of the product) when sold in bigger portions. On the packaging uses of the product are recommended. This idea was an attempt to utilize raw materials that are considered of less value or losses to create added value. The successful existence of similar non-fish sauces in the market was the initial idea. Not something similar has been provided by the focus groups.
Idea 13: Frozen fish fillet that is seasoned or marinated; FG	Frozen fish fillet that is seasoned or marinated either traditional, Italian, Provence or Asian. The product is environmentally sustainable (containing ASC label). It is labelled as a premium product; the country of origin is EU. The product is in a sliding packaging, transparent vacuum-packed bag made of recyclable material, with clear pictures of the unfrozen product on the cardboard sleeve.
Idea 14: Fresh fish fillet with herbs and spices ; FG	Fresh fish fillet covered with herbs and spices in the transparent packaging. Different fillet size in the packaging conveying the product message through images and voice: 'For him – Fish for the triathletes'; 'For her – vacation in Provence'. The product is environmentally sustainable (containing ASC label). It is labelled as a premium product; the country of origin is EU.
Idea 15: Whole deep frozen fish; FG	Whole deep frozen fish, cleaned and easy to prepare in the transparent and clear recyclable packaging. Cooking suggestions on the package. Product message: 'Delicious slow food'; 'Pure and natural, straight and portionable, to satisfy different needs. The product is environmentally sustainable (containing ASC label). It is labelled as a premium product; the country of origin is EU.
Idea 16: Frozen whole fish filled with spices and with organic vegetables; FG	Frozen or fresh whole fish filled with spices and with organic vegetables containing no artificial aromas. Transparent, well-sealed and sliding recyclable packaging. The product is environmentally sustainable (containing ASC label). It is labelled as a premium product; the country of origin is EU.
Idea 17: Fresh whole fish filled with spices and with organic vegetables; FG	Fresh whole fish filled with spices and with organic vegetables containing no artificial aromas. Transparent, well-sealed and sliding recyclable packaging. The product is environmentally sustainable (containing ASC label). It is labelled as a premium product; the country of origin is EU.
Idea 18: Frozen fish fillet with potatoes and vegetables; FG	Frozen fish fillet with potatoes and vegetables ready to cook in the oven. Deluxe sliding packaging with visible product and instructions on preparation method. The product is produced environmentally sustainable (containing ASC label). Product message: 'Fish that gives good feeling of life'; 'Mom knows best'.



Idea 19: Deep frozen white fish fillet in the transparent packaging with additional information; FG	Deep frozen white fish fillet in the transparent packaging with additional information and suggestions on product serving and preparation. The product is environmentally sustainable (containing ASC label). It is labelled as a premium product; the country of origin is EU. Product message: 'Informed and enlightened'.
Idea 20: Fresh back fish fillet; FG	Fresh back fish fillet that looks like a roast in tray or bag that can be prepared in an oven or barbecue. This fish is accompanied with dips, sauces and dressings. The product is environmentally sustainable (containing ASC label). It is labelled as a premium product, the country of origin is EU. The packaging is transparent bag or a tray where fish is laid and covered with transparent plastic. Product message: 'Perfect roast lunch, but fish not meat'.
Idea 21: Fresh fish fillet with different 'healthy' seasoning and marinades; FG	Fresh fish fillet with different 'healthy' seasoning and marinades separately packed that consumer can choose and vary depending on the occasion. This product is sold with recommendation for the appropriate vegetables and wine to accompany the dish. Product message: 'Not two same dishes in a row; 'You have it ready for you, healthy but still have the hectic lifestyle.' It is labelled as a premium product, the country of origin is EU.
Idea 22: Frozen fish and seafood salad; FG	Frozen fish and seafood salad in the tray packaging. Product message: 'Driving the new wave'; 'Voyage of new-discovery, experience contesting the taste'. The product is environmentally sustainable (containing ASC label). It is labelled as a premium product, the country of origin is EU.
Idea 23: Varied meal with fish fillet, burgers sausages; FG	Fresh fish fillet with fish burgers and sausages in the microwavable package, as a varied meal. It is labelled as a premium product, the country of origin is EU. Product message: 'To eat with partner, but also to share with friends.'
Idea 24: Fresh fish Carpaccio; FG	Fresh fish Carpaccio ready to eat on the fancy (posh) tray with transparent lid and with dips, sauces and salad accompanying the product. The product is environmentally sustainable (containing ASC label). It is labelled as a premium product; the country of origin is EU.
Idea 25: Frozen back fish fillet in transparent packaging and accompanying marinades; FG	Frozen back fish fillet visually appealing with transparent packaging and accompanying marinades and serving suggestions on the package. The product is environmentally sustainable (containing ASC label). It is labelled as a premium product; the country of origin is EU. Product message through the image: 'Person morphing into a fish' and voice: 'Streamed and healthy living'.
Idea 26: Fresh ready to eat meal with fish fillet with different cheese and fine herbs; FG	Fresh ready to eat meal with fish fillet with different cheese and fine herbs. The fish is seasoned. This product is pre-cooked and can be prepared in the microwave in 5 minutes. The product is environmentally sustainable (containing ASC label). It is labelled as a premium product; the country of origin is EU. The packaging is individual with transparent window and a lid on the top under which you can smell the product. Product message: 'Happiness can be complete.'
Idea 27: Fish sausages and fish hamburgers;	Fish sausages and fish hamburgers. The main advantage of this product is that the product has no bones. The seasoning is very mild and therefore this product is therefore suitable for children. The product is environmentally sustainable (containing ASC label).



FG	It is labelled as a premium product; the country of origin is EU. The packaging is transparent vacuum packed or in a plastic tray with transparent plastic on the top.
Idea 28: Liquid fish to make soups or drink; FG	Liquid fish to make soups or drink. Liquid fish for soups is in mashed form. These products are without additives and thus highly suitable for diabetic and vegetarian people. The product is environmentally sustainable (containing ASC label). It is labelled as a premium product; the country of origin is EU. The packaging for soups is tetra brick, while liquid fish for drinking is in the plastic bottle.
Idea 29: Fresh fish fillet medallions with garnish and sauce, separately packed; FG	Fresh fish fillet sliced in the forms of medallions complemented with garnish and sauce, separately packed. Product is packed in vacuum plastic package with the plastic tray that can be easily open and used in the microwave. Package contains information on ω -3 fatty acids and cooking instructions. The product is environmentally sustainable (containing ASC label). It is labelled as a premium product; the country of origin is EU. Product message: 'Totally clean, without bones and pre-sliced'.
Idea 30: Ready-made fish tartar with additional soy sauce ; FG	Ready-made fish tartar with additional soy sauce for cold serving. Packaging is the golden tray that reflects the colors and physical appearance of the product and that could also be used for serving. Package contains information how the product was made. The product is environmentally sustainable (containing ASC label). It is labelled as a premium product; the country of origin is EU.
Idea 31: Whole fresh fish with information how to be prepared; FG	Whole fresh fish with information how to be prepared. Co-creation of a product with the consumer. Product can be sold in the fresh fish department or vacuum packed. Product message: 'After knowing the fish in the sea and learning how to cook it, fish doesn't seem so bad!' The product is environmentally sustainable (containing ASC label). It is labelled as a premium product; the country of origin is EU
Idea 32: Bread crusted crispy frozen fish product with a topping; FG	Bread crusted crispy frozen fish product with a topping of vegetables and sauce made by the traditional recipe. This fish product is medium seasoned and easy to prepare in the oven or the microwave in the original packaging. The product is environmentally sustainable (containing ASC label). It is labelled as a premium product; the country of origin is EU. The packaging is a tray with transparent lid where image of the ready dish is presented.
Idea 33: Ready- made fish fillets in olive oil; FG	Ready-made fish fillets stored in olive oil with visible glass packaging. Product message: 'Tradition'. It is labelled as a premium product; the country of origin is EU.
Idea 34: Fresh fish steak for grilling in the pan; FG	Fresh fish steak for grilling in the pan. Transparent packaging. The product is environmentally sustainable (containing ASC label). It is labelled as a premium product; the country of origin is EU.
Idea 35: Steamed fish fillets; FG	Steamed fish fillets stored in the glass jar and seasoned with herbs. It is labelled as a premium product; the country of origin is EU.
Idea 36: Ready-made larger pieces of fish without bones; FG	Ready-made larger pieces of fish without bones packaged in the jar or a can that could be used on pasta. The product is produced environmentally sustainable (containing ASC label). It is labelled as a premium product; the country of origin is EU.
Idea 37: Fresh fish fillet in a simple package; FG	Fresh fish fillet in a simple package that transmits lightness and freshness of the product. The product is environmentally sustainable (containing ASC label). It is labelled as a premium product; the country of origin is EU.
Idea 38:	Fresh fish Carpaccio that can be used as starter for a hot meal or as sandwich filling. This



Fresh fish Carpaccio 2; FG	Carpaccio will be seasoned with ginger and chilli and presented as scales of the fish. The product is environmentally sustainable (containing ASC label). It is labelled as a premium product; the country of origin is EU. The packaging is a plate that looks like a round box with the compartments and transparent wheel on the top that you can turn to rich different sections.
Idea 39: Bottarga sliced as medallions; FG	Bottarga made of grey mullet and sliced like medallions. Bottarga is a Mediterranean delicacy of salted, cured fish roe, typically from grey mullet or tuna. The product is similar to the softer cured mullet roe, karasumi from Japan and East Asia. The product is environmentally sustainable (containing ASC label). It is labelled as a premium product; the country of origin is EU. The packaging is a tray with the transparent film on the top and product can be served in the same tray.
Idea 40: Fresh fish fillet sliced presented in the shape imitating of fish scales; FG	Fresh fish fillet sliced with slices presented in the shape of fish imitating scales, reflecting freshness and luxury. Product is packed in a tray with the sauces on the side in the separate compartment and transparent lid. Product message: 'Fish in all versions.' The product is environmentally sustainable (containing ASC label). It is labelled as a premium product; the country of origin is EU.
Idea 41: Ready-made fish fillet / fish dices accompanied with cereals and vegetables; FG	Ready-made fish fillet or fish dices that could be combined with original recipes and accompanied with cereals and vegetables. Package is A4 cardboard tray - meal with transparent lid and with fork, bread and complete salad. Product message: 'Healthy, complete, quick and good.' The product is environmentally sustainable (containing ASC label). It is labelled as a premium product; the country of origin is EU.
Idea 42: Fresh fish roast ; FG	Fresh fish roast presented as a 'meat roast' in the tray with the transparent lid that could be used in the oven. Package comes with different recipes from the fishmonger. Product message: 'Daily meal of the Fish monger'. The product is environmentally sustainable (containing ASC label). It is labelled as a premium product; the country of origin is EU.
Idea 43: Fresh fish fillet that comes with 3-day plan; FG	Fresh fish fillet that comes with 3-day plan of the meals in the transparent packaging and placed on the tray. Recipes for warm and cold dishes come from the famous 'chefs' with the picture of the final product on the package. Product message: Discover Chef's recipes- with the chef my food is always a success like in the restaurant'. The product is environmentally sustainable (containing ASC label). It is labelled as a premium product; the country of origin is EU.

2.2. Development of screening criteria

The first step for performing a finer screening of ideas was to develop a list of respective criteria. These criteria were used for the evaluation of the concepts derived from focus groups ideas (D28.1), as well as the ones developed within the present D28.2.

The criteria were carefully formulated, independently from the idea generation process (which took place within 28.1) and reflected the objective of the task (to boost the competitiveness of the sector in terms of product and market), the limits of the screening process (available information, timeframe, etc.), as well as new product success factors identified at this stage of new product development (WP27). In specific, technical, economic and market assessment criteria, among others, were developed to identify the ideas, which will have the ability to attract consumer demand and generate cash flow for the industry.

The argumentation for including each screening criterion is given in the following paragraphs. The main source for the selection of the criteria was the work conducted in WP27 (regarding current market trends, market success factors, consumer wants, etc.) as well as technical criteria regarding products feasibility.



1. Nutritional benefit: Nutritional value may alter subject to processing (e.g. thermal processing may result to alterations in nutritional value like destruction of heat-sensitive nutrients). Nutritional benefit is a strong consumption criterion for consumers especially regarding fish, since it is scientifically supported and therefore used as a strong marketing aspect.

2. Healthiness: Turn in healthy food reflects a current trend in food consumption; Healthiness of consumed food was included since it resides among the current European trends in animal protein consumption as shown in trend mapping (D27.4 in pp. 9, 10 and 15). Healthiness as a trend incorporates notions such as low-calorie, low-saturated fat (rich in polyunsaturated), rich in vitamins, alleged health-protecting or health-promoting properties, minimum additives, etc. Therefore the concepts were rated with respect to how consumers will evaluate the healthiness of a product as well as the amount of product aspects that can be used for marketing this product as healthy. Healthiness and nutritional value were included as separate criteria, since the former can be connected to several factors, such as product processing, additives used, preservatives, cooking method required, etc., while the latter is defined by the nutritional benefit of the product.

Convenience: with respect to convenience, it was underlined throughout all reports within WP27 that is a current consumer need in the majority of the aimed countries involved in DIVERSIFY. Therefore it was decided to further *segment this criterion to easy to cook (criterion 3) and ready-to-eat (criterion 4)*, this segmentation of convenience was also included within D27.1.

3. Convenience in preparation (easy-to-cook): One factor that can have a negative effect on the intention of buying a fish product is the complexity in preparing the respective dishes (e.g., deboning, scaling, gutting). Nowadays the majority of the consumers have less time to spend in preparing meals. Therefore, offering them a convenient product which requires short preparation time, while still allows them to be involved in the preparation process can create a market advantage over other competitive products.

4. Convenience in consumption (ready-to-eat): Creating a ready to eat product that can be consumed outside the household in different occasions by itself, or incorporated in existing meals (e.g. sandwiches, salads) can increase the existing market for fish and solve a real problem for the consumer who wants to retain a healthy diet even when there is no available time for cooking.

5. Cost for consumer (price): The final price of the product on the market (price for the consumer) is of utmost importance, according to WP27, for consumers' choice. More specifically, price lies among the 4 most important factors, which affect buying preferences in all aimed markets (UK, D, ES, F, I) (D27.5). Moreover, fish in general is considered an expensive commodity (when compared to most meat and plant foods). Therefore the price of the products must be retained in a reasonable level, in order to be competitive and successful towards similar products like unprocessed fish or processed meat products.

Technical feasibility: The timeframe as well as the resources for realising each product concept are limited. Thus, an important criterion for evaluating each product concept is the feasibility with respect to available equipment, raw materials and know-how; it is expected that research will be needed in order to realise each product still, the expectations should not be unrealistic since a lot of resources, and therefore money, and time could be spend on creating a product which may not succeed in the market place. Therefore technical feasibility is among the most common criteria industries use for evaluating a product in this stage of new product development (Rochford, 1991).

6. Technical feasibility (equipment & raw material): The right equipment for processing must be available or must be designed and created within the timeframe of the DIVERSIFY in order to ensure a stable and efficient production of the designed products. Thus, small commercial sizes may result into certain technical limitations in aspects of processing (e.g., a fish species with commercial sizes of <1 kg cannot be suitable for cuts). Besides, all the designed products must be based on a realistic commercial fish size (a fish size for which there is stability in production). If this is not the case, it could create bottlenecks and delays in the production process since the actual size of the raw material would differentiate from the designed one for the products.



7. *Technical feasibility (know-how):* While creating a new product, a very important thing to consider is the feasibility of production within the frames of current know-how, without the need of designing completely new and untested methods. Products based on completely novel methods of processing can be time consuming (depending on the method and extend of novelty), create uncertain results, or lead to increased overall production cost.

8. *Specific consumer targeting:* Specific consumer targeting is one of the key steps to successful designing of products. The designed products must reflect the needs and desires of the targeted group(s) in order to make them feel that the products fulfil their expectations and solve a real problem for them. The seafood market has a lot of potential for products that can be considered as delicacies or can target special groups of people with special requests (e.g., ethnic or religious minorities).

9. *Familiarity:* Fish consumption strongly differentiates based on the familiarity of consumers to certain species/products (unlike meat where market is universally more uniform). The experience with certain products and types of processing can affect final choice, since it is easier for a consumer to purchase products for which he understands the concept, the production method as well as certain flavour characteristics, rather than unfamiliar ones. Familiarity on some aspects of the product on the other hand, can help consumers to accept more easily a newly introduced product. Therefore, a balance between familiarity and innovativeness should exist.

10. *Newness/ innovativeness:* The effect of innovativeness of a newly developed product with respect to its impact on the market success is difficult to evaluate (Arts et al., 2011). Still, innovativeness is required when a product has to separate its place from competitive ones (become unique) and to excite the consumer. Moreover, innovative look of products was among the most important supplier selection criteria in the majority of the aimed markets (D27.5). Therefore a new product should differentiate itself from other available products of the same category. This differentiation could be expressed in different ways, such as concept behind the product, production process, flavour characteristics, etc. All in all, the buyer should feel that this product brings something new to the table and a balance must exist between the novelty in some aspects of the product and familiarity in some others.

11. *Existence of similar/competitive products:* Product competitiveness is among the prerequisites for market success (D27.6). This notion includes the level of existing competition (substitute products within the fish product category and similar products within the general protein source category), as well as the products advantage (the degree to which the newly developed product is perceived as being better than competitive ones). These are acknowledged as a prerequisite for success (Rogers, 2003; Arts et al., 2011). Thus, evaluating the level of competitiveness can reveal a lot of important information regarding the chances of success such as saturation of market or market gap, where a newly developed product can infiltrate. In this criterion, positive ratings (>4) are given to products that will have to face a low level of competition, while negative ratings (<4) are given to the products that will face a high level of competition in the market place.

12. *Shares characteristics of successful products:* Within D27.6 several successful or failed examples of introduction of new fish products in a market are given. Taking advantage of that information, and since the safest way to infiltrate a market is to replicate the characteristics of already successful products in the respective markets, a criterion of "shares characteristics of successful products" was included. In this criterion it will be examined if suggested products share certain qualities of already successful products on specific markets. Identifying those qualities and incorporating them on the product design could significantly increase the acceptance rate of the new product by consumers.

13. *Perceived consumer freshness:* In the majority of the targeted market, a consumer orientation towards fresh products was identified (D27.4). Thus, freshness is a key criterion in consumers' choice regarding a product and it was included within the screening factors for evaluating product success. Therefore, creating a product for which perceived freshness can be ensured, can create an advantage for the product in the targeted market. It is important to note that actual freshness of the product is not necessarily expressed within this criterion, but rather the impression a product gives to the consumers. Products of specific nature, i.e., high degree of processing, low similarity to initial raw material, deep-freezing or long-life preservation



methods such as canning, give low scores in perceived freshness. In highly perishable food products such as fish, safety issues are of great importance. Thus, creating processed fish products with a low risk of safety hazards was included as a criterion.

14. Safety: When designing a product, one should keep in mind that some types of raw materials, product formulations and processing can create safety issues. Prevention of safety threats in the manufacture and preparation of food products is essential for lowering the risk for consumers. Therefore safety principles should be timely applied in the development process. This will allow to identify potential food-safety incidences and options for effectively addressing those issues, since a number of products have specific nuances and characteristics that need to be addressed (*e.g.*, some ingredients are of a higher microbiological or allergen risk than alternatives).

15. Shelf life: When referring to highly perishable foods, as fish is by nature, anything beneficial in prolonging shelf life can be considered as a significant benefit for the consumer's option to maintain before consumption. Moreover increased shelf life can result to higher benefit for the industry, since it can decrease the waste (off-date products) and therefore the production cost.

16. Packaging: There are several functions a packaging should acquire; maintaining product quality, protection against environment, right portion sizes, convenience. Moreover packaging can act as a marketing tool. The evaluation of packaging function is based on how it covers the aforementioned criteria.

17. Added value: Since whole fresh fish are often marketed close to their actual production cost, the profit margin of the industry is low in these cases. Processing increases the added value, since the product can be marketed in a higher price, thus providing higher profits. Added-value is furthermore created by utilizing fish parts otherwise considered of low value, by-products or waste.

18. Attractiveness (Appearance/ presentation): Attractiveness of a product is a major criterion for consumer choice in the market. This factor can give an important advantage on the product over existing ones and play a significant role in the first contact of a consumer, before consumers have the chance to evaluate the actual taste of a product. Within the frames of the screening process, attractiveness ratings are based on how appealing are the concepts' intrinsic and extrinsic characteristics to a consumer.

19. Recipes: Within WP27 it was stated that "ignorance of how to prepare dishes containing fish" is one of the reasons for low fish consumption. Providing recipes with the packaging, besides potential induction of product acceptance by making cooking more convenient, will also educate the consumers on the subject. Therefore, the existence of variable recipes to offer versatility in choices is regarded as a positive aspect of a product. Moreover, a recipes criterion was included due to the fact that ignorance in preparing meals including fish seems to affect negatively the buying process.

With respect to the sustainability, it is a current market trend and an important acceptance factor within all countries questioned, as the trend mapping (D27.4 of DIVERSIFY, in pp. 10, 11, and 15) revealed. Still a sustainability criterion was not included here, since the evaluation of sustainability of concepts at this new product development stage is limited; product sustainability is connected to several factors, such as choice of species for the realization of the concepts, aquaculture practices regarding the selected species, etc.

2.3. Quantitative screening of concepts

A quantitative scoring method was selected for the screening of new product concepts. Scoring of 1-7 was used to rate each product concept on each of the developed criteria. The explanation of the meaning of the scores of the rating scale is given in **Table 3**.

Experts involved in WP 28 of DOW were called to evaluate and score the concepts on the developed criteria. In **Appendix 1** names and fields of expertise of the experts that participated in the screening are given. Experts scored only the criteria, which felt that corresponded to their expertise in the field. Thus, the average value of each criterion's score was calculated by summing up the individual scores given by the experts that



rated the criterion and dividing by the number of times the specific criterion was scored. The individual score sheets of each expert are given in **Appendix 2**.

