

# D28.4: Physical prototypes of new products from the selected species greater amberjack and grey mullet



Laura Bermúdez  
Macarena Algarin  
Julia Vélez  
Rocio Robles

Oxana Lazo  
Begonya Marcos  
Anna Claret  
Ricard Bou  
Luís Guerrero

# Objective:

**Physical prototypes** of new products from the selected species **meager, greater amberjack, wreckfish, pikeperch and grey mullet**: On the basis of their organoleptic characteristics, **potential products** from the specific species will be made available **for further testing in WP 29**. **Species and product selection criteria** will be decided according to **technical processing limitations, fish availability and similar products availability** in markets.

# Description:

**A maximum of 3 physical prototypes per species** of new products **of varying degree of processing** in commercial format will be delivered. The physical prototypes will be developed based on: information provided by previous tasks, physicochemical characteristics of each raw material, technical properties of the products and the process, and similar product availability in the market. **Guidelines to obtain new products** will be provided including **inputs, processing conditions, technical specifications, and troubleshooting**. In addition, **packaging, conservation conditions, product shelf life and consumer handling/cooking specifications** will be provided.

# Selected ideas for each fish species

:

**Meagre**

**Idea 1: Frozen fish fillets with different recipes**

**(IRTA)**

**Idea 6: Fish burgers shaped as fish**

**Idea 4: Ready to eat meal: salad with fish**

**Pikeperch**

**Idea 21: Fresh fish fillet with different 'healthy' seasoning and marinades**

**(IRTA)**

**Idea 30: Ready-made fish tartar with additional soy sauce**

**Idea 9: Fish spreads / pate**

**Grey mullet**

**Idea 2: Thin smoked fillets**

**(CTAQUA)**

**Idea 33: Ready-made fish fillets in olive oil.**

**Idea 21: Fresh fish fillet with different 'healthy' seasoning and marinades**

**Greater amberjack**

**Idea 13: Frozen fish fillet that is seasoned or marinated**

**(CTAQUA)**

**Idea 30: Ready-made fish tartar with additional soy sauce**

**Idea 34: Fresh fish steak for grilling in the pan**

# Frozen fish fillets with different recipes



Recipes:	
Fish fillet citrus sauce	8.0
Baked fish	7.0
Fish with tomato (microwave)	7.5
Fish fillet in green sauce	8.0
Fish fillet with yogurt sauce and mushrooms	9.0
Baked fish with tomato sauce	8.0
Fish fillet with orange	8.0
fish fillet with garlic and parsley	8.5
Fish fillet with vegetables	8.5
Three cheeses fish fillets	8.0