Table 2: Rating values used in the new product concept screening along with their meaning

	Extremely bad	Really bad	Bad	Neutral	Good	Really good	Excellent
Rating scale	1	2	3	4	5	6	7

It should be underlined that the screening process is perhaps more important than its results; screening is used to evaluate the ideas' relevance, to highlight uncertainties and to identify potential limitations (Buijs, 1979; Rochford, 1991). Therefore emphasis should not be given in numerical accuracy of the screening process, but rather to the information it provides. The negative ratings (<4) are not used to reject the idea completely, but rather to indicate a weak point in the concept.

Therefore, the idea behind the scoring process was:

- To select the concepts that have good chances for success in the market place,
- To identify the weak points of each product concept.

Information on identified weaknesses of product concepts at this stage can be implemented in later stages of new product development process in order to resolve limitations and improve the developed products.

Moreover, ideas that seem to be discarded by the screening process can potentially be enhanced / improved with respect to their weaknesses and used as alternatives to be picked up when selected ideas are dropped or additional resources are made available.

2.4. Analysis of selected concepts

Within the aim of providing valuable information to new product development and marketing, concepts were grouped according to their similarities, and a concept was analysed in depth on a separate chapter to give an example of each group's characteristics. Example analysis is provided only for concepts belonging to the top 20 ranking positions, since they show the most chances for success in the market place. The aim of concepts analysis is to give an in-depth insight for each group of ideas and for each example analysis, the following points are discussed:

- the portfolio of the processed product, including analysis of the concept, as well as its intrinsic and extrinsic characteristics
- The current/future market for the concept, in terms of consumer and consumer segments. For dividing consumers into segments the consumer prototyping suggested by Linnemann et al. (1999) was followed. Consumers were grouped into seven prototypes according to Linnemann et al. (1999) (*environment-conscious; nature and animal-loving; health-conscious; convenience consumer; price-conscious consumer; hedonic consumer; variety seeking consumer*) to set clear targets for new food product development. These prototypes are no real consumers, but a typology of comparable behaviour expressed by various people at different times,
- the current/future market at which this concept is aimed, in terms of product and product functions,
- the current consumer trends to which the new product concept can be connected,
- the current/future competitive products (or product categories) of the developed product concept; benefits/weaknesses of competitive products,
- the consumption situation of the developed product idea, including reasons for consumption and frequency,
- the technical feasibility of the concept (equipment, raw material and know-how needed for realising the concept).



Moreover suggestions are given on:

- how to improve the concepts weaknesses,
- specific fish species suitable for realising the product concept,
- markets/countries, within the ones researched in the frame of the DIVERSIFY project, at which the product should be targeted (UK, France, Germany, Spain and Italy)..

The analysis is based on:

- the market data included in the deliverables D27.1, D27.2, D27.4, D27.5 and D27.6 of DIVERSIFY WP27,
- experts opinions per country regarding specific ideas generated by focus groups. Experts opinions were included in D28.1 (pp. 94-99); experts of different fields were presented with 8 representative ideas out of the total (ID20: Fresh back fish fillet; ID13: Frozen fish fillet that is seasoned or marinated; ID28: Liquid fish to make soups or drink; ID32: Bread crusted crispy frozen fish product with a topping; ID38: Fresh fish Carpaccio 2; ID39: Bottarga sliced like medallions; ID27: Fish sausages and fish hamburgers; ID26: Fresh ready to eat meal with fish fillet with different cheese and fine herbs) and were asked to provide their opinion on the success of each concept regarding the general goal of the project as well as evaluate them in terms of idea attractiveness, idea innovativeness, price, fish species for idea realization, distribution channels, technical feasibility of the idea and possible changes in product lines. Since, the majority of the information provided on these concepts applies to most of the concepts belonging to the same group this information will be used on the analysis of the group of concepts. For the facilitation of the readers a table including the overall opinions of experts regarding the aforementioned ideas is included in Appendix 3.
- consumer segmentation in the researched countries (UK, D, ES, F, I) towards attitudes concerning consumption of fish species, included in D29.2. More specifically, according to the results of this delivery consumers were segmented into 3 main categories: *involved traditional*, who are involved and knowledgeable about fish; *involved innovators*, who are involved and knowledgeable about fish as well as innovative when it comes to dealing with new fish; *ambiguous indifferent*, who are not involved or knowledgeable with respect to fish. Among these categories, *involved traditional* and *involved innovators* constitute the groups that have the highest number of regular fish consumers of farmed fish, while among *ambiguous indifferent* the majority is occasional non-fish consumers (of all fish types),
- own knowledge and literature research.



3. Results of the screening process

3.1. Total results of the screening process

For the screening process of concepts generated within D28.1 as well as D28.2, a quantitative screening (rating on a scale of 1 to 7) was conducted. The ideas were rated on a scale of 1-7. The point of the screening was to identify possible weaknesses in the concepts as well as identify any concepts that do not have a good chance for success or have a lot of weak points and therefore will need a lot of research to become feasible. To overcome the subjectivity, which lies in certain screening methods experts of different fields involved in the WP28 of DOW rated all concepts in the criteria corresponding to their expertise. The total results of the screening process are given on **Table 3**,

Table 4, Table 5, Table 6 & Table 7. Analytical results of each expert that participated in the screening process are provided in Appendix 2 while information about the number of experts, country of origin as well as the questionnaire used to gather the data is included in Appendix 1.

Table 3: The analytical screening process of concepts 1-10 is presented; each of the product concepts are rated using the same screening criteria; a scale of 1-7 (1, 2, 3=negative scoring, 4=average scoring, 5, 6, 7=positive scoring) is used to evaluate the success of a concept with respect to each criterion. The total score each concept acquired (sum of the scores acquired on all criteria) is included at the end on the table.

Criteria	ID1	ID2	ID3	ID4	ID5	ID6	ID7	ID8	ID9	ID10
1. Nutritional benefit / value	5,3	5,0	5,0	6,3	4,7	5,0	4,8	4,7	4,8	5,0
2. Healthiness	5,3	4,3	5,3	6,5	5,7	5,0	5,3	4,8	5,0	5,3
3. Convenience in preparation (easy to cook)	5,6	6,6	6,8	6,8	6,8	5,8	6,0	7,0	6,8	6,4
4. Convenience for consumption (ready to eat)	4,4	5,8	6,4	6,8	6,6	5,2	5,0	7,0	6,6	4,0
5. Cost for consumer (price)	4,8	3,8	3,3	3,3	3,3	4,0	5,0	4,5	5,5	5,8
6. Technical feasibility (equipment & raw material)	6,5	6,0	5,5	6,0	6,0	5,0	6,5	3,5	6,0	5,5
7. Technical feasibility (know-how)	6,5	5,5	5,0	5,5	5,0	5,5	5,5	4,0	5,0	5,5
8. Specific consumer targeting	4,6	5,0	5,0	5,0	4,8	6,2	5,0	5,4	5,2	5,2
9. Familiarity	6,0	5,8	5,0	5,0	5,5	5,5	5,5	4,8	4,8	4,0
10. Newness/innovativeness	3,6	5,0	5,6	5,4	5,2	5,0	4,4	6,0	5,8	5,8
11. Existence of similar products/ Competitors	3,7	4,3	5,0	4,8	4,8	5,5	4,3	5,3	4,3	5,0
12. Shares characteristics of successful products	5,5	5,5	4,7	4,8	4,5	5,5	4,8	4,0	5,0	5,3
13. Perceived consumer freshness	4,8	5,4	4,4	5,0	4,4	4,2	4,4	3,8	3,2	2,6
14. Safety	6,3	6,0	4,3	4,7	4,7	5,3	5,0	6,0	5,3	5,3
15. Shelf life	6,0	5,8	4,5	4,0	4,3	5,0	5,0	6,3	6,3	5,8
16. Packaging	6,0	5,6	6,0	5,6	5,8	5,8	5,4	5,8	5,8	4,6
17. Added value	5,0	5,2	5,6	6,0	6,0	5,8	5,6	5,0	5,8	5,8
18. Attractiveness (Appearance/ presentation)	5,6	6,2	4,8	6,0	5,8	6,0	4,6	5,6	4,2	3,6
19. Recipes (versatility / packaging)	6,8	5,6	3,2	3,4	3,2	5,4	5,8	3,2	4,6	5,2
Total	102,2	102,2	95,3	100,7	96,9	100,7	97,7	96,6	99,9	95,7



Table 4: The analytical screening process of concepts 11-20 is presented; each of the product concepts are rated using the same screening criteria; a scale of 1-7 (1, 2, 3=negative scoring, 4=average scoring, 5, 6, 7= positive scoring) is used to evaluate the success of a concept with respect to each criterion. The total score each concept acquired (sum of the scores acquired on all criteria) is included at the end on the table.

Criteria	ID11	ID12	ID13	ID14	ID15	ID16	ID17	ID18	ID19	ID20
1. Nutritional benefit / value	5,0	4,3	5,8	6,8	6,0	6,0	6,5	5,5	5,8	6,8
2. Healthiness	5,7	4,3	5,8	6,5	6,3	6,3	6,3	6,0	5,8	6,3
3. Convenience in preparation (easy to cook)	6,4	5,8	5,0	5,4	3,8	4,2	5,2	5,2	4,4	5,2
4. Convenience for consumption (ready to eat)	4,0	5,8	5,0	5,0	3,4	4,0	4,4	5,0	4,2	4,8
5. Cost for consumer (price)	6,3	5,3	4,8	3,3	5,3	4,5	3,8	4,5	5,3	2,8
6. Technical feasibility (equipment & raw material)	5,0	6,0	6,5	6,5	6,5	5,0	6,5	6,0	6,5	6,5
7. Technical feasibility (know-how)	5,5	5,5	5,5	7,0	6,5	3,0	3,5	4,0	6,5	6,5
8. Specific consumer targeting	5,4	5,0	5,0	5,8	4,0	4,2	4,8	5,0	3,8	5,6
9. Familiarity	3,0	4,8	5,5	5,8	6,3	4,5	5,3	5,5	6,3	5,5
10. Newness/innovativeness	6,4	5,8	4,0	4,4	2,8	4,4	4,6	4,4	3,2	4,4
11. Existence of similar products/ Competitors	4,5	4,0	4,0	3,8	3,3	5,0	5,0	4,8	4,8	4,5
12. Shares characteristics of successful products	3,8	4,5	5,3	6,0	5,5	4,3	5,0	4,3	5,5	5,5
13. Perceived consumer freshness	2,6	3,4	5,0	6,8	5,6	4,8	6,6	5,0	4,6	6,4
14. Safety	6,0	4,3	6,0	5,3	6,3	5,7	5,0	6,0	6,3	4,7
15. Shelf life	6,8	5,0	6,0	4,8	6,8	6,3	4,0	6,3	6,5	4,3
16. Packaging	4,4	5,4	5,4	5,6	5,6	5,2	5,2	5,8	5,8	6,2
17. Added value	5,6	5,8	5,0	5,2	5,4	5,8	5,6	5,8	5,2	5,4
18. Attractiveness (Appearance/ presentation)	4,4	4,8	5,6	6,2	5,4	5,0	6,4	6,0	5,4	6,4
19. Recipes (versatility / packaging)	5,6	5,4	5,6	5,8	5,4	5,2	5,6	5,4	6,0	5,6
Total	96,2	95,2	100,6	105,8	100,0	93,2	99,2	100,4	101,7	103,2



Table 5: The analytical screening process of concepts 21-30 is presented; each of the product concepts are rated using the same screening criteria; a scale of 1-7 (1, 2, 3=negative scoring, 4=average scoring, 5, 6, 7= positive scoring) is used to evaluate the success of a concept with respect to each criterion. The total score each concept acquired (sum of the scores acquired on all criteria) is included at the end on the table.

Criteria	ID21	ID22	ID23	ID24	ID25	ID26	ID27	ID28	ID29	ID30
1. Nutritional benefit / value	6,8	5,3	5,3	6,3	5,8	5,3	4,8	5,5	6,0	5,8
2. Healthiness	6,8	5,3	5,0	6,3	5,5	3,7	4,5	6,3	6,3	5,8
3. Convenience in preparation (easy to cook)	5,4	5,2	5,8	6,6	5,4	6,6	5,7	6,0	6,0	6,8
4. Convenience for consumption (ready to eat)	4,8	5,2	5,4	6,8	5,4	6,6	4,8	5,8	6,0	7,0
5. Cost for consumer (price)	3,0	3,8	3,8	2,5	4,8	3,0	5,0	4,8	3,5	3,0
6. Technical feasibility (equipment & raw material)	6,5	6,5	3,5	7,0	6,5	3,5	7,0	6,0	6,5	6,0
7. Technical feasibility (know-how)	6,5	5,5	4,0	6,5	6,5	3,5	6,0	6,0	6,5	6,0
8. Specific consumer targeting	5,2	4,4	5,4	5,6	4,6	5,0	5,8	6,4	5,2	5,8
9. Familiarity	5,8	5,3	3,5	4,5	5,5	3,3	5,5	2,5	4,8	4,0
10. Newness/innovativeness	4,4	4,6	5,8	5,6	3,6	5,4	3,8	6,4	5,8	6,2
11. Existence of similar products/ Competitors	4,8	4,0	4,0	4,0	4,0	3,5	4,3	3,3	3,3	4,3
12. Shares characteristics of successful products	5,5	4,5	3,3	3,8	5,3	3,8	4,8	3,0	4,5	3,8
13. Perceived consumer freshness	6,6	4,6	4,6	6,2	5,0	4,4	3,8	4,4	5,2	5,8
14. Safety	5,3	6,0	4,0	5,0	6,3	3,7	5,3	5,3	5,7	4,3
15. Shelf life	4,8	6,3	3,8	3,8	6,3	4,3	5,0	4,8	5,0	3,8
16. Packaging	6,2	5,8	6,0	6,6	5,4	4,8	5,8	5,4	6,2	6,8
17. Added value	5,2	5,2	5,6	5,8	4,6	5,4	6,0	6,6	5,2	6,6
18. Attractiveness (Appearance/ presentation)	6,4	5,6	6,0	6,4	5,4	5,6	5,6	4,6	6,0	6,2
19. Recipes (versatility / packaging)	6,0	4,6	3,8	4,0	6,2	3,6	4,8	4,4	6,8	5,6
Total	105,8	97,5	88,4	103,1	101,9	84,7	98,2	97,3	104,3	103,4



Table 6: The analytical screening process of concepts 31-40 is presented; each of the product concepts are rated using the same screening criteria; a scale of 1-7 (1, 2, 3=negative scoring, 4=average scoring, 5, 6, 7= positive scoring) is used to evaluate the success of a concept with respect to each criterion. The total score each concept acquired (sum of the scores acquired on all criteria) is included at the end on the table.

Criteria	ID31	ID32	ID33	ID34	ID35	ID36	ID37	ID38	ID39	ID40
1. Nutritional benefit / value	6,3	4,0	6,3	6,8	6,5	6,5	6,5	6,3	6,5	6,8
2. Healthiness	6,3	3,7	6,5	6,5	7,0	6,3	6,8	6,3	5,3	6,8
3. Convenience in preparation (easy to cook)	3,6	5,8	5,4	4,4	5,4	5,6	4,2	6,4	6,8	5,6
4. Convenience for consumption (ready to eat)	3,4	5,4	5,6	4,2	5,4	5,6	4,4	6,6	6,8	5,4
5. Cost for consumer (price)	4,0	5,0	3,5	4,5	3,5	3,5	4,3	2,5	1,8	3,0
6. Technical feasibility (equipment & raw material)	6,5	5,0	7,0	6,5	6,0	6,0	6,5	6,5	6,5	6,5
7. Technical feasibility (know-how)	7,0	4,0	7,0	7,0	5,5	5,0	6,0	6,5	6,5	6,5
8. Specific consumer targeting	4,2	4,6	4,4	3,6	4,8	4,8	3,6	6,0	6,4	5,2
9. Familiarity	6,3	5,5	5,5	6,3	6,0	6,0	6,3	4,5	3,0	6,3
10. Newness/innovativeness	3,6	4,2	3,6	3,2	4,2	4,4	3,4	5,8	5,2	5,8
11. Existence of similar products/ Competitors	4,0	4,3	4,0	3,5	5,8	5,8	3,8	4,0	3,3	5,3
12. Shares characteristics of successful products	5,8	5,3	5,5	5,8	4,3	4,5	5,8	4,3	4,5	5,3
13. Perceived consumer freshness	6,8	4,0	4,8	6,0	5,2	5,4	6,2	6,0	5,6	6,2
14. Safety	6,3	6,0	5,0	6,0	4,3	4,0	5,7	5,0	5,7	5,7
15. Shelf life	3,3	6,0	4,3	3,3	3,3	2,8	3,5	3,3	4,3	3,5
16. Packaging	3,6	5,2	4,6	3,5	4,4	4,4	4,0	6,8	6,4	5,2
17. Added value	5,0	5,0	4,6	4,8	4,4	4,0	4,0	5,4	5,6	4,4
18. Attractiveness (Appearance/ presentation)	4,4	5,4	5,2	4,8	5,2	5,0	5,0	6,4	6,6	5,8
19. Recipes (versatility / packaging)	6,6	3,8	4,4	5,0	5,2	5,2	5,0	4,4	4,8	5,6
Total	96,8	92,1	97,1	95,5	96,3	94,7	94,7	102,8	101,4	104,6



Table 7: The analytical screening process of concepts 41-43 is presented; each of the product concepts are rated using the same screening criteria; a scale of 1-7 (1, 2, 3=negative scoring, 4=average scoring, 5, 6, 7= positive scoring) is used to evaluate the success of a concept with respect to each criterion. The total score each concept acquired (sum of the scores acquired on all criteria) is included at the end on the table.

Criteria	ID41	ID42	ID43
1. Nutritional benefit / value	5,8	6,8	6,5
2. Healthiness	6,8	6,8	6,8
3. Convenience in preparation (easy to cook)	7,0	5,2	4,2
4. Convenience for consumption (ready to eat)	7,0	4,8	4,6
5. Cost for consumer (price)	3,3	4,5	4,0
6. Technical feasibility (equipment & raw material)	6,0	6,5	6,5
7. Technical feasibility (know-how)	5,5	6,5	6,5
8. Specific consumer targeting	5,2	4,2	4,6
9. Familiarity	3,5	6,3	5,8
10. Newness/innovativeness	5,2	4,6	4,8
11. Existence of similar products/ Competitors	4,0	4,5	4,5
12. Shares characteristics of successful products	4,0	5,5	5,3
13. Perceived consumer freshness	5,0	6,2	6,2
14. Safety	5,0	5,7	5,7
15. Shelf life	3,5	3,8	3,5
16. Packaging	5,8	5,0	5,2
17. Added value	5,0	4,8	4,8
18. Attractiveness (Appearance/ presentation)	5,6	5,6	6,0
19. Recipes (versatility / packaging)	3,4	5,6	7,0
Total	96,5	102,7	102,3

3.2. Ranking of concepts

Herein, the final ranking of concepts is presented. The ranking positions corresponded to the total score of each product concepts, with concepts achieving high scores being positioned on the top ranks, while the opposite applies for product concepts with low total scoring. Ideas, which acquired the same total scoring, share the same ranking position.



Table 8: Final ranking of product concepts; first column presents the ranking position of each concept, second column the total score (sum of scores on all criteria) is given and the last column gives the number and short title of the concept as they are included in Table 1 where the analysis of all concepts is given.

Ranking position	Total Score	Number & name of Idea
1	105,7833	Idea 21: Fresh fish fillet with different 'healthy' seasoning and marinades
1	105,7833	Idea 14: Fresh fish fillet with herbs and spices
2	104,6167	Idea 40: Fresh fish fillet sliced presented in the shape imitating of fish scales
3	104,3167	Idea 29: Fresh fish fillet medallions with garnish and sauce
4	103,3833	Idea 30: Ready-made fish tartar with additional soy sauce
5	103,1667	Idea 20: Fresh back fish fillet
6	103,1000	Idea 24: Fresh fish Carpaccio
7	102,8000	Idea 38: Fresh fish Carpaccio 2
8	102,6667	Idea 42: Fresh fish roast
9	102,3167	Idea 43: Fresh fish fillet that comes with 3-day plan
10	102,1500	Idea 1: Frozen fish fillets with different recipes
10	102,1500	Idea 2: Thin smoked fillets
11	101,9333	Idea 25: Frozen back fish fillet in transparent packaging and accompanying marinades
12	101,6833	Idea 19: Deep frozen white fish fillet in the transparent packaging with additional information
13	101,3667	Idea 39: Bottarga sliced as medallions
14	100,7333	Idea 6: Fish burgers shaped as fish
15	100,6667	Idea 4: Ready to eat meal: salad with fish
16	100,6000	Idea 13: Frozen fish filet that is seasoned or marinated
17	100,3500	Idea 18: Frozen fish fillet with potatoes and vegetables
18	99,9833	Idea 15: Whole deep frozen fish
19	99,9167	Idea 9: Fish spreads / pate
20	99,1500	Idea 17: Fresh whole fish filled with spices and with organic vegetables
21	98,1833	Idea 27: Fish sausages and fish hamburgers
22	97,7000	Idea 7: Fish balls
23	97,4500	Idea 22: Frozen fish and seafood salad
24	97,3333	Idea 28: Liquid fish to make soups or drink.
25	97,1000	Idea 33: Ready-made fish fillets in olive oil
26	96,8500	Idea 5: Ready to eat meal: fish risotto
27	96,7833	Idea 31: Whole fresh fish with information how to be prepared.
28	96,5500	Idea 8: Dried fish sticks with accompanying dip
29	96,4500	Idea 41: Ready-made fish fillet / fish dices accompanied with cereals and vegetables.
30	96,2833	Idea 35: Steamed fish fillets
31	96,2167	Idea 11: Fish powder
32	95,7000	Idea 10: Fish broth in cubes
33	95,5000	Idea 34: Fresh fish steak for grilling in the pan
34	95,3000	Idea 3: Ready to eat meal: fish soup
35	95,2000	Idea 12: fish sauces
36	94,7167	Idea 37: Fresh fish fillet in a simple package
37	94,6500	Idea 36: Ready-made larger pieces of fish without bones
38	93,2167	Idea 16: Frozen whole fish filled with spices and with organic vegetables
39	92,0667	Idea 32: Bread crusted crispy frozen fish product with a topping
40	88,4000	Idea 23: Varied meal with fish fillet, burgers sausages
41	84,7333	Idea 26: Fresh ready to eat meal with fish fillet with different cheese and fine herbs



4. Technical characteristics of fish species with respect to product feasibility

4.1. Fish species main technical characteristics

The examined fish species differentiate in aspects of their quality. In particular both their commercial sizes and fillet characteristics appear to be different. In the following, the commercial sizes and the fillet technical and nutritional characteristics are presented

Grey mullet is sold at sizes of 300g-500g, or slightly larger (reaching up to 1 kg) and is also used to produce traditional products consisting of its roe in various degrees of processing (Barra et al., 2008). Its flesh is pinkish-beige, characterized by medium firmness and seems to have rather high lipid reaching up to 12.6% (El-Sebaiy et al., 1987). The high fat content allows good sensory characteristics in processing where flesh drying appears to take place, like smoking or salting.

Meagre is a fast grower. Its usual commercial sizes are between 1-2 kg, while it can reach up to 8 kg. Smaller commercial sizes starting from 600g have been also used recently, but with some issues of inferior texture (Giogios et al., 2013), darker appearance and higher edible losses (D27.3; Monfort, 2010). Its large sizes allow flexibility in cutting (cuts, fillets). Small quantities of processed forms, in specific frozen fish, smoked fillets and sushi have been also reported for meagre (Monfort, 2010). Its flesh is characterized as white of medium firmness, mild flavour and has very low fat contents. The muscle fat of farmed meagre ranges, according to the literature, from 0.73-2.93% (Poli et al., 2003; Giogios et al., 2013). Its low muscle fat content may be a limiting factor in processing forms where flesh drying takes place (e.g. smoking, salting).

The greater amberjack is a fast grower that is commercialized in big sizes, usually of 3.5-5.5 kg (Nakada, 2008). Its flesh is dark, quite similar to tuna flesh, with increased firmness (<http://fishingrigz.com/fish/greater-amberjack.html#405>). Cooking lightens up its flesh colour. Its flesh is also used for sushi (Mouritsen, 2009). In general, its fat contents start from average levels up to high ones and range from 3-12.9% (Thakur et al., 2009; Rodríguez-Barreto *et al.*, 2012).

Wreckfish is a fast grower reaching large sizes in short time. This allows commercialization in large sizes, which is a benefit in aspects of processing forms that can be produced. Wreckfish has highly-valued white and firm flesh with a large heavy flake and mild flavor. (<http://www.fortunefishco.net/wreckfish>). Its meat fat in wild ranges from 0.8-4.1% (Roncarati et al., 2014), *i.e.* it is a species with low to medium fat levels.

Atlantic halibut on the other hand, is sold in sizes starting from 125 g up to 8 kg as whole or fillets, fresh or frozen (Howell, 1997; Imsland et al., 2003). Atlantic halibut, like most flatfish is used for sushi namely Hiramé & Karei (Mouritsen, 2009). It has a flaky white meat and few bones. It is usually marketed in large steaks or cutlets. The Atlantic halibut has low muscle fat, with values mentioned by the literature for farmed fish ranging from 1.3-1.9%.

Pikeperch has white flesh with neutral taste and lack of bones (<http://www.setaplus.sk/en/zubac-volzsky-stizosteidon-volgensis/>; D27.4). Commercialization sizes usually range from 600 g to 3 kg and reach up to 8kg, while the preferable size is of 2-4 kg (D27.3). It is currently commercialized in fresh, as whole, headed and gutted, or fillets (100-800 g) (D27.3). Its fillets are largely used for sushi (Nigiri sushi). Its flesh is lean (Mouritsen, 2009), and its fillet fat remains in very low levels of < 2%, usually ranging at 0.6-1.2% (Kowalska et al., 2012). It already comes in various forms including fillets from 30-400 g, and processed forms of fillets or cheeks (*e.g.*, breaded). (http://www.fullfish.net/pike_perch).

Besides the flesh characteristics and commercial sizes, another important technical issue is the yields (particularly the filleting yields) of the species. Within the same species, the general rule is that yields increase with fish size (Grigorakis, 2010).



4.2. Product suitability on different species based on technical criteria

Herein, each species' technical compatibility for every product concept group is given (Table 9 and Table 10). Concepts are divided in groups with respect to similar technical characteristics. The groups are evaluated in aspects of technical feasibility to discover which species can be used for which product. Moreover, the species that can be used for realizing each product concept group are given on a best fitted rank.

Table 9: Each species' technical compatibility, including positive and negative features, for every product group concept; the species that can be used for realizing each product concept are given on a best fitted rank.

Product	Species	Positive features	Negative features	Suggested species(best fitted): rank
fresh fillet products without further processing (ideas 14, 20, 21, 29, 37, 40, 43)	<i>grey mullet</i>	-	Small commercial sizes - yields	1. meagre, wreckfish, amberjack 2. halibut, pikeperch, 3. grey mullet
	<i>meagre</i>	Fast grower (better yields)	-	
	<i>amberjack</i>	Fast grower (better yields)	-	
	<i>wreckfish</i>	Fast grower (better yields)	-	
	<i>halibut</i>	-	-	
frozen fish fillet products without further processing (ideas 1, 13, 18, 19, 25)	<i>grey mullet</i>	-	High fat Small commercial sizes - yields	1. meagre 2. halibut, pikeperch, wreckfish 3. amberjack
	<i>meagre</i>	Low fat; Fast grower (better yields)	-	
	<i>amberjack</i>	Fast grower (better yields)	High fat	
	<i>wreckfish</i>	Fast grower (better yields)	-	
	<i>halibut</i>	Low fat	-	
whole fresh fish products (ideas 17, 31)	<i>grey mullet</i>	-	High fat	1. meagre, pikeperch 2. halibut (only idea 31)
	<i>meagre</i>	-	-	
	<i>amberjack</i>	-	Large commercial weights, High fat	
	<i>wreckfish</i>	-	Large commercial weights	
	<i>halibut</i>	-	(non feasible idea 17: stuffed fish)	
whole frozen fish products (ideas 15,16)	<i>grey mullet</i>	-	High fat	1. meagre, pikeperch 2. halibut (only idea 15)
	<i>meagre</i>	Low fat	-	
	<i>amberjack</i>	-	Large commercial weights, High fat	
	<i>wreckfish</i>	-	Large commercial weights	
	<i>halibut</i>	Low fat	(non feasible idea 16: stuffed fish)	
crispy frozen fish product (idea 32)	<i>grey mullet</i>	-	High fat	1. meagre, halibut, pikeperch 2. wreckfish
	<i>meagre</i>	Low fat	-	
	<i>amberjack</i>	-	High fat	
	<i>wreckfish</i>	-	-	
	<i>halibut</i>	Low fat	-	
fish Carpaccios or tartar (ideas 24, 30, 38)	<i>grey mullet</i>	High fat	-	1. grey mullet, amberjack 2. meagre, wreckfish, halibut, pikeperch
	<i>meagre</i>	-	-	
	<i>amberjack</i>	High fat	-	
	<i>wreckfish</i>	-	-	
	<i>halibut</i>	-	-	
Bottarga (idea 39)	<i>grey mullet</i>	Know how - tradition	-	1. Grey mullet 2. (Future potential): amberjack, halibut, pikeperch
	<i>meagre</i>	-	Unknown product – technical limitations	
	<i>amberjack</i>	existence of roe products from similar species	technical limitations	
	<i>wreckfish</i>	-	Unknown product – technical limitations	
	<i>halibut</i>	existence of roe products from similar species	technical limitations	
Fish fillets steamed or in olive oil (ideas 33, 35)	<i>grey mullet</i>	-	-	1. meagre, amberjack, wreckfish 2. grey mullet, halibut, pikeperch
	<i>meagre</i>	Fast grower (better yields)	-	
	<i>amberjack</i>	Fast grower (better yields)	-	
	<i>wreckfish</i>	Fast grower (better yields)	-	
	<i>halibut</i>	-	-	
	<i>pikeperch</i>	-	-	



Table 10: summary of each species' technical compatibility, including positive and negative features, for every product is attempted; the species that can be used for realizing each product concept are given on a best fitted rank.

Product	Species	Positive features	Negative features	Suggested species (best fitted): rank
Fish steaks or large pieces or roasts (ideas 34, 36, 42	<i>grey mullet</i>			1. meagre, amberjack, wreckfish 2. grey mullet, halibut, pikeperch
	<i>meagre</i>	Fast grower (better yields)		
	<i>amberjack</i>	Fast grower (better yields)		
	<i>wreckfish</i>	Fast grower (better yields)		
	<i>halibut</i>			
Thin smoked fillets (idea 2)	<i>grey mullet</i>	high fat	-	1. amberjack, grey mullet 2. meagre, wreckfish, , 3. halibut, pikeperch
	<i>meagre</i>	Fast grower (better yields)	-	
	<i>amberjack</i>	High fat	-	
		Fast grower (better yields)		
	<i>wreckfish</i>	Fast grower (better yields)	-	
Ready to eat meals (ideas 3, 4, 5, 26, 41)	<i>grey mullet</i>	-	-	Grey mullet, meagre, amberjack, wreckfish, halibut, pikeperch
	<i>meagre</i>	-	-	
	<i>amberjack</i>	-	-	
	<i>wreckfish</i>	-	-	
	<i>halibut</i>	-	-	
Fish burgers , balls or sausages (ideas 6, 7, 27)	<i>grey mullet</i>	Higher proportion of muscle discard (if discard tissues are used)	-	1. meagre, 2. halibut, pikeperch 3. grey mullet, wreckfish, amberjack,
	<i>meagre</i>	Higher proportion of muscle discard (if discard tissues are used) Low fat (if frozen)	-	
	<i>amberjack</i>	-	-	
	<i>wreckfish</i>	Higher proportion of muscle discard (if discard tissues are used)	-	
	<i>halibut</i>	Low fat if frozen	-	
Varied meal with fish fillet,, burgers, sausages (idea 23)	<i>grey mullet</i>	-	-	Grey mullet, meagre, amberjack, wreckfish, halibut, pikeperch
	<i>meagre</i>	-	-	
	<i>amberjack</i>	-	-	
	<i>wreckfish</i>	-	-	
	<i>halibut</i>	-	-	
Frozen fish & seafood salad (idea 22)	<i>grey mullet</i>	-	High fat	1. meagre, halibut, pikeperch 2. grey mullet, wreckfish
	<i>meagre</i>	Low fat	-	
	<i>amberjack</i>	-	High fat	
	<i>wreckfish</i>	-	-	
	<i>halibut</i>	Low fat	-	
Liquid fish - broth (ideas 10 and 28)	<i>grey mullet</i>	Higher proportion of muscle discard	-	1. meagre, wreckfish, 2. amberjack halibut, pikeperch, grey mullet,
	<i>meagre</i>	Bony fish (large head skeleton)	-	
	<i>amberjack</i>	-	-	
	<i>wreckfish</i>	Bony fish (large head skeleton)	-	
	<i>halibut</i>	-	-	
Fish pate, dried fish, sticks, seasoning, sauces (ideas 8, 9, 11, 12, 28)	<i>grey mullet</i>	Higher proportion of muscle discard	-	1. grey mullet, meagre, wreckfish, 2. amberjack halibut, pikeperch
	<i>meagre</i>	Higher proportion of muscle discard	-	
	<i>amberjack</i>	-	-	
	<i>wreckfish</i>	Higher proportion of muscle discard	-	
	<i>halibut</i>	-	-	
	<i>pikeperch</i>	-	-	



Fresh fillet products without further processing (ideas 14, 20, 21, 29, 37, 40, 43): all fish species can be utilized. However, the fast growers (*i.e.*, meagre, wreckfish & amberjack) have a technical advantage due to their high yields.

Frozen fish fillet products without further processing (ideas 1, 13, 18, 19, 25): Similarly to the previous group of concepts the fast growers retain an advantage. However, since referring to frozen products, low fat is an important advantage, due to lower lipid oxidation and therefore due to higher preservation ability. Thus the meagre that is a fast grower with low muscle fat is primarily recommended, followed with the two other low fat species, *i.e.* the halibut and the pikeperch, and the wreckfish that is also a fast grower.

Whole fresh fish products (ideas 17, 31): This type of products requires whole fish. This by default excludes the species that have too large commercial weights to be commercialized as whole. Within these meagre and pikeperch are preferred, while technically halibut can support only idea 31 (idea 17 is not feasible with this fish species because it cannot be stuffed with material due to its somatometry).

Whole frozen fish products (ideas 15, 16): This type of products requires whole fish. The same applies as with the previous group. Additionally, low fat is considered as an advantage. Within these, the meagre and pikeperch are the best fitted species, followed by halibut. In specific for halibut, can support only idea 15 (idea 16 is not feasible with this fish species because it cannot be stuffed with material due to its somatometry).

Crispy frozen fish product (idea 32): can utilize any fish species. Since it is made from intact muscle tissue, fish with higher filleting (muscular) yields would be considered advantageous. Also, lower fat content may be considered as an advantage in terms of storage ability. Thus, meagre, halibut and pikeperch are expected to be superior due to their low fat contents.

Fish Carpaccio or tartar (ideas 24, 30, 38): Although all species can be used, the grey mullet and amberjack have a feature that distinguish these species for the production of a fish Carpaccio or tartar dish, and this is their higher muscular fat.

Bottarga (idea 39): The bottarga is a specific traditional product, consisting of mullet roe. The use of the other species to produce similar products would enable a high degree of uncertainty in both terms of production (technical limitations: 1. obtain of adequate quantities of raw material 2. response of raw material to processing) and in terms of end-product quality (integrity, sensory properties). This is due to the complete absence of information in roes. However, in a future perspective maybe halibut, amberjack and pikeperch can be considered, since species with great similarities to them (genera of the same families), *i.e.* the flounder (*Platyichthis* or *Paralychthis* sp.), the tuna, and the perch (*Perca fluviatilis*), respectively, are used for their roes (Blendsoe et al., 2003).

Fish fillet steamed or in olive oil (ideas 33, 35): for these products apply the same as with other fresh fillet products, *i.e.* the fast growers meagre, amberjack and wreckfish retain an advantage.

Fish steaks or large pieces or roast (ideas 34, 36, 42): for these products apply the same as with other fresh fillet products, *i.e.* the fast growers meagre, amberjack and wreckfish retain an advantage.

Thin smoked fillet products (idea 2): The amberjack is advantageous because it gathers two desirable characteristics it has high fat (aroma advantage when smoked) and high growth rates. Meagre and wreckfish follow due to their high growth rates and grey mullet due to its high muscular fat.

Ready to eat meals (ideas 3, 4, 5, 26, 41): can utilize any species meat, since each one has individualities but none has a particular advantage. Thus, the choice of species depends mainly on the flavour new product development wants to achieve with this product. If fish tissue is separated from the rest, this would make the products easier in manufacture and preservation.



Fish burgers, balls or sausages (ideas 6, 7, 27): Can be made from all of the studied species. If processing discards is to be used for their production, species with higher musculature losses during processing such as meagre and wreckfish (big head) can be advantageous. If intact muscular pieces are going to be used for the production, species with flesh of lower market value, such grey mullet that has lower commercial weight and therefore higher expected filleting losses (proportional) can possibly have an advantage over the rest. Additionally, if products are going to be marketed as a frozen, low fat species are more compatible in aspects of lower lipid oxidation and higher preservation quality. Thus, meagre could be a superior raw material, due to low fat and high growth rate, followed by other low fat species (halibut and pikeperch).

Frozen fish and seafood salad (idea 22): Low fat species meagre, halibut and pikeperch are advantageous.

Liquid fish – broth (ideas 10, 28): Can be produced from any species, considered that muscle discards (from filleting) can be used. Fish that have larger technical losses can be advantageous, as this product can use flesh that is attached to filleting or other processing discards as raw material. Expert screening indicates the feasibility of producing this product by all species. Fish with larger head and tail proportions (i.e. wreckfish, and meagre) and fish of smaller sizes (grey mullet) can possibly be advantageous in aspects of liquid fish production yield.

Fish pate/ spreads, dried fish sticks, seasoning, sauces (ideas 8, 9, 11, 12, 28): can utilize any fish meat. Thus, it can be produced by any fish species. The fact that added value is produced if discarded muscle tissues are used, creates an advantage for fish species that have higher discards. Still, grey mullet due to its small commercial sizes, as well as meagre and wreckfish, due to large sizes and high head proportion, have higher muscle discard. Therefore they might be considered advantageous in relation to the other species.

4.3. Products with technical difficulties – incompatibilities

Herein, some product concepts, which were found to be problematic in aspects of technical feasibility are presented. The possible technical difficulties that new product development could face are presented in detail for each of the concepts. These product concepts are not suggested for further development irrespectively of their final ranking position.

Idea 16: frozen whole fish filled with spices & vegetables. This product will be problematic in aspects of freezing and defrost as well as preparation (cooking) due to differences in the nature and properties of its ingredients (fish and vegetables) that are inevitably incorporated to one another.

Idea 17: fresh whole fish filled with spices & vegetables. This product may have issues in aspects of preservation and sensory properties due to coexistence (e.g. fluid exchanges) of fish and vegetables. Also may have a similar issue in preparation (cooking).

Idea 23: Varied meal with fish fillet, burgers, sausages. This meal contains in the same package three different food types of different spoilage patterns and shelf life, and thus is technically incompatible (wasting two out of the three food items in favor of the one - most probably the burger – with the shortest shelf life).

Idea 26: Fresh ready to eat meal with fish fillet and cheese. This is technically complicated dish since it has to combine cheese and fish and there are difficulties for both human sensory issues and aspects of preservation and shelf life.

Idea 32: Bread crusted crispy frozen product with a topping of vegetables. This product should not incorporate the topping with the fish, due to difficulties in preparation (different defrost - warming times for toping and fish).



Idea 41: Ready-made fish fillet / fish dices accompanied with cereals and vegetables. This product should not incorporate cereals and vegetables to the main fish, because they will undergo alterations due to moisture extraction by the fish.



5. Analysis of selected concepts

In order to provide new product development with valuable information, an analysis regarding the portfolio, market and consumer segments of the products will be given for the twenty top concepts in the ranking. Since the top rated product concepts share features, they will be divided in groups according to their technical characteristics, similarly to 4.2, and one of the fish products belonging to each group will be used to make an example analysis. Moreover, to facilitate readers, the products will be firstly divided into three main categories *fresh/chilled products*, *frozen/ deep-frozen products* & other processed products (this section will include all products which do not fall to the previous two categories).

Each example analysis will include an in-depth insight into products' intrinsic and extrinsic characteristics; current/future market for the concept, in terms of consumer and consumer segments (prototyping of consumers' included in Linnemann et al. (1999) is used); the current/ future market, in terms of product and product functions; current consumer trends that the new product concept can be connected to; current/ future competitive products (or product categories) of the developed product concept; benefits/ weaknesses of competitive products; consumption situation of the developed product (reasons for consumption and frequency are included); the technical feasibility of the concept (equipment, raw material, know-how needed for realising the concept). Moreover suggestions are given on: specific fish species suitable for realising the product concept with respect to their technical characteristics as well as markets/countries, within the ones researched in the frames of the DIVERSIFY project, in which the product should be targeted at (UK, France, Germany, Spain and Italy). The analysis is based on data included in the deliverables of DIVERSIFY WP27, in deliverables D28.1, and D29.2, as well as our own knowledge and literature search.

5.1. Fresh/ chilled products

5.1.1. Fresh fillet products without further processing

Fresh fish fillets without further processing includes ideas 14, 20, 21, 29, 37, 40, 43. Out of these 7 ideas, with the exception of idea 37 all were included in the top 20 positions of the ranking. More specifically:

- Idea 14: *Fresh fish fillet with herbs and spices* acquired the **1st** position in the ranking
- Idea 21: *Fresh fish fillet with different 'healthy' seasoning and marinades* shared the **1st** position with idea 14 since they acquired the same total score
- Idea 40: *Fresh fish fillet sliced presented in the shape imitating of fish scales* acquired the **2nd** position in the ranking
- Idea 29: *Fresh fish fillet medallions with garnish and sauce* acquired the **3rd** position in the ranking
- Idea 20: *Fresh back fish fillet* acquired the **5th** position in the ranking
- Idea 43: *Fresh fish fillet that comes with 3-day plan* acquired the **9th** position in the ranking

Out of these concepts *fresh back fish fillet* was chosen in order to make an example analysis.

5.1.1.1. Example analysis of fresh fish back fillet

Concept of idea: Fresh fish back fillet that looks like a roast in a tray or bag that can be prepared in an oven or barbecue. This fish is accompanied with dips, sauces and dressings. The product is produced in an environmentally sustainable way (containing ASC label). It is labelled as a premium product and the country of origin is EU. The packaging is a transparent bag or a tray where fish is laid and covered with transparent plastic. Since this product is marketed fresh, the production chain should be short to ensure a reasonable shelf life. The price range of this product is medium with respect to its quality.



Available market with respect to consumer/ consumer segments: The product is intended for a mass market since it addresses the needs of various consumer prototypes. Moreover it can be delivered to the consumers through several distribution channels including supermarkets, specialty stores, convenient stores, restaurants, hotels, catering, delicatessen and fish shops (experts' opinions D28.1). The price range of this product is medium, taking into consideration its premium quality, thus making it accessible to consumers who are interested in paying a reasonable price for a quality product. Consumer segments interested in this type of product can include *environment conscious consumers* who prefer minimum processing, foods from short product chains and technological efficiency; *health conscious consumers* who are interested in the health promoting properties of fish products; *convenience consumers* who are interested in foods which are easy to prepare; *hedonic consumers* who desire food with a high sensory quality; moreover with the addition of innovative recipes to the products concept can provide access to *variety seeking consumers*, who are interested in diversity in raw materials, ingredients and fabricated foods for homemade meals (Linnemann et al., 1999).