#### IDEA 1: Frozen fish fillets with different recipes (recipe number 1)

**APPEARANCE** (Scale from 0 to 10, where 10 is the highest score)  
SUGGESTIONS FOR IMPROVEMENT:

**AROMA** (Scale from 0 to 10, where 10 is the highest score)  
SUGGESTIONS FOR IMPROVEMENT:

**FLAVOUR** (Scale from 0 to 10, where 10 is the highest score)  
SUGGESTIONS FOR IMPROVEMENT:

**TEXTURE** (Scale from 0 to 10, where 10 is the highest score)  
SUGGESTIONS FOR IMPROVEMENT:

**OVERALL ACCEPTABILITY** (Scale from 0 to 10, where 10 is the highest score)

**GENERAL REMARKS:**





*three cheeses fish fillets*



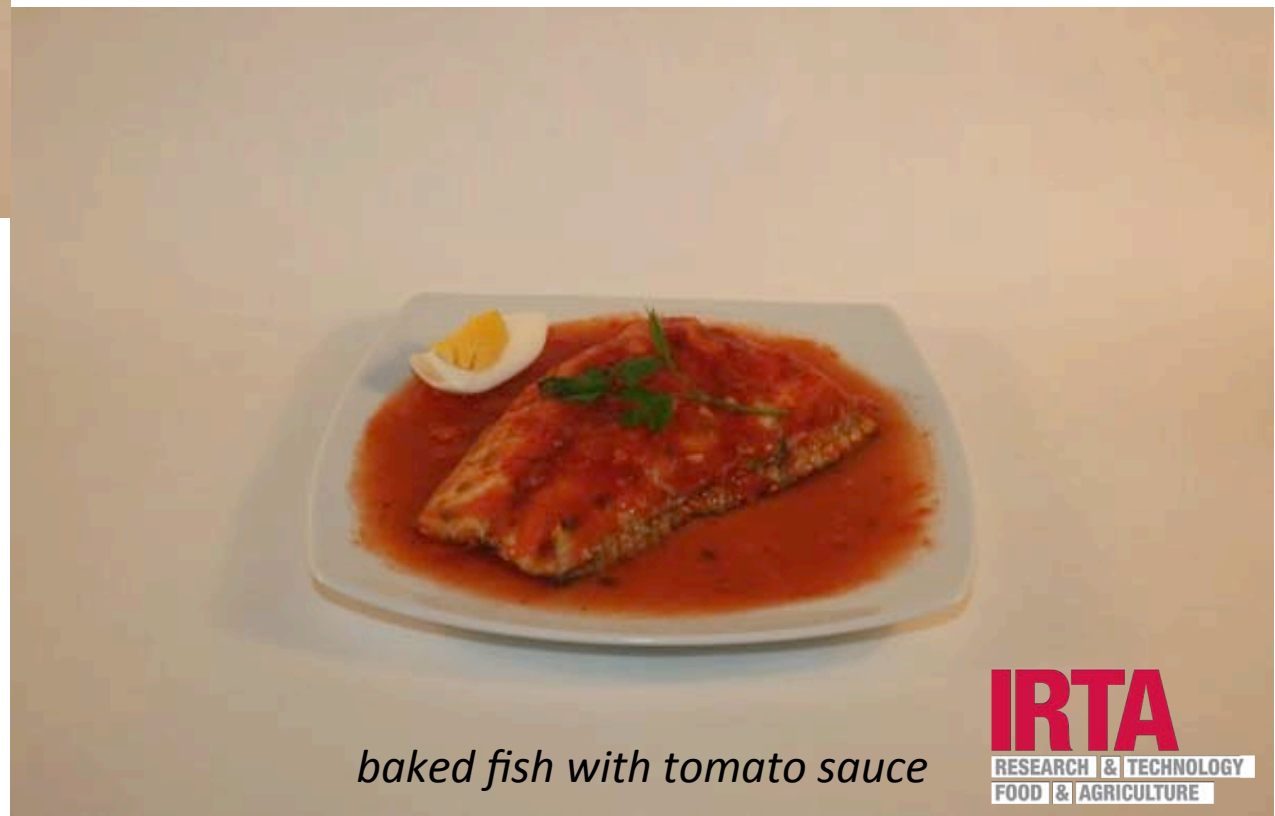
*fish fillet with yogurt sauce and mushrooms*



*fish fillet with vegetables*



*fish fillet with orange*



*baked fish with tomato sauce*



## Ready to eat meal: salad with fish



Effect of different concentrations of cider vinegar on the pH of meagre after different times of marinating at 4 °C<sup>1</sup>

Vinegar	Initial pH	pH 30 min	pH 60 min	pH 120 min	pH 180 min
30%	6.64	6.45	5.72	5.2	5.1
40%	6.64	6.24	5.52	5.16	4.90
50%	6.64	5.99	5.10	5.06	4.87
60%	6.64	5.79	4.75	4.54	4.45
70%	6.64	5.34	4.56	4.35	4.2

<sup>1</sup> Meagre was cut in cubes of approximately 1.5 cm and marinated at 1:1 weight ratio with the different vinegar solutions containing 1% NaCl. The pH was measured in well drained samples which were homogenized in 10 volumes of distilled water.

Shelf life assessment of the vinegar-cooked meagre and the mustard vinaigrette of the “*salad with fish*” prototype: microbial counts over the shelf life assessment period (8 days). <sup>1</sup>

		Day 1	Day 5	Day 8
		Log (ufc/g)	Log (ufc/g)	Log (ufc/g)
<b>Vinegar-cooked meagre</b>	Lactic acid bacteria	<1.00*	<1.00*	<1.00*
	Mesophilic bacteria	1.10	1.45	0.86
	<i>Enterobacteriaceae</i>	<1.00*	<1.00*	<1.00*
	<i>E.coli</i>	<1.00*	<1.00*	<1.00*
	Psycrophilic bacteria	<2.00*	<2.00*	<2.00*
	<i>Salmonella</i>	A	A	A
	<i>Listeria monocytogenes</i>	A	A	A
<b>Mustard vinaigrette</b>	Mesophilic bacteria	4.06	4.22	4.33
	<i>Enterobacteriaceae</i>	<1.00*	<1.00*	<1.00*
	<i>Salmonella</i>	A	A	A
	<i>Listeria monocytogenes</i>	A	A	A

Results are averages of 5 different samples. The presence of *Listeria* and *Salmonella* is determined in 25 g of sample and the rest in 10 g. Letter “A” stands for absence and the asterisk indicates that is below the limit of detection. For more information see material and methods section.