Available market with respect to product and product functions: both the intrinsic and extrinsic characteristics of the product concept make healthy fresh fish more accessible to consumers. The packaging as well as the innovative recipes with the accompanying dips/sauces/dressings minimizes the preparation time of the meal. Moreover issues regarding convenience in fish consumption, such as de-scaling, gutting, the existence of bones in fresh fish fillets, and the ignorance of consumers regarding available recipes for preparing fish in certain countries, are dealt with. Product packaging adds value to the product since the transparent bag or cooking tray, in which it is delivered, allows the consumer to inspect the product as well as provides a convenient solution for its cooking process.

Consumer trends the concept can be connected to: the concept incorporates several current and future European trends for animal protein consumption including: the increasing demand for animal proteins; the need of substitution of animal proteins from meat products with ones derived by fish products; the growing importance of sustainability certification (the product contains ASC label); the growing interest in traceability of products; the growing interest in local and regional products. Moreover it satisfies the consumers short term demands of the selected countries (UK, France, Germany, Spain and Italy) which in their majority ask for healthy, fresh, convenient fish products.

Competitive products & benefits/ weaknesses: with respect to available competitive products, fresh fish and fish fillets pose the largest competitor since they can be offered in more competitive prices and they allow consumer involvement in the cooking process. Still, the shortest preparation time, the ensured freshness and the versatility of the product provided by the accompanying innovative recipes, can make this product attractive even to more traditional, home cooking consumers such as the Italians. Moreover this idea overcomes several weak points of competitive products such as existence of bones, ignorance of preparation recipes etc. Frozen fish products can also pose a threat, still according to the market insights of WP27, consumers make the decision between fresh and frozen fish products beforehand based on the price range they are willing to pay for creating a meal. The only weakness of this product identified by the screening process lies in the existence of similar products in the market. This weakness is minor since this problem exists in specific markets only and can be dealt with the inclusion of innovative recipes, attractive and convenient packaging, inclusion of ASC label to promote products sustainability and inclusion of the origin (locality) of the produced product to promote traceability.

Consumption situation, reasons for consumption and frequency: this product can constitute a regular meal of the day (lunch or dinner) prepared and consumed at home, since it requires some minimum cooking time and is of a considerable portion to cover the energy needed in such a meal. The product should be used for its health benefits, nutritional value, convenience and freshness as well as for its high quality.

Technical feasibility of the concept: there is no obvious bottleneck concerning the feasibility in the production process of the product since the major innovation of this concepts lies in packaging and the creation of possible recipes and accompanying dips, sauces and dressings.

Fish species suitable for realising the product concept: according to experts opinions fresh fish back fillet can be produced from any of the species included in the DIVERSIFY project. Still, within the available



species, in terms of technical-economic feasibility fish of large sizes and particularly fast grower species retain an advantage, since filleting is technically more profitable in large fish. Therefore, species such as Atlantic halibut (mostly mentioned by the experts), a flatfish with flaky white meat, low muscle fat and only few bones is considered the most appropriate option. Moreover, based on technical criteria meagre, wreckfish and greater amberjack are also considered compatible in aspects of their fast growth and large commercial weights, which can offer higher filleting yields. Still due to the fact that reared wreckfish and greater amberjack current production is minor or non-existent, new product development should focus on realising the concept with the rest of the suggested species.

Countries the product concept should be mainly targeted at: according to the market data of WP27 with respect to the products fresh concept it should be firstly targeted to UK and France markets, where there is a considerable consumption of fresh (chilled) fish products (55-60% of the purchases in UK retail in 2012; 62% of French fish product consumption in 2011), when compared to frozen ones. With respect to Spain and Italy; fresh products dominate the Spanish market, while both fresh and frozen fish products are consumed by Italians. Concerning Germany fresh chilled fish products accounted only 8% of the total fish consumption, therefore success of a fresh/chilled fish product in such a market is debatable.

Fish species for realisation of the concept in selected countries: Both meagre and Atlantic halibut are good alternatives for the development of the product, still some suggestions which could increase the diversification and success of the products in the selected markets can be given. Atlantic halibut can be used for the development of fresh fish back fillets for UK since it has a local aquaculture production and an established market for this species (D27.3; D27.5). Atlantic halibut could be also used for promoting such a product in Germany and France, since again there is an established market for this species (D27.5). Atlantic halibut is not recommended for realization of the concept in Italy since this species has a negative image due to low prices (D27.5). With respect to meagre and its processed products, they are little known by European consumers (D27.3), with the exception of UK where there is an established market for meagre (D27.5). Still, if meagre fresh back fillets are developed the launching of this product should start from UK due to the already established market as well as Spain, France and Italy since these countries already have a steady meagre production. In specific, Spanish market asks for alternative species and Italy finds meagre species interesting (D27.5). Moreover Italy has 37% of *involved innovators* who are innovative and open to the introduction of new fish species, such as meagre (D29.2). Spain and France could also favour products produced from meagre since there is a stated preference for local suppliers. Moreover, in the aforementioned markets (Italy, Spain, France) the indication of locally produced product could lessen the chance of this product being unsuccessful in the market due to the limited familiarity of the consumer with the meagre species.

5.1.2. Whole fresh fish products

“Whole fresh fish products” group includes ideas 17 & 31. Out of these 2 ideas only idea 17: **Fresh whole fish filled with spices and with organic vegetables** was included in the top 20 positions of the ranking in which it acquired the 20th position. Due to the fact that it is included in 4.3, its realisation is not recommended for technical reasons. Thus, an example analysis of this concept won't be included.

5.1.3. Ready to eat meals

Ready to eat meals includes ideas 3, 4, 5, 26, 41. Out of these 5 ideas only Idea 4 was included in the top 20 positions of the ranking. More specifically Idea 4: **Ready to eat meal, salad with fish** acquired the 15th position in the ranking. An example analysis of Idea 4 will follow.

5.1.3.1. Example analysis of ready to eat meal: salad with fish

Concept of idea: Fresh ready to eat salad which includes fish as well as an accompanying sauce; fish and sauce are provided separately packed and included within the original package. The fish included is



either a smoked fillet (provided in slices), or vinegar-cooked, or alternatively bottarga; thus, the dish can be eaten cold. The product is produced in an environmentally sustainable way (containing ASC label). It is labelled as a premium product; the country of origin is EU. The packaging (MAP) is composed by bowl where the salad is placed; the fish pieces and the sauce are provided in separate transparent accompanying packages incorporated with the original bowl package. A transparent lid exists on the top to allow product visibility and the packaging has the picture of the ready meal on it. *This concept was created as an alternative to D28.1 concept, Ready to eat meal: fresh fillet with cheese.*

Available market with respect to consumer/ consumer segments: The product is intended for a mass market since it accesses the needs of various consumer prototypes and answers directly to the current consumers' need for convenient, fresh, healthy products. Moreover it can be delivered to the consumers through a variety of distribution channels (as suggested for Ready to eat meal: fresh fillet with cheese by experts in D28.1) including: supermarkets, specialty stores, convenient stores, restaurants, catering, delicatessen and gastro pubs (experts' opinions D28.1). Consumer segments interested in this type of product can include; *environment conscious consumers* who prefer minimum processing, foods from short product chains and technological efficiency; *health conscious consumers* who are interested in the health promoting properties of fish products; *convenience consumers* which is interested in foods which are easy to prepare; *hedonic consumers* who desire food with a high sensory quality; *variety seeking consumers*, who are interested in diversity in raw materials and ingredients (Linnemann et al., 1999).

Available market with respect to product and product functions: both the intrinsic and extrinsic characteristics of the product concept make healthy fresh fish more accessible to consumers who have no time for cooking and want to consume a healthy ready to eat meal. Since this product is a whole meal there is no need for purchasing extra ingredients. Moreover, due to the nature of the fish included (smoked/ bottarga/ vinegar cooked) there is no need for any preparation or cooking process, since it is eaten cold. Thus, it is a highly convenient meal, which still retains all the freshness, healthiness and nutritional value of fish. The packaging allows the consumer to inspect the product and evaluate its quality. Moreover it is highly convenient since consumers can choose whether all the separate ingredients (salad, sauce or fish) will be consumed together or separately (e.g., dieting people may choose not to consume the accompanying sauce).

Consumer trends the concept can be connected to: the concept incorporates several current and future European trends for animal protein consumption including: the increasing demand for animal proteins; the need of substitution of animal proteins from meat products with ones derived by fish products; the growing importance of sustainability certification (the product contains ASC label); the growing interest in traceability of products; the growing interest in local and regional products. Moreover it satisfies the consumers short term demands of the selected countries (UK, France, Germany, Spain and Italy) which in their majority ask for healthy, fresh, convenient fish products.

Competitive products & benefits/ weaknesses: while the price of this product is elevated due to its nature and short shelf life, there is gap in the market for this kind of convenient products (experts' opinion D28.1). Thus, ready to eat salad with fish is highly competitive. Competitive products can include ready-to-eat meals/ salads, which can be consumed both inside and outside the household (e.g. at work). Among the advantages of ready to eat meal, salad with fish are: its quality, ready to eat nature (no need, for preparation, cooking or even microwave), high freshness, healthiness, innovativeness, nutritional value and convenience, which make the product attractive to a variety of consumers. Moreover fish with salad is a familiar dish which can be advantageous over competitive ones for several reasons such as health issues, diets etc. The main weaknesses of this concept include its price, short shelf life and lack of versatility. Still, short shelf life and lack of versatility is expected when purchasing a fresh, ready to meal. Moreover, the price range of this product can stay is reasonable with respect to its competitors.

Consumption situation, reasons for consumption and frequency: this product can constitute a regular meal of the day (lunch or dinner) consumed both inside and outside the household. The product should be used primarily for its convenience, freshness, healthiness, high quality and nutritional value.

Technical feasibility of the concept: the concept is technically feasible, while there is always a technical challenge of prolonging shelf life while keeping the safety and freshness of the product.



Fish species suitable for realising the product concept: ready to eat salad with fish can be produced from any of the species included in the DIVERSIFY project since none has any particular advantage and all can be processed to produce such a dish. Technical issues/ complications can occur in such a concept, since the product is marketed fresh (i.e. with short shelf life). Still, the packaging that separates fish tissue from the rest (salad and sauce), facilitates the product preparation by the consumer and its preservation. Thus, ready to eat meal, salad with fish can utilize any species flesh always taking into account their individualities with respect to the final flavour of meal. Moreover, if bottarga is included, lower quality specimens can be utilized (smaller sizes or broken gonads).

Countries the product concept should be mainly targeted at: according to the market data of WP27 all countries involved in DIVERSIFY ask for convenient ready to eat products. Moreover, due to the low level of processing and no pre-seasoning, such a product can be successful even at the Spanish market where a negative image of processed products exists (D27.5). An additional advantage of ready to eat salad with fish is the familiarity consumers have with this products' concept. Thus, this product should be targeted to all countries involved in DIVERSIFY.

Fish species for realisation of the concept in selected countries: since all fish species can be used for the realisation of the concept, the choice of species should be made according to the processing of the tissue incorporated in the salad (e.g., bottarga, grey mullet; smoked, higher muscle fat species such as greater amberjack and grey mullet; vinegar-cooked, all species). Moreover, choice can be made accordingly to the interest as well as the local farmed fish availability there is in each market regarding the available DIVERSIFY species. Thus, greater amberjack, Atlantic halibut and meagre could be preferred for production in the UK; all species for Spain; Atlantic halibut, meagre for France; pikeperch, Atlantic halibut and greater amberjack could be used for Germany; greater amberjack, grey mullet, meagre for Italy. Still because of the high number of *involved innovators*, in the German and Italian market all species have great chances of success (D27.3; D27.5; D29.2).

5.1.4. Fish steaks or large pieces or roast

Fish steaks or large pieces of roast includes ideas 34, 36, 42. Out of these 3 ideas only Idea 42 was included in the top 20 positions of the ranking. More specifically Idea 42: **Fresh fish roast** acquired the **8th** position in the ranking. An example analysis of Idea 42 will follow.

5.1.4.1. Example analysis of fresh fish roast

Concept of idea: Fresh fish roast presented as a 'meat roast' in the tray with the transparent lid that could be used in the oven. Package comes with different recipes from the fishmonger. Product message: 'Daily meal of the Fish monger'. The product is produced environmentally sustainable (containing ASC label). It is labelled as a premium product; the country of origin is EU.

Available market with respect to consumer/ consumer segments: The product is intended for a mass market and accesses the needs of various consumer prototypes. Moreover, the product can be delivered to the consumers through several distribution channels including supermarkets, specialty stores, convenient stores, restaurants, hotels, catering and fish shops. Consumer segments interested in this type of product can include *environment conscious consumers* who prefer minimum processing, foods from short product chains and technological efficiency; *health conscious consumers* who are interested in the health promoting properties of fish products; *convenience consumers* which is interested in foods which are easy to prepare and *price conscious consumers* who are interested in products with a favourable price/quality ratio (Linnemann et al., 1999). The main difference between fresh fish back fillet and this concept is that the first product is more convenient since it is ready to cook and has no bones while the latter is more attractive to traditional consumers or consumers that want to be highly involved to the cooking process. Moreover fresh fish roast due to their minimal processing could be available in more affordable prices and have a slightly longer shelf life.



Available market with respect to product and product functions: while fresh fish roast has a less attractive appearance when compared to fresh fish products without bones it is an accessible and attractive product from several different perspectives. Firstly, it is a convenient product, which requires minimum preparation time before consumption, since it comes in a tray with the transparent lid which could be used for cooking it in the oven. Secondly, its price make it more accessible (when compared to fresh- chilled seasoned and deboned fish products) to consumers that are interested in a favourable price/ quality ratio; it can be stored for a longer time in refrigerator before consumption and its price allows consumers to purchase it more frequently and it is a more versatile dish which allows consumer involvement in the preparation process

Consumer trends the concept can be connected to: the concept incorporates several current and future European trends for animal protein consumption including: the increasing demand for animal proteins; the need of substitution of animal proteins from meat products with ones derived by fish products; the growing importance of sustainability certification (the product contains ASC label); the growing interest in traceability of products; the growing interest in local and regional products. Moreover it satisfies the consumers' short term demands of the selected countries (UK, France, Germany, Spain and Italy) which in their majority ask for healthy and fresh fish products.

Competitive products & benefits/ weaknesses: the major weakness of this product is the existence of similar products in the market as well as the existence of bones. With respect to available competitive products, fresh fish and frozen fish fillets pose the largest competitor since they are offered in a similar price range. Still, the concept of the product creates an advantage, since it is offered in very competitive prices (minimum processing), has a long shelf life and still allows consumer involvement and versatility in the cooking process (different recipes that are dealing with consumers ignorance of how to prepare fish meals).

Consumption situation, reasons for consumption and frequency: same as fresh fish back fillet. Moreover, due the more versatile nature and lower price frozen fish fillets can be consumed more frequently than seasoned/ marinated frozen fillets.

Technical feasibility of the concept: there is no major bottleneck concerning the feasibility in the production process of the product; the major innovation lies in the packaging, which allows direct cooking of the product in the oven.

Fish species suitable for realising the product concept: same as 5.1.1.1 Example analysis of fresh fish back fillet

Countries the product concept should be mainly targeted at: same as 5.1.1.1 Example analysis of fresh fish back fillet. Moreover, this product could have better success chances if targeted in more traditional markets such as Italy and Spain. In specific Italian consumers seem to be more involved in the preparation of their meals, therefore such a product could have an advantage in the Italian market. Additionally, the Spanish market asks for fish fillets, but still requires less seasoning and pre-packaging since a negative image of processed products exist in the market. Thus, a less processed product could have greater chances for success in the Italian and Spanish market.

Fish species for realisation of the concept in selected countries: same as 5.1.1.1 Example analysis of fresh fish back fillet.

5.1.5. Fish burgers, balls or sausages

Fish burgers, balls or sausages includes ideas 6, 7 and 27. Out of these 3 ideas only Idea 6 was included in the top 20 positions of the ranking. More specifically Idea 6: **Fish burgers shaped as fish** acquired the **14th** position in the ranking. An example analysis of Idea 6 will follow.

5.1.5.1. Example analysis of fish burgers in the shape of fish

Concept of idea: Frozen fish burgers shaped as fish. The burgers are ready to cook and prepared with a mild seasoning and can be incorporated in a sandwich or prepared as a part of a meal. Among the advantages of



this product, is the absence of bones and the attractive shape for children. The product is sustainably produced (containing ASC label). It is labelled as a premium product; the country of origin is EU. The product is included in a transparent vacuum-packed bag or in a plastic tray with transparent plastic on the top. Information on fish for educative purposes (children) and playful gifts (e.g. sticker) are included in the packaging. *This concept was created by enhancing the fish sausages/ hamburgers concept of D28.1.*

Available market with respect to consumer/ consumer segments: this product is targeted to a specific market segment; it is intended to increase fish consumption in children by making the eating process and the meal more interesting - attractive for them. Since children by themselves do not have a direct buying power (still, they can influence parents choice) parents who want to increase their children's fish consumption are the main targeted group. Fish burgers shaped as fish could be delivered to the consumers through several distribution channels including: supermarkets, convenient stores, speciality stores, catering and restaurants. Consumer segments interested in this type of product can include: *health conscious consumers* who are interested in providing their children healthy meals; *price conscious consumers* who are interested in products with a favourable price/quality ratio; *convenience consumers* who are interested in foods which are easy to prepare for their children; *variety seeking consumers*, who are interested providing diverse and attractive children meals.

Available market with respect to product and product functions: fish burgers shaped as fish is by itself a convenient ready to cook product, which, at the same time is both healthy and attractive for children. It allows versatility in preparation since it leaves the choice of the main meals' accompaniment and cooking process (steamed/ baked/ fried) to parents, while still overcomes several steps of the preparation process of fish meals (de-scaling, degutting, bones, filleting, ignorance regarding cooking process of fish), which can become unattractive for both children and parents. Moreover, the shape of the burgers as well as the information/games regarding fish/gifts included in the packaging can furthermore help familiarization of children with fish make product appealing and therefore increase consumption. Moreover, its affordable price and long shelf life make it an easier and even more convenient option for parents.

Consumer trends the concept can be connected to: the concept incorporates several current and future European trends for animal protein consumption including: the increasing demand for animal proteins; the need of substitution of animal proteins from meat products with ones derived by fish products; the growing importance of sustainability certification (the product contains ASC label); the growing interest in traceability of products; the growing interest in local and regional products. Moreover it satisfies the consumers short term demands of the selected countries (UK, France, Germany, Spain and Italy) which ask for convenient fish products which are healthy and easy to prepare.

Competitive products & benefits/ weaknesses: major competitive products of fish burgers shaped as fish are animal derived burgers or products that have no bones (e.g. fish sticks). Still, taking into account the high nutritional value of fish and the need to increase fish consumption in children, fish-derived burgers are more advantageous when compared to meat-derived products. Moreover, the attractive shape and packaging make this product highly competitive even within the fish product category. The main identified weakness of this product are the technical feasibility in equipment, since fish moulds for creating the shape of fish must be created, as well as the low freshness due to the frozen burger concept. However, it is a highly attractive, convenient, versatile and affordable product which has a high added value, since it can use industry filleting by-products (non utilized intact muscle tissue), and serves its purpose, to increase children's' fish consumption.

Consumption situation, reasons for consumption and frequency: due to its versatility, familiar sensory characteristics and affordable price fish products shaped as fish can be consumed regularly. Reasons for its consumption are its attractiveness and high nutritional value for children. Fish burgers shaped as fish can constitute the main part of a regular meal of the day or even can be used as a sandwich filling along with other ingredients.

Technical feasibility of the concept: the major bottleneck concerning the feasibility in the production is the creation of moulds, which will give the shape of fish in the produced burgers.



Fish species suitable for realising the product concept: fish burgers shaped as fish can utilize any DIVERSIFY fish species as raw materials. This was also underlined in experts' evaluation for fish sausages and hamburgers idea of D28.1. If processing discards is to be used for their production, species with higher musculature losses during processing can be advantageous. If intact muscular pieces are going to be used for the production, species with flesh of lower market value are advantageous. Since the product is aimed for children it is best that only leftover fillet parts (not tails, heads etc.) and/or intact musculature pieces are used. This information could be included on the packaging/ marketing to increase the products perceived quality. Moreover, since the product is marketed frozen low fat species, such as meagre (low fat and high growth rate) are advantageous in aspects of lower lipid oxidation and higher preservation quality, followed by other low fat species such as Atlantic halibut and pikeperch. Still, in the production more than one species (regarding what is available at the moment) could be used to achieve a specific, acceptable fat content in the product.

Countries the product concept should be mainly targeted at: This is a fish product, for specific consumer audience (children), and all countries should be targeted.

Fish species for realisation of the concept in selected countries: all fish species, combination of fish species. Still the same sensory and general quality should be kept among batches (even if they derive from different species) to ensure consumers acceptance of the product.

Suggestion for changes in the concept: this product could be also marketed as a fresh-chilled fish product, and the consumers could have the option to freeze just part of it.

5.1.6. Fish Carpaccio or tartar

Fish Carpaccio or tartar includes ideas 24, 30 & 38. Out of these 3 ideas all were included in the top 20 positions of the ranking. More specifically:

- Idea 30: **Ready-made fish tartar with additional soy sauce** acquired the **4th** position in the ranking
- Idea 24: **Fresh fish Carpaccio** acquired the **6th** position in the ranking
- Idea 38: **Fresh fish Carpaccio 2** acquired the **7th** position in the ranking

Out of these concepts **fresh fish Carpaccio 2** was chosen in order to make an example analysis.

5.1.6.1. Example analysis of fresh fish Carpaccio 2

Concept of idea: Fresh fish Carpaccio that can be used as starter for a hot meal or as sandwich filling. This Carpaccio will be seasoned with ginger and chilli and presented as scales of the fish. The product is produced in an environmentally sustainable way (containing ASC label). It is labelled as a premium product; the country of origin is EU. The packaging is a plate that looks like a round box with the compartments and transparent wheel on the top that you can turn to rich different sections.

Available market with respect to consumer/ consumer segments: fish Carpaccio is a high-end product intended for specific market segments due to its price and characteristics. Moreover, it is best fitted to be delivered to the consumers through specific distribution channels including mainly: specialty stores, delicatessen. Moreover, it can also be delivered to specific: supermarkets, convenient stores, sandwich stores, hotels, catering and restaurants, which have a delicatessen corner or are interested in delicatessen products of premium quality (experts' opinions D28.1). The price range of this product is elevated due to its nature and short shelf life and is targeted for consumers with specific tastes who are interested in investing in a gourmet quality product. Consumer segments interested in this type of product can include mostly: *hedonic consumers* who desire food with a high sensory quality and *variety seeking consumers*, who are interested in diversity of raw materials and ingredients and finally *environment conscious consumers* due to the minimal processing of this food product (Linnemann et al., 1999).



Available market with respect to product and product functions: the innovativeness of the products concept as well as its special packaging, make it a gourmet product aimed at specific market segments. Such a product can be used as a started, incorporated in the preparation of a dish or even used as a sandwich filling. Still, fish Carpaccio, by itself, it is a convenient ready to eat product since it requires no preparation time. Moreover it maintains all the nutritional value and freshness of fresh fish due to its minimum processing. Packaging attaches added-value to the product since it is convenient (wheel at the top which allows the consumer to reach different compartments) and allows the consumer to inspect it (transparent).

Consumer trends the concept can be connected to: same as §5.1.1.1

Competitive products & benefits/ weaknesses: the only identified weakness in this concept is its price, limited shelf life and unfamiliarity with the raw product concept. Still, since the major competitive products are within the delicatessen category their price range in the market is similar to our products'. Competitive products can include both delicatessen fish as well as meat products (bottarga, meat Carpaccio etc.). Moreover, the products' innovativeness (Carpaccio made by fish), healthiness and nutritional value, since the product requires minimum processing, create an advantage over competitive meat products. Additionally, the convenient and attractive packaging can create advantage in a niche market where attention to detail is important. With respect to unfamiliarity issues, the product is targeted at consumers with specific tastes who are already interested in such products.

Consumption situation, reasons for consumption and frequency: fish Carpaccio is a healthy product that can be consumed frequently. Still, due to its price and supreme quality, it can be a product used in special occasions. Fish Carpaccio can not constitute a whole meal, but it can be used as starter as an accompaniment in meals or even as a sandwich filling on a regular basis.

Technical feasibility of the concept: there is no major bottleneck concerning the feasibility in the production process of the product and no changes are required in the production line; the major innovation lies in the Carpaccio concept translated to fish as well as to the attractive and convenient packaging.

Fish species suitable for realising the product concept: all fish species were perceived feasible for the realisation of this products concept by the experts (D28.1). Still, due to the raw nature of the product certain advantages can be found for specific species, since raw fish meat is fully exposing its flavour and texture in the product. Higher fillet/ muscular fat can be considered an advantage, since in aspects of fillets' sensory properties this fillet property creates a juicer mouth sensation and a smoother texture (Grigorakis, 2007). Thus, while all species can be used, grey mullet and greater amberjack are advantageous when compared to the rest of the available fish, since they have higher muscular fat. These features distinguish grey mullet and greater amberjack for the realisation of fish Carpaccio. However, greater amberjack could potentially be inferior to the grey mullet due to its darker muscle appearance (light-coloured fillet fish species are generally considered of higher quality in the fresh fish market).

Countries the product concept should be mainly targeted at: fish Carpaccio is a delicacy product aimed at specific consumer segments and a niche market. Thus, no specific countries are targeted like for products for mass market. Markets which could have an advantage (and therefore higher distribution of this product can be achieved) are the ones, which are more familiar with the raw fish concept as well as ready to pay a higher price for a quality/ gourmet product. Still, all markets should be targeted.

Fish species for realisation of the concept in selected countries: According D27.5 data, the UK, Germany and Italy would be interested in greater amberjack products. With respect to grey mullet, UK market is not interested in its products, while the German market is unfamiliar with this species. Still, the German market has a high number of *involved innovators* who are open to new species, so grey mullet can be used for the production also in Germany (D29.2). Italy finds grey mullet products interesting and Spain asks for different species and diversification in the market. No data on the buying process of those species exist in D27.5 for the French market (no real awareness concerning farmed fish). Moreover, according to D29.2 half of the French market consists of average consumers while only 15% represents the involved innovators category. Thus, the success of the selected species for realising the product concept in France is debatable.



Suggestion for changes in the concept: According to experts' opinion (D28.1) the only concern regarding this product is the chilli accompaniment. Thus, a different and more mild accompaniment could be suggested (e.g., hummus)

5.1.7. Thin smoked fillets

Due to its unique technical characteristics thin smoked fillets could not be grouped with other concepts. *Thin smoked fillets* idea was included in the top 20 positions of the ranking in which it acquired the **10th** position. A detailed analysis of the concept follows

5.1.7.1. Example analysis of thin smoked fillets

Concept of idea: Fresh thin smoked fillets from the same (or different) fish species which can be used as a starter or incorporated within a sandwich/salad. The product is sustainably produced (containing ASC label). It is labelled as a premium product; the country of origin is EU. The packaging is a plastic tray that the fillets are laid covered with a transparent plastic, which allows visibility of the fillets and vacuum pack or Modified Atmosphere (MAP) is used for shelf life prolongation. Ideas concerning the different uses of the fillets are included on the product's sleeve.

Available market with respect to consumer/ consumer segments: while this product can fall into the delicatessen category it is intended for a wider market segments when compared to fish Carpaccio and bottarga due to its more affordable price and familiarity in sensory characteristics (smoking). Thus, it could be delivered to the consumers through several distribution channels including: specialty stores, delicatessen, gourmet, supermarkets, convenient stores, sandwich stores, hotels, catering and restaurants. Consumer segments interested in this type of product can include: *environment conscious consumers* who prefer minimum processing, foods from short product chains and technological efficiency; *health conscious consumers* who are interested in the health promoting properties of fish products; *convenience consumers* which are interested in foods which are easy to prepare; *hedonic consumers* who desire food with a high sensory quality; moreover with the addition of innovative recipes to the products concept can provide access to *variety seeking consumers*, who are interested in diversity in raw materials, ingredients and fabricated foods for homemade meals.

Available market with respect to product and product functions: thin smoked fillets are a versatile product, which allows consumer involvement in the preparation of their meal. This product can be used as a starter, incorporated in the preparation of a dish (salad/ hot dish), side dish, or even used as a sandwich filling. It is a convenient ready to eat product, which overcomes all weakness of unprocessed fish products (de-scaling, degutting, bones, filleting, ignorance regarding cooking process of fish), while retaining its freshness and nutritional value. Moreover its packaging allows both inspection of the product and easy access to it (convenient). The thin slices enable easy portioning and use of convenient quantity for the consumer, without having to cut the fillet into smaller pieces when smaller quantities are desired. Therefore due its functions, thin smoked fillets are targeted to consumers who are interested in paying a reasonable price for a versatile, convenient and quality product.

Consumer trends the concept can be connected to: same as §5.1.1.1

Competitive products & benefits/ weaknesses: major competitive products of thin smoked fillets are within both the delicatessen category as well as within the category of animal derived smoked products (which have a high protein level). Concerning, the delicatessen products for a niche market (bottarga, fish Carpaccio etc) thin smoked fillets are advantageous due to their affordable price. Moreover, the high nutritional value as well as desirable appearance (the fillets are presented is thin fillets similar to meat products used for sandwich fillings) make this product competitive in the wider market of smoked products (fish/meat). The main identified weakness of this product is its low added value; significant tissue losses can occur to accomplish thin fillets. Still, if the tissue that cannot be used for fillets is forwarded to the creation of other



added value products, which do not require intact tissue, the waste is limited and the price can remain affordable.

Consumption situation, reasons for consumption and frequency: due to its reasonable price and more familiar sensory characteristics thin smoked fillets can be consumed more regularly than fish Carpaccio and bottarga. Reasons for its consumption are its versatility, reasonable price for quality, gourmet characteristics, nutritional value and familiarity. Thin smoked fillets cannot constitute a whole meal, still it can be used as starter as an accompaniment in meals, as a sandwich filling or inside a salad.

Technical feasibility of the concept: there is no major bottleneck concerning the feasibility in the production process of the product and no changes are required in the production line.

Fish species suitable for realising the product concept: thin smoked fillets can utilize any DIVERSIFY fish species as raw materials. In general, fish of larger sizes, having higher yields are expected to be more profitable. However, since light smoking also produces a sense of dehydration, higher muscle fat could possibly give more desirable sensory characteristics to the produced products. Thus, while thin smoked fillets can be produced all DIVERSIFY species, greater amberjack and grey mullet offer an advantage since they combine higher fat contents (good sensory result in smoking) with good yields.

Countries the product concept should be mainly targeted at: It is a delicacy product aimed at specific consumer segments and a niche market. Thus, no specific countries are targeted like for products for mass market. Markets which could have an advantage (and therefore higher distribution of this product can be achieved) are the ones, which are more familiar with the raw fish concept as well as ready to pay a higher price for a quality/ gourmet product. Still, all markets should be targeted.

Fish species for realisation of the concept in selected countries: According D27.5 data, the UK, Germany and Italy would be interested in greater amberjack products. With respect to grey mullet, UK market is not interested in its products, while the German market is unfamiliar with this species. Still, the German market has a high number of *involved innovators* who are open to new species, so grey mullet can be used for the production also in Germany (D29.2). Italy finds grey mullet products interesting and Spain asks for different species and diversification in the market. No data on the buying process of those species exist in D27.5 for the French market (no real awareness concerning farmed fish). Moreover, according to D29.2 half of the French market consists of average consumers while only 15% represents the *involved innovators* category. Thus, the success of the selected species for realising the product concept in France is debatable.

5.2. Frozen products

5.2.1. Frozen fish fillet products without further processing

Frozen fish fillets without further processing includes ideas 1, 13, 18, 19 & 25. All of these ideas, were included in the top 20 positions of the ranking. More specifically:

- Idea 1: ***Frozen fish fillets with different recipes*** acquired the **10th** position in the ranking
- Idea 25: ***Frozen back fish fillet in transparent packaging and accompanying marinades*** the **11th** position in the ranking
- Idea 19: ***Deep frozen white fish fillet in the transparent packaging with additional information*** acquired the **12th** position in the ranking
- Idea 13: ***Frozen fish fillet that is seasoned or marinated*** acquired the **16th** position in the ranking
- Idea 18: ***Frozen fish fillet with potatoes and vegetables*** acquired the **17th** position in the ranking

Out of these concepts since, ideas 25, 13 & 18 come with accompaniments and idea 1 & 19 without. Thus, two example analyses of ***Frozen fish fillet that is seasoned or marinated*** and ***Frozen fish fillets with different recipes*** will be made, respectively.



5.2.1.1. Example analysis of frozen fish fillet seasoned/ marinated

Concept of idea: Frozen fish fillet that is seasoned or marinated either traditional, Italian, Provence or Asian. The product is produced in an environmentally sustainable way (containing ASC label). It is labelled as a premium product; the country of origin is EU. The product is in a sliding packaging, transparent vacuum-packed bag made of recyclable material, with clear pictures of the unfrozen product on the cardboard sleeve.

Available market with respect to consumer/ consumer segments: The product is intended for a mass market since it accesses the needs of various consumer types. Moreover it can be delivered to the consumers through several distribution channels including: supermarkets, specialty stores, convenient stores, restaurants, hotels, catering and fish shops (experts' opinions D28.1). While this product is a fillet, its final price range is quite reasonable, since it is marketed frozen (frozen products have a longer shelf life which lowers the risks of losses and therefore can be marketed at lower price than fresh-chilled ones). Consumer segments interested in this type of product can include; *environment conscious consumers* who prefer minimum processing, foods from short product chains and technological efficiency; *health conscious consumers* who are interested in the health promoting properties of fish products; *convenience consumers* who are interested in foods which are easy to prepare; *price conscious consumers* who generally focus on money and prefers large scale production products with ingredients of a favourable price/quality ratio; *variety seeking consumers*, who are interested in diversity in raw materials, ingredients and fabricated foods for homemade meals will be also interested in such a product since it will be produced using several different recipes which will provide diversity and therefore a lot of variety in meal choices (Linnemann et al., 1999).

Available market with respect to product and product functions: while frozen fish fillet has a less attractive appearance when compared to fresh fish products it is an accessible and attractive product from several different perspectives. Firstly, it is a convenient ready to cook product, which requires minimum preparation time before consumption, since it is already seasoned/ marinated. Secondly, issues regarding convenience in fish consumption, such as de-scaling, gutting, the existence of bones in fresh fish fillets and the ignorance of consumers regarding available recipes for preparing fish in certain countries, are dealt with. Moreover, its price and its shelf life make it even more accessible (when compared to fresh- chilled fish products) to consumers that are interested in a favourable price/ quality ratio; it can be stored for a longer time in freezer before consumption and its price allows consumers to purchase it more frequently.

Consumer trends the concept can be connected to: the concept incorporates several current and future European trends for animal protein consumption including: the increasing demand for animal proteins; the need of substitution of animal proteins from meat products with ones derived by fish products; the growing importance of sustainability certification (the product contains ASC label); the growing interest in traceability of products; the growing interest in local and regional products. Moreover it satisfies the consumers short term demands of the selected countries (UK, France, Germany, Spain and Italy) which ask for convenient fish products which are healthy and easy to prepare.

Competitive products & benefits/ weaknesses: the only weakness of this product identified by the screening process lies in the existence of similar products in the market. With respect to available competitive products, fresh fish and frozen fish fillets pose the largest competitor since they are offered in a similar price range. Moreover, for the traditional consumer, which wants to be involved in the cooking process, this product concept is disadvantageous, since it does not include such a function. Still, fresh fish fillets require several steps before cooking (degutting, de-scaling, existence of bones), which are unattractive to the majority of the consumers who ask for convenient fish products. Moreover, the existence of traditional recipe alternatives, accompanying this product, can make it competitive towards similar frozen products. Fresh fish products can also pose a threat, still according to the market insights of **WP27**, consumers make the decision between fresh and frozen fish products beforehand based on the price range they are willing to pay for creating a meal. Additionally, the inclusion of ASC label to promote products sustainability and inclusion of the origin (locality) to promote traceability can increase market power of this product.

Consumption situation, reasons for consumption and frequency: this product can constitute a regular meal of the day (lunch or dinner) prepared and consumed at home, since it needs defrosting and also requires a minimum cooking time. The product should be primarily used for its convenience, low price, health benefits



and nutritional value. Its consumption frequency can be higher when compared to fresh fish products due to its price and long preservation time.

Technical feasibility of the concept: there is no major bottleneck concerning the feasibility in the production process of the product; the major innovation lies in the success of the different recipes used and since the product is marketed frozen no obstacles will be created with respects to the products' safety and shelf life.

Fish species suitable for realising the product concept: according to experts evaluation frozen fish fillet can be literally produced from any of the species included in the DIVERSIFY project. Still, within the available species, in terms of technical-economic feasibility, filleting of large fish is more profitable since it provides higher yields. In aspects of shelf life, the fillet lipid content is a limiting factor because lipid oxidation is the main spoilage mechanism in frozen products. Thus, fattier species may be inferior. Therefore, species such as Atlantic halibut (mostly mentioned by the experts), a flatfish with flaky white meat, low muscle fat and only few bones is considered the most appropriate option. Moreover based on technical criteria meagre, wreckfish and greater amberjack are compatible and offer a competitive advantage. Among the three aforementioned species meagre is superior due to its low fat content, which allows a higher preservation quality. On the other side grey mullet is the most disadvantageous due to small commercial size and high lipid content and therefore is not recommended. Moreover, due to the fact that reared wreckfish and greater amberjack current production is minor or non-existent, new product development should focus on realising the concept with the Atlantic halibut and meagre. Even if steady aquaculture production of greater amberjack was possible, this species has the disadvantage of higher fat (and therefore oxidation susceptibility) when compared to the rest of the suggested species.

Countries the product concept should be mainly targeted at: according to the products frozen concept and the market data of WP 27, the markets/countries (within the ones investigated for DIVERSIFY) in which the products should be targeted at firstly is Germany. Germany has the highest consumption among the investigated countries with respect to frozen products consumption (30% vs. only 8% for fresh fish products). Moreover, while frozen fish products account for around only 20% of the total sales in UK and France, price lies among the three first buying criteria. Additionally, both countries ask for convenient fish products. Therefore, it is believed that a margin for introducing this product in UK and France exists. With respect to Spain and Italy, fresh products dominate the Spanish market, while both fresh and frozen fish products are consumed by Italians. Taking into account the market data and the fact that Italians are traditional consumers who want to be involved in the cooking process and Spanish consumers ask for less pre-packaging/ seasoning in their products, success of such a product in the Italian and Spanish market is debatable. On the other hand, UK and Germany would be ideal targeted markets, due to the established demand for pre-seasoned fish products.

Fish species for realisation of the concept in selected countries: Since again the product is a fillet and the suggested fish species are meagre and Atlantic halibut the analysis is similar to the one for fresh fish back fillet; Atlantic halibut should be promoted to UK, Germany and France; while meagre products should start from Italy and UK but also be aimed at France and Spain (due to the need for diversification in the market and the local production of this species).

Suggestion for changes in the concept: According to experts opinion (D28.1) this product could be also marketed as a fresh fish product (e.g. fresh fish fillet seasoned/marinated according to a traditional recipe). In such a case its concept analysis will be similar to the one of fresh fish back fillet).

5.2.1.2. Example analysis of frozen fish fillets with different recipes

Concept of idea: Frozen fish fillets divided in double portions; each packaging includes three or four 2-person portions from the same or different fish species packaged separately. The product is produced in an environmentally sustainable way (containing ASC label). It is labelled as a premium product; the country of origin is EU. The product is included in transparent vacuum packed bags (one for each 2-persons' portion) made of recyclable material where fish fillets are laid; each bag can be divided easily from the other; each 2-



portion bag has a different recipe from the others within the same package; a picture of the prepared dish is included on each 2-portion bag.

Available market with respect to consumer/ consumer segments: The product is intended for a mass market since it accesses the needs of various consumer types. Moreover it can be delivered to the consumers through several distribution channels including: supermarkets, specialty stores, convenient stores, restaurants, hotels, catering and fish shops (experts' opinions D28.1). While this product is a fillet, its final price range is quite reasonable, since it is marketed frozen (frozen products have a longer shelf life which lowers the risks of losses and therefore can be marketed at lower price than fresh-chilled ones). Consumer segments interested in this type of product can include; *environment conscious consumers* who prefer minimum processing, foods from short product chains and technological efficiency; *health conscious consumers* who are interested in the health promoting properties of fish products; *convenience consumers* who are interested in foods which are easy to prepare; *price conscious consumers* who generally focus on money and prefers large scale production products with ingredients of a favourable price/quality ratio; *variety seeking consumers*, who are interested in diversity in raw materials, ingredients and fabricated foods for homemade meals will be also interested in such a product since it will be produced using several different recipes which will provide diversity and therefore a lot of variety in meal choices (Linnemann et al., 1999). Furthermore the product is attractive to the traditional consumers or consumers that want to be highly involved to the cooking process.

Available market with respect to product and product functions: while frozen fish fillet has a less attractive appearance when compared to fresh fish products it is an accessible and attractive product from several different perspectives. Firstly, issues regarding convenience in fish consumption, such as de-scaling, gutting, the existence of bones in fresh fish fillets and the ignorance of consumers regarding available recipes for preparing fish in certain countries, are dealt with. Moreover, its price and its shelf life make it even more accessible (when compared to fresh- chilled fish products) to consumers that are interested in a favourable price/ quality ratio; it can be stored for a longer time in freezer before consumption and its price allows consumers to purchase it more frequently.

Consumer trends the concept can be connected to: the concept incorporates several current and future European trends for animal protein consumption including: the increasing demand for animal proteins; the need of substitution of animal proteins from meat products with ones derived by fish products; the growing importance of sustainability certification (the product contains ASC label); the growing interest in traceability of products; the growing interest in local and regional products. Moreover it satisfies the consumers short term demands of the selected countries (UK, France, Germany, Spain and Italy) which ask for convenient fish products which are healthy and easy to prepare.

Competitive products & benefits/ weaknesses: the major weakness of this product is the existence of similar products in the market. With respect to available competitive products, fresh fish and frozen fish fillets pose the largest competitor since they are offered in a similar price range. Still, the concept of the product creates an advantage, since it is offered in very competitive prices (minimum processing), has a long shelf life and still allows consumer involvement and versatility in the cooking process (different recipes that are dealing with consumers ignorance of how to prepare fish meals).

Consumption situation, reasons for consumption and frequency: this product can constitute a regular meal of the day (lunch or dinner) prepared and consumed at home, since it needs defrosting and also requires a minimum cooking time. The product should be primarily used for its convenience, low price, health benefits and nutritional value. Its consumption frequency can be higher when compared to fresh fish products due to its price and long preservation time.

Technical feasibility of the concept: there is no major bottleneck concerning the feasibility in the production process of the product; the major innovation lies in the multiple packaging and the recipes included.

Fish species suitable for realising the product concept: according to experts evaluation frozen fish fillet can be literally produced from any of the species included in the DIVERSIFY project. Still, within the available species, in terms of technical-economic feasibility, filleting of large fish is more profitable since it provides higher yields. In aspects of shelf life, the fillet lipid content is a limiting factor because lipid oxidation is the main spoilage mechanism in frozen products. Thus fattier species may be inferior. Therefore, species such as



Atlantic halibut (mostly mentioned by the experts), a flatfish with flaky white meat, low muscle fat and only few bones is considered the most appropriate option. Moreover based on technical criteria meagre, wreckfish and greater amberjack are compatible and offer a competitive advantage. Among the three aforementioned species meagre is superior due to its low fat content, which allows a higher preservation quality. On the other side grey mullet is the most disadvantageous due to small commercial size and high lipid content and therefore is not recommended. Moreover, due to the fact that reared wreckfish and greater amberjack current production is minor or non-existent, new product development should focus on realising the concept with the Atlantic halibut and meagre. Even if steady aquaculture production of greater amberjack was possible, this species has the disadvantage of higher fat (and therefore oxidation susceptibility) when compared to the rest of the suggested species.