# Fish burgers shaped as fish



# Fish burgers shaped as fish







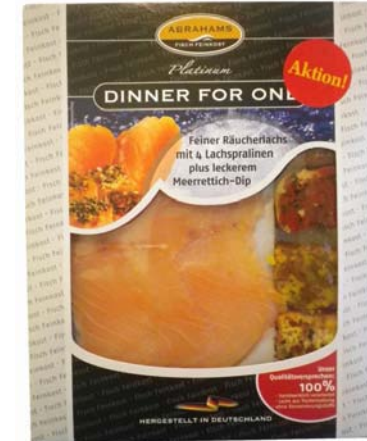
# Fish spreads / pate







# Fresh fillet with different 'healthy' seasonings and marinades





# Ready-made fish tartar with additional soy sauce







# To summarize for meagre and pikeperch species:

## **Frozen fish fillets** (meagre):

- Decide recipes, long shelf life

## **Salad with fish** (meagre):

- Shelf life depends on the *mesclun* vegetables

## **Fish burger** (meagre):

- Minimum difficulties, long shelf life

## **Fish pate** (pikeperch):

- Difficulties with the packaging

## **Fresh fillet with healthy seasonings and marinades** (pikeperch):

- Decide seasoning, relatively limited shelf life

## **Fish tartar** (pikeperch)

- Shelf life is 6 days, however, with HPP can be extended and eventually combined with avocado

**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
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>	-	-	
	<i>pikeperch</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	-	
	<i>pikeperch</i>	Low fat	-	
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>			
	<i>pikeperch</i>			

# GREY MULLET

**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
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>			
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>	-	-	
	<i>pikeperch</i>	-	-	

# GREY MULLET

**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
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)	-	
	<i>halibut</i>	-	-	
	<i>pikeperch</i>	-	-	



# Selected ideas for each fish species

**Greater  
amberjack**

**Idea 13: Frozen fish filets that is seasoned or marinated**

**Idea 30: Tartar with additional soya sauce**

**Idea 34: Fresh fish steak for grilling in the pan**



**Grey mullet**

**Idea 2: Thin smoked fillet**

**Idea 33: Ready-made fish fillet in olive oil**

**Idea 21: Fresh fish fillet with different 'healthy' seasoning and marinades**





# Greater amberjack

- Farmed specimens (South of Spain)
- Average size 1,5 kg



- Filet yield 48-50%
- Preliminary trials → Ideas 13 and 30



# Amberjack: Idea 13: Frozen fish filet that is seasoned or marinated: soya and honey

Frozen fish filet 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 13: Frozen fish filet that is seasoned or marinated: soya and honey



## INGREDIENTS:

### → MARINATING

- HONEY
- SOYA SAUCE
- WATER
- LEMON JUICE

### → MARINATE 50 min

→ optional: final dressing with parsley and/or toasted sesam seeds



# Idea 13: Frozen fish filet that is seasoned or marinated: soya and honey



→ Microbiological and sensory shelf-life assessment in progress

→ Upon microbiological results, physico-chemical analyses of the final product will be performed.



# Amber jack: Idea 30: Tartar with additional soya sauce

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 30: Tartar with additional soya sauce



- Cut the filets in 1 cm cubes.

## INGREDIENTS:

- Lime grate, salt and black pepper
- Keep refrigerated
- Vinaigrette: olive oil, soya sauce, shery vinegar and mustard
- Spray the vinaigrette over the amberjack and mix it well.
- Remove excess liquid after 5 minutes
- Construct the tartar with a ring mould.
- Garnish with parsley and toasted sesame seeds.



## Idea 30: Tartar with additional soya sauce



- PROBLEMS WITH THE VACUUM PACKAGING:
  - the selected round form plastic was not strong enough to keep the round shape under the vacuum pressure
- The excess of liquid was not contained and gave a bad image of the product

# Idea 30: Tartar with additional soya sauce



- A plastic glass type container was selected to keep the tartar shape
- Better containment of the liquids and better final product shape
- Golden tray was also used

# Idea 30: Tartar with additional soya sauce

- Microbiological and sensory shelf-life assessment in progress
- Upon microbiological results, physico-chemical analyses of the final product will be performed.



# Great amberjack: Idea 34: fresh fish steak for grilling in the pan

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.

---



# Grey mullet: Idea 2: Thin smoked filet

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 2: Thin smoked filet



- Farmed fish not available
- Wild specimens have been used
- Average weight 2 kg
- Filet yield 35-40%

## Idea 2: Thin smoked filet : Grey mullet

- Salting: mixture of salt (high quality) and sugar
- Prepare a tray with a thick layer of the salting on the bottom. Place the filets and cover them with a thick layer of the salting.
- Keep the fish in salting tray during 2,5 h
- Rinse the filet thoroughly to remove any trace of the salting



## Idea 2: Thin smoked filet : Grey mullet

- Smoking: use specific smoking wood pieces: wet oak chips
- Any material to be used in the smoking oven should be free of any organic matter





## Idea 2: Thin smoked filet : Grey mullet

- Smoking temperature: 60°C
- Time: 40 minutes



## Idea 2: Thin smoked filet : Grey mullet

- Final product vacuum packed
- One or two portions

→ Microbiological and sensory shel-life assesment in progress

→ Upon microbiological results, physico-chemical analyses of the final product will be performed.



# Grey mullet: Idea 21: Fresh fish fillet with different 'healthy' seasoning and marinades

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.



Forthcoming work.....

# Grey mullet:Idea 33: Ready-made fish filet in olive oil

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.



Forth coming work.....





# Thank you