Countries the product concept should be mainly targeted at: according to the products frozen concept and the market data of WP 27, the markets/countries (within the ones investigated for DIVERSIFY) in which the products should be targeted at firstly is Germany. Germany has the highest consumption among the investigated countries with respect to frozen products consumption (30% vs. only 8% for fresh fish products). Moreover, while frozen fish products account for around only 20% of the total sales in UK and France, price lies among the three first buying criteria. Additionally, both countries ask for convenient fish products. Therefore, it is believed that a margin for introducing this product in UK and France exists. With respect to Spain and Italy, fresh products dominate the Spanish market, while both fresh and frozen fish products are consumed by Italians. Taking into account the market data and the fact that Italians are traditional consumers who want to be involved in the cooking process and Spanish consumers ask for less pre-packaging/ seasoning in their products, success of such a product in the Italian and Spanish market is debatable. On the other hand, UK and Germany would be ideal targeted markets, due to the established demand for pre-seasoned fish products. Moreover, this product could have better success chances if targeted in more traditional markets such as Italy and Spain. In specific Italian consumers seem to be more involved in the preparation of their meals, therefore such a product could have an advantage in the Italian market. Additionally, the Spanish market asks for fish fillets, but still requires less seasoning and pre-packaging since a negative image of processed products exist in the market. Thus, fish fillets with different recipes have greater chances for success in the Italian and Spanish market.

Fish species for realisation of the concept in selected countries: Since again the product is a fillet and the suggested fish species are meagre and Atlantic halibut the analysis is similar to the one for fresh fish back fillet; Atlantic halibut should be promoted to UK, Germany and France; while meagre products should start from Italy and UK but also be aimed at France and Spain (due to the need for diversification in the market and the local production of this species).

Suggestion for changes in the concept: this product could be also marketed as a fresh-chilled fish product, and the consumers could have the option to freeze just part of it.

5.2.2. Whole frozen fish products

Whole frozen fish products includes ideas 15 & 16. Both ideas were included in the top 20 positions of the ranking. More specifically:

- Idea 15: **Whole deep frozen fish** acquired the **18th** position in the ranking

An example analysis of **Whole deep frozen fish** will not follow since it is a really common fish product found in all EU markets.



5.3. Other processed products

5.3.1. Bottarga

Due to its unique technical characteristics bottarga could not be grouped with other concepts. *Bottarga sliced like medallions* was included in the top 20 positions of the ranking in which it acquired the **13th** position. A detailed analysis of the concept follows.

5.3.1.1. Example analysis of bottarga

Concept of idea: Bottarga made of grey mullet and sliced like medallions. Bottarga is a Mediterranean delicacy of salted, cured fish roe, typically from grey mullet or tuna. The product is similar to the softer cured mullet roe, karasumi from Japan and East Asia. The product is produced in an environmentally sustainable way (containing ASC label). It is labelled as a premium product; the country of origin is EU. The packaging is a tray with the transparent film on the top and product can be served in the same tray.

Available market with respect to consumer/ consumer segments: The product is intended for specific market segments due to its price and characteristics. Moreover, it is best fitted to be delivered to the consumers through specific distribution channels including mainly: specialty stores, delicatessen and gourmet. Moreover, it can also be delivered to specific: supermarkets, convenient stores, sandwich stores, hotels, catering and restaurants, which have a delicatessen corner or are interested in delicatessen products with premium quality (experts' opinions D28.1). The price range of this product is elevated due to its nature and is targeted for consumers with specific tastes who are interested in investing in a gourmet quality product. Consumer segments interested in this type of product can include mostly; *hedonic consumers* who desire food with a high sensory quality and *variety seeking consumers*, who are interested in diversity in raw materials and ingredients (Linnemann et al., 1999).

Available market with respect to product and product functions: the innovativeness of the special packaging the product is offered in along with its high quality and price, making it a delicacy product aimed at specific market/ consumer segments. Such a product can be used as a side dish, or incorporated in the preparation of a dish. Still, bottarga is also a convenient ready to eat product, since it requires no preparation. Due to the fact that the product contains high levels of salt, on the one hand it has a long shelf life while on the other hand it should not be consumed in high quantities especially from people who have salt diet restrictions (like elderly people). Product packaging and presentation was especially appealing to the experts (D28.1). These functions attach added-value to the product since the packaging allows the consumer to inspect the product within its transparency, makes storage more convenient than custom non-packed bottarga, and the medallion-shaped roe cuts are convenient, innovative and attractive.

Consumer trends the concept can be connected to: the concept incorporates several current and future European trends for animal product consumption including: the increasing demand for n-3 polyunsaturated fatty acids; the need of substitution of animal lipids from meat products with health-enhancing ones derived from fish products; the growing importance of sustainability certification (the product contains ASC label); the growing interest in traceability of products; the growing interest in local and regional products..

Competitive products & benefits/ weaknesses: bottarga is targeted at a niche market for specific consumers segments with special tastes. Thus, major competitive products are within the delicatessen category and include mainly bottarga (or variations of it), which have an already established market. Still, because of their nature the price range of the competitive products in the market is similar to our products. The main identified weaknesses, are its price (bottarga has a high production cost), its healthiness (due to the high level of salt), as well as the existing competition. Since, bottarga is a delicacy that already exists in several markets, the main advantage this product could have over competitive ones is its convenient and attractive packaging. Moreover, the alternative uses of the product (included on the packaging) as well as the innovation of making bottarga from fish species (other than grey mullet could create an advantage for the product.



Consumption situation, reasons for consumption and frequency: due to its high price, high salt content and unique taste, bottarga is not by its nature a product to be consumed regularly and in high quantities. Thus, it can be used in special occasions. Bottarga cannot constitute a whole meal, but it can be used as an accompaniment in meals, as a sandwich filling, inside a salad for extra flavour or in the preparation of a sauce marinade to produce more intense flavours.

Technical feasibility of the concept: there is no major bottleneck concerning the feasibility in the production process of the product and no changes are required in the production line; the major innovation lies in the attractive and convenient packaging.

Fish species suitable for realising the product concept: bottarga can be produced by the roe of any fish species that have adequate roe yield (mirrored in gonadosomatic index) and have specific sensory properties in its roes. Traditionally, specific fish species are used for the production of food deriving from their roe or eggs (Bledsoe et al., 2003). Bottarga is a traditional product consisting of mullet roe. The use of the other species to produce similar products would enable a high degree of uncertainty in both terms of production (technical limitations: 1. obtain of adequate quantities of raw material 2. response of raw material to processing) and in terms of end-product quality (integrity, sensory properties). This is due to the complete absence of information in roes. However, in a future perspective maybe Atlantic halibut, greater amberjack and pikeperch can be considered. This is assumed by the fact that species with great similarities to them (genera of the same families), *i.e.* the flounder (*Platyichthis* or *Paralychthis* sp.), the tuna, and the perch (*Perca fluviatilis*), respectively, are used for their roes (Bledsoe et al., 2003).

Countries the product concept should be mainly targeted at: This is a delicacy product aimed at specific consumer segments and a niche market. Thus, no specific countries are targeted like for products for mass market. Markets which could have an advantage (and therefore higher distribution of this product can be achieved) are the ones which are more familiar with the raw fish concept as well as ready to pay a higher price for a quality/ gourmet product. Still, all markets should be targeted.

Fish species for realisation of the concept in selected countries: For the time being and due to the absence of knowledge in other species roe quality, grey mullet should be used for bottarga production in all selected countries.

5.3.2. Fish pate/ spreads, dried fish sticks, seasoning, sauces

Fish spreads, dried fish sticks, seasoning, sauces includes ideas 8, 9, 11, 12, 28. Out of these 5 ideas only Idea 19 was included in the top 20 positions of the ranking. More specifically Idea 19: **Fish pate/ spreads** acquired the **19th** position in the ranking. An example analysis of Idea 19 will follow.

5.3.2.1. Example analysis of fish pate/ spreads

Concept of idea: Fish pate/ spreads prepared using different recipes. Can be used as starter or incorporated in a sandwich. The product is sustainably produced (containing ASC label). It is labelled as a premium product; the country of origin is EU. The product is included in a tube to facilitate use, extraction of right amount of product as well as prolong shelf life (only outer part of the product will come in contact with air in each use).

Available market with respect to consumer/ consumer segments: Fish pate/spreads is a convenient, healthy, affordable, added value product targeted to mass market. It constitutes a healthy, convenient way of enhancing the flavour of meals since it can be used as sandwich filling or a meal starter. Moreover, due to its processing it has a longer shelf life. Due to product's versatility and shelf life, it could be delivered to the consumers through several distribution channels including: supermarkets, convenient stores, hotels, hospitals, catering and restaurants. Consumer segments interested in this type of product can include: *health conscious consumers* who are interested in enhancing their meals flavour with a healthy product with no additives; *price conscious consumers* who interested in products with a favourable price/quality ratio; *convenience consumers* which are interested in a easy way of enhancing their meals flavour; *hedonic*



consumers who are interested in enhancing the sensory quality of their meals; *variety seeking consumers*, who are interested in variety in ingredients for homemade meals (Linnemann et al., 1999).

Available market with respect to product and product functions: fish pate/spreads is a convenient, ready to use product, which can be used as sandwich filling or a starter. The packaging, facilitates its usage, allows easy portioning while it secures the freshness of the rest of the product. The product can be highly attractive and provide an alternative for catering, and restaurants that want to increase the versatility of their products. Additionally, due to the fact it uses industry's fish by products (heads, tails or bones) in its preparation, it is affordable. Finally fish pate/ spreads is a highly versatile product since it can be used in the preparation of various dishes.

Consumer trends the concept can be connected to: while the product by itself does not increase significantly animal protein consumption or the substitution of terrestrial animal proteins with fish-derived ones, it still constitutes a convenient, healthy, environmentally sustainable fish product.

Competitive products & benefits/ weaknesses: major competitive products include the ones within the general pate/ spread category available in the market. Still, taking into account the health benefits and affordable price, fish pate/ spreads could be highly competitive to competitive products from other origin (meat), since currently there is a turn to convenient and healthy products. Moreover, the convenient packaging of the product, which facilitates its use and prolongs its shelf life make it even more appealing and competitive. Besides the benefits this product offers to consumers, it is a highly advantageous for the industry since it uses fish by-products, such as heads, tails and bones, which in general have limited uses, to create an added-value product. The main identified weakness of this product is its reduced value of freshness.

Consumption situation, reasons for consumption and frequency: fish broth constitutes a convenient, ready to use product with versatile uses. It can be used frequently in the preparation of various home-made sandwiches or a starter etc. Moreover, it can be used by restaurants, caterings or even hospitals since it is healthy and has a high nutritional value. Reasons for its consumption are its versatility in uses, familiar sensory characteristics, healthiness and affordable price.

Technical feasibility of the concept: there is no major bottleneck concerning the feasibility of the products production process.

Fish species suitable for realising the product concept: fish pate spreads can utilize industry fish discards of all species. In specific, since pate/spreads are produced by fish parts with a low value such as bones, heads and tails, fish high higher discards of the short could be more profitable. Thus, fish with higher bones percentage, such as meagre and wreckfish, which have large heads and skeletons in relation to their body size, are particularly advantageous. Still, all species depending on the industry's availability and discards should be used to make this process even more profitable.

Countries the product concept should be mainly targeted at: all countries should be targeted

Fish species for realisation of the concept in selected countries: all fish species separately, or even a combination of fish species, can be used depending on the availability. Still a certain recipe to ensure the same quality of product should be followed.



6. Conclusion

Generation of a pool of ideas for potential fish products, which could be realized using the DIVERSIFY species, was the aim of this deliverable. In order to identify the concepts with the highest chances of success among the generated ones, all concepts were screened, using a quantitative scoring method. The following concepts acquired the highest scores and are suggested for product development. In order to divide the products into groups for the facilitation of the reader, their main characteristics are used as follows.

A. Mass market products: can be delivered through several distribution channels; are oriented to the widest variety of consumer segments. Similarities are that they can constitute a regular daily meal; price and versatile characteristics allow frequent use; are convenient, healthy, have high nutritional value; there are no bottlenecks in their production. The advantageous aforementioned characteristics make them competitive against fresh or frozen fish products that occur in mass market. These mass market products include:

1. **Fresh fillet products without further processing** including Idea 14: *Fresh fish fillet with herbs and spices*, Idea 21: *Fresh fish fillet with different 'healthy' seasoning and marinades*, Idea 40: *Fresh fish fillet sliced presented in the shape imitating of fish scales*, Idea 29: *Fresh fish fillet medallions with garnish and sauce*, Idea 20: *Fresh back fish fillet* and Idea 43: *Fresh fish fillet that comes with 3-day plan*.
2. **Ready to eat meals** represented by Idea 4: *Ready to eat meal, salad with fish*.
3. **Fish steaks or large pieces or roasts** represented by Idea 42: *Fresh fish roast*.
4. **Whole frozen fish products** that include ideas 15 & 16, both included in the top 20 positions of the ranking.
5. **Frozen fish fillets without further processing** including: Idea 1: *Frozen fish fillets with different recipes*, Idea 25: *Frozen back fish fillet in transparent packaging and accompanying marinades*, Idea 19: *Deep frozen white fish fillet in the transparent packaging with additional information*, Idea 13: *Frozen fish filet that is seasoned or marinated*, and Idea 18: *Frozen fish fillet with potatoes and vegetables*.

Regarding suitability of the DIVERSIFY species, all species are suitable for the above ideas. However, Atlantic halibut, meagre, wreckfish and greater amberjack can offer a competitive technical advantage. Atlantic halibut products could be targeted to UK, Germany and France (already established market for these species). Meagre products could be launched to the UK (already established market for this species) and Spain, France and Italy (countries with meagre production). There is demand for frozen products in German, as well as an established demand in the UK and Germany for pre-seasoned fish products.

B. Products targeted to specific market segments: delicacies/high end products, best if delivered to the consumers through specific distribution channels such as specialty stores or delicatessens. The price range is elevated due to their nature, and are oriented mainly to consumer prototypes such as *hedonic consumers* and *variety seeking consumers*. Competitive advantages include innovative nature and packaging; convenience; versatility in use. There are no obvious bottlenecks in their production.

6. **Fish Carpaccios or tartars** (including ideas 24, 30 & 38), were all included in the top 20 positions of the ranking. As an example is typically described *Fish Carpaccio 2* seasoned with ginger and chilli and presented in the form of fish scales-like cuts (Idea 38): The packaging is a plate that looks as a round box with compartments and a transparent wheel on the top that can be turned to reach different sections. Advantages include high nutritional value and freshness due to minimum processing, innovativeness and healthiness. The only identified weaknesses are higher price; limited shelf life; unfamiliarity with raw product concept. Still, major competitors have similar price range. A suggestion for possible changes in the product is the inclusion of a milder seasoning.
7. **Bottarga sliced like medallions** (Idea 39). Bottarga is a Mediterranean delicacy of salted, cured fish roe, typically from grey mullet or tuna. The product is similar to the softer cured mullet roe, karasumi from



Japan and East Asia. The packaging is a tray with the transparent film on the top and the product can be served in the same tray. Due to high levels of salt it has a prolonged shelf life. Product packaging and presentation give added-value to the product, and the medallion-shaped roe cuts are convenient, innovative and attractive. The main identified weaknesses, are its price and the existing competition.

8. **Fresh thin smoked fillets** (Idea 2): the packaging is a plastic tray where the fillets are laid covered with a transparent plastic that allows visibility of the fillets. Ideas concerning the different uses of the fillets are included on the product's sleeve. This product can be targeted to wider market segments than product 4 or 5 due to more affordable price and higher familiarity in sensory characteristics (smoking). Among the advantages are versatility in uses; convenience; freshness; nutritional value; reasonable price/quality; familiarity in sensory characteristics. Thin smoked fillets are competitive due to price, high nutritional value and desirable appearance and because they are appropriate for several uses. Main identified weakness includes the low added value due to significant filleting losses.

All species are suitable for development of product 4 to 6; however grey mullet and greater amberjack are advantageous due to the combination of higher fat contents (good sensory result in smoking) with good yields. Bottarga can be produced by the roe of any fish species that have adequate roe yield and specific sensory properties, but possible bottlenecks in the production could arise if other species than mullet are used (traditional). Since these are delicacies aimed at specific consumer segments, no specific countries are targeted. The UK, Germany and Italy show interest for greater amberjack products, Italy finds grey mullet products interesting and Spain asks for different species and diversification in the market.

C. Added-value products: can be targeted to mass market and delivered through several distribution routes. Common characteristics of these products include convenience; versatility; high nutritional value; affordable price; and high added value. Added value products may not by themselves increase significantly fish consumption, still they should be incorporated in the production parallel to other products. Such a practice could generate significant profits by using industries' low value by-products or discards.

9. **Fish burgers, balls or sausages** represented by Idea 6 *Frozen fish burgers in the shape of fish, targeted to children*. The burgers are ready to cook and prepared with a mild seasoning. The product is included in a transparent vacuum-packed bag or in a plastic tray with transparent plastic on the top. Information on fish for educative purposes (children) and playful gifts (e.g., sticker) are included in the packaging. This is intended to increase fish consumption in children. The advantages of this product includes absence of bones; attractive shape for children; reasonable price; versatility; familiar sensory characteristics; convenience; healthiness and nutritional value. Main identified weaknesses include technical feasibility in equipment and low freshness (frozen).
10. **Fish spreads, dried fish sticks, seasoning, sauces** represented by Idea 19 *fish pate*. Fish pate/ spreads prepared using different recipes. Can be used as starter or incorporated in a sandwich. The product is sustainably produced (containing ASC label). It is labelled as a premium product; the country of origin is EU. Its advantages are its convenient use, healthiness, affordable price, prolonged shelf life. The main identified weakness of this product is its reduced value of freshness.

For the creation of these products all fish species can be utilised as raw materials. Since product 9 is marketed frozen, low fat species, such as meagre are advantageous, followed by other low fat species such as Atlantic halibut and pikeperch. No specific country or market limitations occur for this group of products.

Finally a convenient mass-market product with characteristics depending on the choice of incorporated fish is:

11. Idea 4: **Fresh ready to eat salad that includes fish as well as an accompanying sauce;** fish and sauce are provided, and are separately packed and included within the original package. The fish included is either a smoked fillet (provided in slices), or vinegar-cooked, or alternatively bottarga; thus, the dish can be eaten cold. The packaging is composed of a bowl where the salad is placed; the fish pieces and the sauce are provided in separate transparent accompanying packages. A transparent lid exists on the top to allow product visibility and the packaging has the picture of the ready meal on it. Advantages include



convenience; healthiness; freshness; nutritional value; and familiarity. The main disadvantage is short shelf life. Depending on the fish accompaniment, characteristics (such as price) can change.

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APPENDIX 1

Name of expert (Alphabetical order) – expertise field

Mrs. Niki Alexi (P1. HCMR) - Food Scientist specialized in Food Sensory analysis & consumer science.

Dr. Marija Banovic (P11. AU) – Consumer Science

Dr. Kriton Grigorakis (P1. HCMR) – Food science, Fish quality.

Dr. Luis Guerrero (P3. IRTA) - Food Development, Food Sensory Analysis, Consumer behaviour, Sensometrics

Prof. Athanasios Krystallis (P11. AU) – Consumer behaviour, Consumer Strategy, Industrial Marketing

Dr. Machiel Reinders (P6. LEI/DLO) – Marketing & consumer Behaviour



APPENDIX 2

FP7-KBBE-2013-07, DIVERSIFY 603121

Luis Guerrero

CRITERIA	ID 1	ID 2	ID 3	ID 4	ID 5	ID 6	ID 7	ID 8	ID 9	ID 10	ID 11	ID 12	ID 13	ID 14	ID 15	ID 16	ID 17	ID 18	ID 19	ID 20	ID 21	ID 22
1. Nutritional benefit / value	6,0	5,0	5,0	6,0	5,0	5,0	5,0	5,0	5,0	4,0	5,0	4,0	6,0	7,0	6,0	6,0	6,0	5,0	6,0	6,0	6,0	5,0
2. Healthiness	6,0	5,0	6,0	6,0	6,0	6,0	6,0	6,0	6,0	5,0	6,0	4,0	6,0	6,0	6,0	6,0	6,0	6,0	6,0	6,0	6,0	6,0
3. Convenience in preparation (easy to cook)	6,0	7,0	6,0	6,0	6,0	6,0	6,0	7,0	6,0	6,0	6,0	5,0	6,0	6,0	5,0	5,0	5,0	5,0	5,0	5,0	6,0	6,0
4. Convenience for consumption (ready to eat)	5,0	7,0	6,0	6,0	6,0	5,0	5,0	7,0	6,0	5,0	5,0	6,0	5,0	6,0	4,0	5,0	5,0	5,0	5,0	5,0	5,0	6,0
5. Cost for consumer (price)	4,0	3,0	5,0	6,0	5,0	6,0	6,0	5,0	6,0	6,0	6,0	6,0	5,0	4,0	5,0	4,0	4,0	5,0	5,0	3,0	4,0	4,0
6. Technical feasibility (equipment & raw material)	6,0	6,0	6,0	6,0	6,0	7,0	7,0	6,0	6,0	5,0	4,0	6,0	6,0	6,0	6,0	6,0	6,0	5,0	6,0	6,0	6,0	6,0
7. Technical feasibility (know-how)	6,0	6,0	6,0	6,0	5,0	7,0	7,0	6,0	6,0	5,0	5,0	6,0	6,0	7,0	6,0	5,0	5,0	4,0	6,0	7,0	6,0	6,0
8. Specific consumer targeting	5,0	6,0	6,0	6,0	5,0	7,0	6,0	6,0	6,0	5,0	6,0	6,0	6,0	6,0	5,0	6,0	6,0	5,0	5,0	6,0	4,0	4,0
9. Familiarity	6,0	5,0	6,0	5,0	6,0	6,0	6,0	5,0	5,0	3,0	4,0	4,0	6,0	7,0	6,0	5,0	5,0	6,0	6,0	5,0	6,0	6,0
10. Newness/innovativeness	3,0	5,0	4,0	5,0	5,0	5,0	4,0	6,0	6,0	6,0	6,0	6,0	4,0	3,0	3,0	4,0	4,0	4,0	4,0	5,0	4,0	4,0
11. Existence of similar products/ Competitors	4,0	5,0	3,0	5,0	4,0	5,0	4,0	5,0	6,0	5,0	5,0	5,0	4,0	3,0	4,0	4,0	4,0	4,0	4,0	5,0	4,0	4,0
12. Shares characteristics of successful products	4,0	6,0	5,0	4,0	5,0	6,0	5,0	5,0	4,0	5,0	4,0	4,0	5,0	6,0	5,0	4,0	4,0	4,0	4,0	5,0	5,0	4,0
13. Perceived consumer freshness	2,0	5,0	4,0	5,0	5,0	4,0	6,0	5,0	4,0	3,0	4,0	3,0	4,0	7,0	4,0	5,0	5,0	5,0	5,0	6,0	6,0	5,0
14. Safety	6,0	6,0	5,0	6,0	6,0	6,0	6,0	6,0	6,0	6,0	6,0	5,0	6,0	5,0	5,0	5,0	5,0	5,0	6,0	5,0	6,0	6,0
15. Shelf life	4,0	6,0	7,0	5,0	6,0	4,0	6,0	7,0	7,0	7,0	7,0	7,0	6,0	5,0	6,0	5,0	5,0	6,0	6,0	5,0	5,0	6,0
16. Packaging	5,0	6,0	6,0	5,0	6,0	4,0	5,0	6,0	7,0	5,0	4,0	6,0	6,0	6,0	6,0	6,0	6,0	6,0	5,0	6,0	6,0	6,0
17. Added value	3,0	6,0	5,0	6,0	6,0	5,0	4,0	5,0	5,0	5,0	5,0	5,0	5,0	6,0	5,0	5,0	5,0	6,0	5,0	6,0	5,0	5,0
18. Attractiveness (Appearance/ presentation)	4,0	6,0	5,0	6,0	6,0	6,0	4,0	6,0	4,0	3,0	4,0	4,0	5,0	6,0	5,0	5,0	5,0	6,0	5,0	6,0	6,0	6,0
19. Recipes (versatility / packaging)	6,0	6,0	3,0	6,0	5,0	5,0	5,0	5,0	6,0	6,0	7,0	7,0	6,0	7,0	6,0	6,0	6,0	5,0	6,0	5,0	5,0	6,0



Luis Guerrero

CRITERIA	ID 23	ID 24	ID 25	ID 26	ID 27	ID 28	ID 29	ID 30	ID 31	ID 32	ID 33	ID 34	ID 35	ID 36	ID 37	ID 38	ID 39	ID 40	ID 41	ID 42	ID 43
1. Nutritional benefit / value	6,0	6,0	6,0	5,0	6,0	5,0	6,0	6,0	6,0	5,0	7,0	6,0	6,0	6,0	6,0	6,0	6,0	6,0	6,0	6,0	6,0
2. Healthiness	6,0	6,0	6,0	5,0	6,0	6,0	6,0	6,0	6,0	5,0	7,0	6,0	7,0	6,0	6,0	6,0	4,0	6,0	6,0	6,0	6,0
3. Convenience in preparation (easy to cook)	6,0	7,0	5,0	6,0	6,0	6,0	5,0	7,0	3,0	6,0	6,0	6,0	7,0	6,0	6,0	6,0	6,0	6,0	7,0	5,0	4,0
4. Convenience for consumption (ready to eat)	5,0	7,0	5,0	6,0	5,0	6,0	5,0	7,0	3,0	5,0	7,0	5,0	7,0	6,0	5,0	7,0	7,0	5,0	7,0	5,0	5,0
5. Cost for consumer (price)	5,0	4,0	5,0	5,0	6,0	6,0	4,0	4,0	5,0	5,0	4,0	5,0	4,0	5,0	5,0	4,0	3,0	4,0	5,0	5,0	5,0
6. Technical feasibility (equipment & raw material)	6,0	7,0	6,0	6,0	7,0	6,0	6,0	7,0	6,0	5,0	7,0	6,0	6,0	6,0	6,0	6,0	6,0	6,0	6,0	6,0	6,0
7. Technical feasibility (know-how)	7,0	6,0	6,0	6,0	7,0	6,0	6,0	7,0	7,0	5,0	7,0	7,0	7,0	6,0	5,0	6,0	6,0	6,0	7,0	6,0	6,0
8. Specific consumer targeting	4,0	6,0	5,0	5,0	5,0	6,0	6,0	7,0	6,0	6,0	6,0	4,0	6,0	5,0	4,0	5,0	7,0	6,0	6,0	5,0	6,0
9. Familiarity	6,0	6,0	6,0	5,0	6,0	5,0	6,0	5,0	6,0	6,0	6,0	6,0	6,0	6,0	6,0	5,0	3,0	6,0	6,0	6,0	4,0
10. Newness/innovativeness	4,0	5,0	4,0	5,0	4,0	5,0	4,0	6,0	3,0	4,0	4,0	3,0	4,0	4,0	4,0	5,0	5,0	6,0	6,0	4,0	6,0
11. Existence of similar products/ Competitors	5,0	4,0	4,0	4,0	4,0	4,0	4,0	6,0	3,0	4,0	4,0	3,0	6,0	6,0	4,0	5,0	4,0	6,0	6,0	5,0	5,0
12. Shares characteristics of successful products	5,0	5,0	5,0	4,0	4,0	4,0	5,0	3,0	5,0	5,0	6,0	6,0	4,0	5,0	6,0	5,0	6,0	4,0	4,0	5,0	5,0
13. Perceived consumer freshness	6,0	6,0	5,0	4,0	4,0	4,0	6,0	6,0	6,0	4,0	5,0	6,0	5,0	5,0	6,0	5,0	6,0	6,0	5,0	6,0	6,0
14. Safety	5,0	6,0	6,0	6,0	6,0	6,0	6,0	5,0	6,0	6,0	6,0	6,0	5,0	6,0	6,0	6,0	6,0	6,0	6,0	6,0	6,0
15. Shelf life	5,0	6,0	6,0	6,0	5,0	6,0	5,0	3,0	3,0	6,0	6,0	4,0	5,0	6,0	5,0	6,0	6,0	5,0	5,0	5,0	5,0
16. Packaging	6,0	6,0	6,0	6,0	5,0	6,0	6,0	6,0	5,0	6,0	5,0	-	6,0	6,0	6,0	7,0	6,0	5,0	6,0	5,0	6,0
17. Added value	6,0	5,0	4,0	5,0	5,0	5,0	5,0	6,0	5,0	5,0	6,0	5,0	6,0	5,0	4,0	6,0	5,0	5,0	5,0	5,0	6,0
18. Attractiveness (Appearance/ presentation)	6,0	6,0	5,0	6,0	5,0	4,0	6,0	6,0	4,0	6,0	6,0	5,0	6,0	5,0	6,0	6,0	6,0	6,0	6,0	5,0	6,0
19. Recipes (versatility / packaging)	5,0	6,0	6,0	5,0	6,0	4,0	6,0	3,0	6,0	4,0	3,0	6,0	6,0	6,0	6,0	5,0	5,0	6,0	7,0	5,0	7,0



M. Banovic

CRITERIA	ID1	ID2	ID3	ID4	ID5	ID6	ID7	ID8	ID9	ID10	ID11	ID12	ID13	ID14	ID15	ID16	ID17	ID18	ID19	ID20	ID21	ID22
1. Nutritional benefit / value	4,0	3,0	5,0	6,0	5,0	5,0	4,0	4,0	5,0	5,0	5,0	5,0	5,0	6,0	6,0	6,0	6,0	5,0	6,0	7,0	7,0	5,0
2. Healthiness	4,0	3,0	5,0	6,0	5,0	5,0	5,0	3,0	5,0	5,0	5,0	5,0	6,0	6,0	6,0	6,0	6,0	5,0	6,0	6,0	7,0	4,0
3. Convenience in preparation (easy to cook)	6,0	5,0	7,0	7,0	7,0	5,0	6,0	7,0	7,0	7,0	7,0	6,0	6,0	6,0	5,0	6,0	6,0	6,0	5,0	5,0	5,0	4,0
4. Convenience for consumption (ready to eat)	4,0	4,0	7,0	7,0	7,0	6,0	6,0	7,0	7,0	3,0	3,0	6,0	6,0	5,0	4,0	5,0	5,0	6,0	5,0	5,0	5,0	4,0
5. Cost for consumer (price)	4,0	4,0	2,0	2,0	2,0	3,0	5,0	6,0	6,0	5,0	6,0	5,0	4,0	3,0	4,0	3,0	3,0	4,0	4,0	2,0	2,0	4,0
6. Technical feasibility (equipment & raw material)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
7. Technical feasibility (know-how)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
8. Specific consumer targeting	5,0	4,0	4,0	4,0	4,0	5,0	5,0	5,0	5,0	6,0	6,0	5,0	6,0	6,0	6,0	6,0	6,0	6,0	4,0	6,0	6,0	4,0
9. Familiarity	5,0	5,0	5,0	3,0	5,0	5,0	5,0	6,0	6,0	5,0	4,0	4,0	5,0	4,0	6,0	5,0	5,0	4,0	6,0	5,0	5,0	6,0
10. Newness/innovativeness	4,0	5,0	6,0	6,0	6,0	5,0	5,0	6,0	6,0	6,0	6,0	6,0	4,0	5,0	4,0	5,0	5,0	5,0	3,0	3,0	4,0	4,0
11. Existence of similar products/ Competitors	4,0	4,0	6,0	6,0	5,0	6,0	6,0	5,0	4,0	6,0	6,0	5,0	4,0	4,0	2,0	4,0	4,0	4,0	6,0	5,0	5,0	3,0
12. Shares characteristics of successful products	6,0	4,0	6,0	4,0	4,0	5,0	4,0	4,0	5,0	5,0	5,0	5,0	5,0	6,0	6,0	5,0	6,0	4,0	6,0	5,0	5,0	5,0
13. Perceived consumer freshness	6,0	5,0	6,0	4,0	4,0	5,0	4,0	4,0	4,0	4,0	5,0	4,0	6,0	7,0	7,0	6,0	7,0	5,0	4,0	7,0	7,0	4,0
14. Safety	6,0	6,0	4,0	2,0	3,0	4,0	3,0	5,0	4,0	3,0	5,0	3,0	6,0	4,0	7,0	6,0	4,0	6,0	6,0	3,0	3,0	6,0
15. Shelf life	7,0	7,0	3,0	2,0	4,0	2,0	5,0	5,0	3,0	6,0	4,0	6,0	4,0	7,0	6,0	4,0	5,0	6,0	4,0	4,0	4,0	6,0
16. Packaging	7,0	6,0	6,0	6,0	6,0	6,0	6,0	6,0	6,0	5,0	5,0	5,0	6,0	5,0	6,0	5,0	5,0	6,0	6,0	6,0	6,0	6,0
17. Added value	6,0	6,0	6,0	6,0	6,0	6,0	6,0	6,0	6,0	6,0	6,0	6,0	5,0	5,0	5,0	6,0	6,0	6,0	6,0	6,0	6,0	6,0
18. Attractiveness (Appearance/ presentation)	7,0	6,0	5,0	6,0	6,0	6,0	5,0	6,0	5,0	5,0	5,0	5,0	7,0	6,0	7,0	6,0	7,0	6,0	6,0	7,0	7,0	6,0
19. Recipes (versatility / packaging)	7,0	5,0	5,0	3,0	3,0	6,0	6,0	4,0	3,0	4,0	5,0	5,0	6,0	6,0	6,0	5,0	5,0	5,0	6,0	6,0	6,0	3,0



M Banovic

CRITERIA	ID 23	ID 24	ID 25	ID 26	ID 27	ID 28	ID 29	ID 30	ID 31	ID 32	ID 33	ID 34	ID 35	ID 36	ID 37	ID 38	ID 39	ID 40	ID 41	ID 42	ID 43
1. Nutritional benefit / value	5,0	5,0	6,0	5,0	5,0	6,0	6,0	4,0	6,0	3,0	4,0	7,0	7,0	7,0	6,0	5,0	6,0	7,0	5,0	7,0	6,0
2. Healthiness	4,0	5,0	5,0	3,0	4,0	6,0	6,0	4,0	6,0	3,0	6,0	6,0	7,0	5,0	7,0	5,0	7,0	7,0	7,0	7,0	7,0
3. Convenience in preparation (easy to cook)	4,0	5,0	6,0	7,0	6,0	6,0	6,0	6,0	6,0	5,0	6,0	5,0	5,0	6,0	4,0	5,0	7,0	6,0	7,0	6,0	4,0
4. Convenience for consumption (ready to eat)	4,0	6,0	6,0	7,0	6,0	6,0	5,0	7,0	5,0	6,0	6,0	5,0	5,0	6,0	5,0	5,0	6,0	6,0	7,0	6,0	6,0
5. Cost for consumer (price)	3,0	2,0	4,0	2,0	5,0	4,0	4,0	3,0	3,0	5,0	4,0	4,0	4,0	3,0	4,0	2,0	2,0	3,0	3,0	5,0	3,0
6. Technical feasibility (equipment & raw material)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
7. Technical feasibility (know-how)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
8. Specific consumer targeting	6,0	3,0	5,0	5,0	6,0	6,0	5,0	5,0	6,0	4,0	5,0	5,0	5,0	6,0	5,0	6,0	6,0	4,0	5,0	6,0	5,0
9. Familiarity	3,0	4,0	5,0	4,0	6,0	2,0	3,0	3,0	6,0	5,0	6,0	6,0	6,0	6,0	6,0	5,0	3,0	6,0	2,0	6,0	6,0
10. Newness/innovativeness	6,0	5,0	2,0	5,0	4,0	7,0	6,0	6,0	5,0	4,0	4,0	4,0	4,0	4,0	4,0	5,0	6,0	6,0	5,0	7,0	4,0
11. Existence of similar products/ Competitors	2,0	3,0	4,0	2,0	4,0	1,0	2,0	2,0	6,0	3,0	5,0	5,0	5,0	5,0	5,0	2,0	2,0	5,0	3,0	6,0	5,0
12. Shares characteristics of successful products	4,0	2,0	5,0	3,0	5,0	6,0	4,0	4,0	6,0	5,0	5,0	5,0	5,0	5,0	5,0	4,0	3,0	5,0	3,0	6,0	5,0
13. Perceived consumer freshness	4,0	6,0	5,0	4,0	4,0	5,0	4,0	4,0	7,0	5,0	6,0	6,0	6,0	6,0	6,0	6,0	6,0	6,0	4,0	6,0	6,0
14. Safety	3,0	3,0	6,0	4,0	4,0	5,0	4,0	4,0	6,0	6,0	3,0	5,0	5,0	3,0	4,0	3,0	4,0	4,0	3,0	4,0	4,0
15. Shelf life	3,0	3,0	6,0	4,0	4,0	5,0	4,0	4,0	3,0	6,0	2,0	2,0	5,0	2,0	2,0	2,0	2,0	2,0	3,0	3,0	2,0
16. Packaging	7,0	7,0	5,0	6,0	7,0	6,0	6,0	7,0	3,0	5,0	4,0	4,0	4,0	4,0	4,0	6,0	7,0	4,0	6,0	6,0	4,0
17. Added value	7,0	7,0	5,0	6,0	7,0	7,0	6,0	7,0	6,0	5,0	4,0	6,0	5,0	4,0	4,0	4,0	6,0	4,0	6,0	6,0	4,0
18. Attractiveness (Appearance/ presentation)	7,0	7,0	6,0	6,0	7,0	6,0	6,0	6,0	6,0	5,0	5,0	6,0	5,0	5,0	5,0	7,0	7,0	5,0	5,0	7,0	6,0
19. Recipes (versatility / packaging)	4,0	2,0	6,0	4,0	4,0	4,0	7,0	6,0	7,0	4,0	6,0	6,0	6,0	6,0	6,0	4,0	5,0	6,0	2,0	7,0	7,0



M. Reinders

CRITERIA	ID 1	ID 2	ID 3	ID 4	ID 5	ID 6	ID 7	ID 8	ID 9	ID 10	ID 11	ID 12	ID 13	ID 14	ID 15	ID 16	ID 17	ID 18	ID 19	ID 20	ID 21	ID 22
1. Nutritional benefit / value	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2. Healthiness	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3. Convenience in preparation (easy to cook)	6,0	7,0	7,0	7,0	7,0	6,0	6,0	7,0	7,0	7,0	7,0	6,0	5,0	5,0	4,0	5,0	5,0	6,0	5,0	5,0	5,0	6,0
4. Convenience for consumption (ready to eat)	5,0	6,0	7,0	7,0	7,0	5,0	5,0	7,0	7,0	-	-	6,0	5,0	5,0	4,0	5,0	5,0	6,0	5,0	5,0	5,0	6,0
5. Cost for consumer (price)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
6. Technical feasibility (equipment & raw material)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
7. Technical feasibility (know-how)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
8. Specific consumer targeting	4,0	5,0	5,0	5,0	5,0	6,0	5,0	5,0	5,0	5,0	5,0	5,0	4,0	6,0	6,0	6,0	6,0	5,0	4,0	5,0	5,0	5,0
9. Familiarity	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
10. Newness/innovativeness	4,0	5,0	6,0	6,0	6,0	5,0	5,0	6,0	6,0	6,0	6,0	6,0	4,0	5,0	4,0	5,0	5,0	5,0	3,0	5,0	5,0	5,0
11. Existence of similar products/ Competitors	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
12. Shares characteristics of successful products	6,0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
13. Perceived consumer freshness	6,0	6,0	4,0	5,0	5,0	4,0	4,0	4,0	3,0	2,0	2,0	4,0	5,0	6,0	7,0	6,0	7,0	5,0	5,0	5,0	6,0	5,0
14. Safety	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
15. Shelf life	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
16. Packaging	7,0	6,0	6,0	6,0	6,0	6,0	6,0	6,0	6,0	4,0	4,0	5,0	5,0	5,0	5,0	5,0	5,0	6,0	5,0	6,0	6,0	6,0
17. Added value	6,0	6,0	6,0	6,0	6,0	6,0	6,0	6,0	6,0	6,0	6,0	6,0	5,0	5,0	5,0	6,0	6,0	6,0	5,0	5,0	5,0	5,0
18. Attractiveness (Appearance/ presentation)	6,0	6,0	5,0	6,0	6,0	5,0	5,0	6,0	4,0	4,0	4,0	5,0	5,0	6,0	6,0	6,0	7,0	6,0	5,0	6,0	6,0	5,0
19. Recipes (versatility / packaging)	7,0	5,0	3,0	3,0	3,0	5,0	6,0	3,0	3,0	3,0	3,0	5,0	4,0	4,0	6,0	5,0	5,0	5,0	7,0	5,0	6,0	5,0



M Reinders

CRITERIA	ID 23	ID 24	ID 25	ID 26	ID 27	ID 28	ID 29	ID 30	ID 31	ID 32	ID 33	ID 34	ID 35	ID 36	ID 37	ID 38	ID 39	ID 40	ID 41	ID 42	ID 43
1. Nutritional benefit / value	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2. Healthiness	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3. Convenience in preparation (easy to cook)	6,0	7,0	5,0	7,0	5,5	7,0	6,0	7,0	5,0	6,0	4,0	4,0	4,0	5,0	4,0	7,0	7,0	5,0	7,0	5,0	5,0
4. Convenience for consumption (ready to eat)	6,0	7,0	5,0	7,0	5,5	7,0	6,0	7,0	4,0	5,0	4,0	4,0	4,0	5,0	4,0	7,0	7,0	5,0	7,0	5,0	5,0
5. Cost for consumer (price)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
6. Technical feasibility (equipment & raw material)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
7. Technical feasibility (know-how)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
8. Specific consumer targeting	6,0	6,0	5,0	5,0	6,0	7,0	5,0	5,0	4,0	5,0	4,0	4,0	4,0	4,0	4,0	6,0	6,0	6,0	5,0	4,0	5,0
9. Familiarity	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
10. Newness/innovativeness	6,0	6,0	5,0	5,0	5,0	7,0	6,0	6,0	4,0	5,0	4,0	3,0	4,0	5,0	3,0	7,0	6,0	6,0	5,0	4,0	6,0
11. Existence of similar products/ Competitors	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
12. Shares characteristics of successful products	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
13. Perceived consumer freshness	4,0	6,0	5,0	5,0	4,0	4,0	5,0	6,0	7,0	5,0	5,0	5,0	4,0	5,0	6,0	6,0	6,0	6,0	5,0	6,0	6,0
14. Safety	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
15. Shelf life	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
16. Packaging	6,0	6,0	5,0	4,0	4,0	5,0	6,0	7,0	3,0	5,0	4,0	4,0	5,0	5,0	4,0	7,0	5,0	6,0	5,0	5,0	7,0
17. Added value	6,0	6,0	5,0	6,0	5,0	7,0	6,0	7,0	4,0	5,0	4,0	4,0	5,0	5,0	4,0	6,0	6,0	6,0	6,0	5,0	6,0
18. Attractiveness (Appearance/ presentation)	6,0	6,0	5,0	5,0	5,0	5,0	5,0	6,0	6,0	5,0	4,0	4,0	5,0	5,0	5,0	6,0	6,0	6,0	5,0	5,0	6,0
19. Recipes (versatility / packaging)	3,0	3,0	6,0	4,0	4,0	4,0	7,0	6,0	7,0	3,0	3,0	3,0	3,0	3,0	3,0	3,0	3,0	3,0	3,0	6,0	7,0



A Krystallis

CRITERIA	ID 1	ID 2	ID 3	ID 4	ID 5	ID 6	ID 7	ID 8	ID 9	ID 10	ID 11	ID 12	ID 13	ID 14	ID 15	ID 16	ID 17	ID 18	ID 19	ID 20	ID 21	ID 22
1. Nutritional benefit / value	5,0	5,0	-	7,0	-	5,0	5,0	-	5,0	-	-	-	6,0	7,0	6,0	6,0	7,0	6,0	5,0	7,0	7,0	5,0
2. Healthiness	5,0	5,0	4,0	7,0	-	5,0	6,0	4,0	5,0	-	-	-	6,0	7,0	6,0	6,0	6,0	6,0	5,0	7,0	7,0	5,0
3. Convenience in preparation (easy to cook)	6,0	7,0	7,0	7,0	7,0	6,0	6,0	7,0	7,0	7,0	7,0	6,0	3,0	5,0	3,0	3,0	4,0	3,0	3,0	5,0	5,0	5,0
4. Convenience for consumption (ready to eat)	5,0	6,0	6,0	7,0	7,0	6,0	5,0	7,0	7,0	-	-	6,0	4,0	5,0	3,0	3,0	4,0	4,0	3,0	5,0	5,0	6,0
5. Cost for consumer (price)	4,0	4,0	3,0	2,0	2,0	2,0	3,0	5,0	4,0	6,0	6,0	4,0	4,0	2,0	5,0	4,0	2,0	4,0	5,0	2,0	2,0	4,0
6. Technical feasibility (equipment & raw material)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
7. Technical feasibility (know-how)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
8. Specific consumer targeting	5,0	5,0	5,0	5,0	5,0	6,0	5,0	5,0	5,0	5,0	5,0	5,0	5,0	6,0	2,0	2,0	2,0	5,0	2,0	6,0	6,0	5,0
9. Familiarity	6,0	6,0	4,0	6,0	6,0	6,0	6,0	6,0	3,0	2,0	1,0	6,0	5,0	5,0	6,0	6,0	6,0	6,0	6,0	5,0	5,0	6,0
10. Newness/innovativeness	3,0	5,0	6,0	5,0	4,0	4,0	5,0	6,0	6,0	6,0	7,0	6,0	4,0	3,0	2,0	2,0	2,0	4,0	2,0	3,0	3,0	3,0
11. Existence of similar products/ Competitors	-	4,0	-	4,0	5,0	5,0	4,0	-	-	-	1,0	4,0	5,0	5,0	6,0	6,0	6,0	5,0	6,0	5,0	5,0	3,0
12. Shares characteristics of successful products	-	6,0	-	5,0	4,0	5,0	4,0	-	-	-	1,0	4,0	5,0	5,0	6,0	6,0	6,0	5,0	6,0	5,0	5,0	5,0
13. Perceived consumer freshness	5,0	6,0	4,0	5,0	5,0	5,0	5,0	4,0	3,0	2,0	1,0	4,0	5,0	7,0	5,0	5,0	7,0	5,0	4,0	7,0	7,0	4,0
14. Safety	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
15. Shelf life	6,0	6,0	6,0	6,0	6,0	6,0	6,0	6,0	7,0	7,0	7,0	5,0	5,0	5,0	7,0	7,0	5,0	7,0	7,0	5,0	5,0	6,0
16. Packaging	6,0	6,0	6,0	6,0	6,0	6,0	6,0	6,0	6,0	4,0	4,0	6,0	5,0	6,0	6,0	5,0	5,0	5,0	6,0	6,0	6,0	6,0
17. Added value	6,0	6,0	6,0	6,0	6,0	6,0	6,0	6,0	5,0	5,0	4,0	6,0	6,0	6,0	6,0	6,0	6,0	6,0	6,0	6,0	6,0	6,0
18. Attractiveness (Appearance/ presentation)	6,0	7,0	5,0	6,0	6,0	6,0	5,0	6,0	5,0	4,0	4,0	6,0	6,0	7,0	6,0	6,0	7,0	6,0	6,0	7,0	7,0	6,0
19. Recipes (versatility / packaging)	7,0	6,0	3,0	3,0	3,0	5,0	6,0	3,0	5,0	6,0	6,0	6,0	6,0	6,0	6,0	6,0	6,0	6,0	6,0	6,0	6,0	3,0



A Krystallis

CRITERIA	ID 23	ID 24	ID 25	ID 26	ID 27	ID 28	ID 29	ID 30	ID 31	ID 32	ID 33	ID 34	ID 35	ID 36	ID 37	ID 38	ID 39	ID 40	ID 41	ID 42	ID 43
1. Nutritional benefit / value	5,0	7,0	5,0	5,0	5,0	6,0	5,0	6,0	6,0	-	7,0	7,0	7,0	7,0	7,0	7,0	7,0	7,0	6,0	7,0	7,0
2. Healthiness	-	7,0	5,0	-	5,0	6,0	6,0	7,0	6,0	-	7,0	7,0	7,0	7,0	7,0	7,0	7,0	7,0	7,0	7,0	7,0
3. Convenience in preparation (easy to cook)	6,0	7,0	6,0	7,0	6,0	6,0	6,0	7,0	2,0	6,0	4,0	4,0	4,0	4,0	4,0	7,0	7,0	4,0	7,0	4,0	4,0
4. Convenience for consumption (ready to eat)	6,0	7,0	6,0	7,0	6,0	7,0	7,0	7,0	3,0	5,0	4,0	4,0	4,0	4,0	4,0	7,0	7,0	4,0	7,0	4,0	4,0
5. Cost for consumer (price)	3,0	1,0	4,0	2,0	2,0	2,0	4,0	2,0	2,0	5,0	3,0	3,0	3,0	3,0	3,0	1,0	1,0	3,0	2,0	3,0	3,0
6. Technical feasibility (equipment & raw material)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
7. Technical feasibility (know-how)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
8. Specific consumer targeting	6,0	6,0	4,0	5,0	6,0	7,0	5,0	6,0	4,0	4,0	4,0	4,0	4,0	4,0	4,0	6,0	6,0	4,0	5,0	4,0	4,0
9. Familiarity	2,0	5,0	5,0	3,0	6,0	1,0	3,0	3,0	6,0	5,0	6,0	6,0	6,0	6,0	6,0	5,0	3,0	6,0	2,0	6,0	6,0
10. Newness/innovativeness	6,0	5,0	3,0	5,0	4,0	7,0	6,0	6,0	5,0	4,0	4,0	4,0	4,0	4,0	4,0	5,0	6,0	4,0	5,0	4,0	4,0
11. Existence of similar products/ Competitors	2,0	2,0	5,0	2,0	5,0	1,0	2,0	2,0	6,0	5,0	5,0	5,0	5,0	5,0	5,0	2,0	2,0	5,0	3,0	5,0	5,0
12. Shares characteristics of successful products	2,0	2,0	5,0	2,0	5,0	1,0	2,0	2,0	6,0	5,0	5,0	5,0	5,0	5,0	5,0	2,0	2,0	5,0	3,0	5,0	5,0
13. Perceived consumer freshness	4,0	6,0	5,0	5,0	5,0	4,0	4,0	6,0	7,0	3,0	6,0	6,0	6,0	6,0	6,0	6,0	6,0	6,0	5,0	6,0	6,0
14. Safety	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
15. Shelf life	5,0	3,0	6,0	6,0	6,0	6,0	6,0	6,0	2,0	6,0	2,0	2,0	2,0	2,0	2,0	2,0	2,0	2,0	3,0	2,0	2,0
16. Packaging	7,0	7,0	5,0	6,0	7,0	6,0	6,0	7,0	3,0	5,0	4,0	4,0	4,0	4,0	4,0	7,0	7,0	4,0	6,0	4,0	4,0
17. Added value	7,0	7,0	5,0	6,0	7,0	7,0	6,0	7,0	4,0	5,0	4,0	4,0	4,0	4,0	4,0	7,0	7,0	4,0	6,0	4,0	4,0
18. Attractiveness (Appearance/ presentation)	7,0	7,0	6,0	6,0	7,0	6,0	6,0	6,0	4,0	5,0	5,0	5,0	5,0	5,0	5,0	7,0	7,0	5,0	7,0	5,0	6,0
19. Recipes (versatility / packaging)	2,0	3,0	6,0	3,0	4,0	4,0	7,0	6,0	7,0	3,0	6,0	6,0	6,0	6,0	6,0	4,0	5,0	6,0	2,0	6,0	7,0



K Grigorakis – N. Alexis

CRITERIA	ID 1	ID 2	ID 3	ID 4	ID 5	ID 6	ID 7	ID 8	ID 9	ID 10	ID 11	ID 12	ID 13	ID 14	ID 15	ID 16	ID 17	ID 18	ID 19	ID 20	ID 21	ID 22
1. Nutritional benefit / value	6,0	7,0	5,0	6,0	4,0	5,0	5,0	5,0	4,0	6,0	5,0	4,0	6,0	7,0	6,0	6,0	7,0	6,0	6,0	7,0	7,0	6,0
2. Healthiness	6,0	4,0	6,0	7,0	6,0	4,0	4,0	6,0	4,0	6,0	6,0	4,0	5,0	7,0	7,0	7,0	7,0	7,0	6,0	6,0	7,0	6,0
3. Convenience in preparation (easy to cook)	4,0	7,0	7,0	7,0	7,0	6,0	6,0	7,0	7,0	5,0	5,0	6,0	5,0	5,0	2,0	2,0	6,0	6,0	4,0	6,0	6,0	5,0
4. Convenience for consumption (ready to eat)	3,0	6,0	6,0	7,0	6,0	4,0	4,0	7,0	6,0	4,0	4,0	5,0	5,0	4,0	2,0	2,0	3,0	4,0	3,0	4,0	4,0	4,0
5. Cost for consumer (price)	7,0	4,0	3,0	3,0	4,0	5,0	6,0	2,0	6,0	6,0	7,0	6,0	6,0	4,0	7,0	7,0	6,0	5,0	7,0	4,0	4,0	3,0
6. Technical feasibility (equipment & raw material)	7,0	6,0	5,0	6,0	6,0	3,0	6,0	1,0	6,0	6,0	6,0	6,0	7,0	7,0	7,0	4,0	7,0	7,0	7,0	7,0	7,0	7,0
7. Technical feasibility (know-how)	7,0	5,0	4,0	5,0	5,0	4,0	4,0	2,0	4,0	6,0	6,0	5,0	5,0	7,0	7,0	1,0	2,0	4,0	7,0	6,0	7,0	5,0
8. Specific consumer targeting	4,0	5,0	5,0	5,0	5,0	7,0	4,0	6,0	5,0	5,0	5,0	4,0	4,0	5,0	1,0	1,0	4,0	4,0	4,0	5,0	5,0	4,0
9. Familiarity	7,0	7,0	5,0	6,0	5,0	5,0	5,0	2,0	5,0	6,0	3,0	5,0	6,0	7,0	7,0	2,0	5,0	6,0	7,0	7,0	7,0	3,0
10. Newness/innovativeness	4,0	5,0	6,0	5,0	5,0	6,0	3,0	6,0	5,0	5,0	7,0	5,0	4,0	6,0	1,0	6,0	7,0	4,0	4,0	6,0	6,0	7,0
11. Existence of similar products/ Competitors	3,0	4,0	6,0	4,0	5,0	6,0	3,0	6,0	3,0	4,0	6,0	2,0	3,0	3,0	1,0	6,0	6,0	6,0	3,0	3,0	5,0	6,0
12. Shares characteristics of successful products	6,0	6,0	3,0	6,0	5,0	6,0	6,0	3,0	6,0	6,0	5,0	5,0	6,0	7,0	5,0	2,0	4,0	4,0	6,0	7,0	7,0	4,0
13. Perceived consumer freshness	5,0	5,0	4,0	6,0	3,0	3,0	3,0	2,0	2,0	2,0	1,0	2,0	5,0	7,0	5,0	2,0	7,0	5,0	5,0	7,0	7,0	5,0
14. Safety	7,0	6,0	4,0	6,0	5,0	6,0	6,0	7,0	6,0	7,0	7,0	5,0	6,0	7,0	7,0	6,0	6,0	7,0	7,0	6,0	7,0	6,0
15. Shelf life	7,0	4,0	2,0	3,0	3,0	6,0	6,0	7,0	6,0	6,0	7,0	4,0	7,0	5,0	7,0	7,0	2,0	7,0	7,0	3,0	5,0	7,0
16. Packaging	5,0	4,0	6,0	5,0	5,0	7,0	4,0	5,0	4,0	5,0	5,0	5,0	5,0	6,0	5,0	5,0	5,0	6,0	7,0	7,0	7,0	5,0
17. Added value	4,0	2,0	5,0	6,0	6,0	6,0	6,0	2,0	7,0	7,0	7,0	6,0	4,0	4,0	6,0	6,0	5,0	5,0	4,0	4,0	4,0	4,0
18. Attractiveness (Appearance/ presentation)	5,0	6,0	4,0	6,0	5,0	7,0	4,0	4,0	3,0	2,0	5,0	4,0	5,0	6,0	3,0	2,0	6,0	6,0	5,0	6,0	6,0	5,0
19. Recipes (versatility / packaging)	7,0	6,0	2,0	2,0	2,0	6,0	6,0	1,0	6,0	7,0	7,0	4,0	6,0	6,0	3,0	4,0	6,0	6,0	5,0	6,0	7,0	6,0



K Grigorakis – N. Alexis

CRITERIA	ID 23	ID 24	ID 25	ID 26	ID 27	ID 28	ID 29	ID 30	ID 31	ID 32	ID 33	ID 34	ID 35	ID 36	ID 37	ID 38	ID 39	ID 40	ID 41	ID 42	ID 43
1. Nutritional benefit / value	5,0	7,0	6,0	6,0	3,0	5,0	7,0	7,0	7,0	4,0	7,0	7,0	6,0	6,0	7,0	7,0	7,0	7,0	6,0	7,0	7,0
2. Healthiness	5,0	7,0	6,0	3,0	3,0	7,0	7,0	6,0	7,0	3,0	6,0	7,0	7,0	7,0	7,0	7,0	3,0	7,0	7,0	7,0	7,0
3. Convenience in preparation (easy to cook)	7,0	7,0	5,0	6,0	5,0	5,0	7,0	7,0	2,0	6,0	7,0	3,0	7,0	7,0	3,0	7,0	7,0	7,0	7,0	6,0	4,0
4. Convenience for consumption (ready to eat)	6,0	7,0	5,0	6,0	7,0	3,0	7,0	7,0	2,0	6,0	7,0	3,0	7,0	7,0	4,0	7,0	7,0	7,0	7,0	4,0	3,0
5. Cost for consumer (price)	4,0	2,0	6,0	3,0	7,0	7,0	2,0	3,0	6,0	5,0	3,0	6,0	3,0	3,0	5,0	3,0	1,0	2,0	3,0	5,0	5,0
6. Technical feasibility (equipment & raw material)	1,0	7,0	7,0	1,0	7,0	6,0	7,0	5,0	7,0	5,0	7,0	7,0	6,0	6,0	7,0	7,0	7,0	7,0	6,0	7,0	7,0
7. Technical feasibility (know-how)	1,0	6,0	7,0	1,0	5,0	6,0	7,0	5,0	7,0	3,0	7,0	7,0	4,0	4,0	7,0	7,0	7,0	7,0	4,0	7,0	7,0
8. Specific consumer targeting	5,0	7,0	4,0	5,0	6,0	6,0	5,0	6,0	1,0	4,0	3,0	1,0	5,0	5,0	1,0	7,0	7,0	6,0	5,0	2,0	3,0
9. Familiarity	3,0	3,0	6,0	1,0	4,0	2,0	7,0	5,0	7,0	6,0	4,0	7,0	6,0	6,0	7,0	3,0	3,0	7,0	4,0	7,0	7,0
10. Newness/innovativeness	7,0	7,0	4,0	7,0	2,0	6,0	7,0	7,0	1,0	4,0	2,0	2,0	5,0	5,0	2,0	7,0	3,0	7,0	5,0	4,0	4,0
11. Existence of similar products/ Competitors	7,0	7,0	3,0	6,0	4,0	7,0	5,0	7,0	1,0	5,0	2,0	1,0	7,0	7,0	1,0	7,0	5,0	5,0	4,0	2,0	3,0
12. Shares characteristics of successful products	2,0	6,0	6,0	6,0	5,0	1,0	7,0	6,0	6,0	6,0	6,0	7,0	3,0	3,0	7,0	6,0	7,0	7,0	6,0	6,0	6,0
13. Perceived consumer freshness	5,0	7,0	5,0	4,0	2,0	5,0	7,0	7,0	7,0	3,0	2,0	7,0	5,0	5,0	7,0	7,0	4,0	7,0	6,0	7,0	7,0
14. Safety	4,0	6,0	7,0	1,0	6,0	5,0	7,0	4,0	7,0	6,0	6,0	7,0	3,0	3,0	7,0	6,0	7,0	7,0	6,0	7,0	7,0
15. Shelf life	2,0	3,0	7,0	1,0	5,0	2,0	5,0	2,0	5,0	6,0	7,0	5,0	1,0	1,0	5,0	3,0	7,0	5,0	3,0	5,0	5,0
16. Packaging	4,0	7,0	6,0	2,0	6,0	4,0	7,0	7,0	4,0	5,0	6,0	2,0	3,0	3,0	2,0	7,0	7,0	7,0	6,0	5,0	5,0
17. Added value	2,0	4,0	4,0	4,0	6,0	7,0	3,0	6,0	6,0	5,0	5,0	5,0	2,0	2,0	4,0	4,0	4,0	3,0	2,0	4,0	4,0
18. Attractiveness (Appearance/ presentation)	4,0	6,0	5,0	5,0	4,0	2,0	7,0	7,0	2,0	6,0	6,0	4,0	5,0	5,0	4,0	6,0	7,0	7,0	5,0	6,0	6,0
19. Recipes (versatility / packaging)	5,0	6,0	7,0	2,0	6,0	6,0	7,0	7,0	6,0	5,0	4,0	4,0	5,0	5,0	4,0	6,0	6,0	7,0	3,0	4,0	7,0

APPENDIX 3

Summary of the experts opinions concerning the feasibility of some of the developed ideas are given in Table 11. *The results included in this section were part of the D28.1 and are presented here unaltered for the facilitation of the readers.*

Table 11: Overall summary of expert opinions and ranking of new product ideas for selected fish species

Ranking of product ideas	Idea attractiveness	Idea innovativeness	Price	Fish species (most frequently mentioned)	Distribution channels	Technical feasibility	Change of product lines
1 <i>Fresh fish back fillet (UK)</i>	> good idea > convenient with sauces > healthy > quality product	> packaging added value > not new > fun recipe > unique idea > special customers	> 5-14 Euros per portion > 15-18 Euros per kg	>Atlantic halibut	> supermarket > specialty store > convenient store > restaurants > hotels > catering > delicatessen > fish shop	> no problem	> no change
2 <i>Frozen fish fillet (Germany)</i>	> good idea > fresh > attractive packaging > info on traceability and origin	> not new in fresh version > recipes and marinade good > convenient > mass market	> 3-5.5 Euros per portion > 5-15 Euros per kg	>Atlantic halibut	> supermarket > specialty store > convenient store > restaurants >hotels > catering > fish monger	> no problem	> no change
3 <i>Liquid fish (Spain)</i>	> good idea > add value to leftovers > quality product >fish drink bad idea	> novel/not new > chef recipe > protein intake > health issue > gap in the market	> 2.5 to 10 Euros per bottle	> Meagre >Wreckfish > Atlantic halibut > Pikeperch > Grey mullet > Greater amberjack	> supermarket > convenient store > catering > restaurants > delicatessen > fish monger > specialty store > hospitals > old people homes	> no problem	> no change
4 <i>Crispy frozen fish product (Italy)</i>	>good idea >requires sampling > convenient > good for dieting people > sports people	> novel > fish quality > mass market > market saturated	> 2.9-8 Euros per portion > 5-10 Euros per kg	>Meagre > Atlantic halibut	> supermarket > catering > restaurants > convenient store > delicatessen > convenient store		
5 <i>Fish Carpaccio (France)</i>	>special segment > high-end product >chili an issue	>innovative > good recipe > good packaging > niche market	>5-10 Euros per portion > 4-5 Euros per 100gr > 7-20 Euros per kg	> Grey mullet > Greater amberjack	> specialty stores > delicatessen > gourmet > supermarket > convenient store > sandwich store > hotels > catering > restaurants	> no problem	> no change
6 <i>Bottarga (France)</i>	>good idea >special segment > high-end product > strong taste	> special consumers > good packaging > good medallion shape > niche market	>6-10 Euros per portion > 3-12 Euros per 100gr > 8-25 Euros per kg	> Grey mullet	> specialty store > delicatessen > supermarket > convenient store >gourmet >fish shops > restaurants	> no problem	> no change
7 <i>Sausages and fish hamburgers (Spain)</i>	>good idea for kids > leftovers if not for kids > important offer >Mediterranean diet	> not new > convenient > does not work > added value	> 2-3 Euros for 2 package >4-6 Euros per portion > 10-15 Euros per kg	> Meagre >Wreckfish > Atlantic halibut > Pikeperch > Grey mullet > Greater amberjack	> supermarket > specialty store > convenient store > restaurants > catering > delicatessen > gastro pub > schools	> no problem > higher fish content for kids	> no change
8 <i>Ready to eat meal, fish fillet with cheese and fine herbs (Spain)</i>	> good idea >cheese could be a problem > good idea cause of cheese	> innovative, > smell not good idea > gap in the market	>4-8 Euros per portion > 3-4.5 pounds per portion > 10-12 Euros per kg	> Atlantic halibut > Grey mullet	> supermarket > specialty store > convenient store > restaurants > catering > delicatessen > fish monger > gastro pub	> could be a problem > shelf life > more handling	> no change



Deviations: Deliverable 28.2 is delivered with a 120-day delay due to the 2-month deadline extension of a preceding D28.1, the results of which were a prerequisite for the completion of D28.2. The 120-day delay of this deliverable will not create further delays or affect the completion of other Tasks in the DOW.



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