



## INTRODUCTION

Seafood is an important source of nutritious food in Europe. Seafood plays a vital role in a balanced diet as it is a good source of high-quality proteins, vitamins (especially vitamin B12 and vitamin D), minerals (particularly iodine, iron and selenium) and contains a unique type of fat and omega-3 fatty acids, which have many health benefits. Most governments and health organisations recommend eating two portions of seafood per week. However, like any other food type, seafood can also be a source of harmful contaminants with the potential to impact human health negatively. Nevertheless, for most people, the overall benefits of seafood consumption (following the official recommendations) outweigh potential food safety risks.

As the global demand for food increases, now more than ever, there is a need for high-quality food that is socially, economically and environmentally sustainable. **SEAFOOD<sup>TOMORROW</sup>**, an EU-funded project, has generated new knowledge and innovative solutions to help meet this demand and to improve the dietary value and safety of seafood. The project's results benefit both the seafood industry and consumers.

There is growing evidence that specific subsets of the population, namely pregnant women, children and older adults, benefit from eating seafood as it meets their specific dietary requirements and needs.

This factsheet outlines the health benefits that seafood offers for pregnant woman, aspects to consider and what pregnant women can do to minimise any potential risks from their seafood consumption. We also highlight relevant research findings from the **SEAFOOD<sup>TOMORROW</sup>** project, including tasty recipes that meet the dietary needs of pregnant women.

## SEAFOOD FOR PREGNANT WOMEN

Pregnant women have specific dietary needs. These include sources of **high protein** and **healthy fats**, **reduced need for carbohydrates**, and increased need for **vitamins (especially vitamin D)** and **minerals (iron, iodine)**. Seafood provides important sources of each of the following nutrients.

- **Protein:** seafood is a good source of lean, high-quality proteins that are needed for growth of the fetal cells, from building bones and muscle tissue to skin and hair.
- **Omega-3 fatty acids ("healthy fats"):** oily fish are especially high in the omega-3 fatty acid, docosahexaenoic acid (DHA), which is particularly important during the last trimester when the fetal brain and nervous system develop. There is also some evidence that omega-3s (DHA and Eicosapentaenoic acid (EPA)) can boost memory and mood during pregnancy.
- **Vitamin D:** is particularly important during pregnancy as it helps the body to absorb calcium. For the mother, vitamin D helps to maintain bone and tooth strength and lower the risk of high blood pressure. For the fetus, vitamin D supports the development of bones, teeth, nervous system, and muscles.
- **Iron:** is an important mineral for women who are pregnant or who could become pregnant. It is used to make extra haemoglobin to carry oxygen from the woman's bloodstream to the fetus and supports a healthy immune system.
- **Iodine:** is essential for the production of both the maternal and fetal thyroid hormone that regulates the development of the fetal brain and nervous system.

## Seafood for you!

Health benefits  
and new seafood  
products for  
pregnant women



## RECOMMENDATIONS FOR PREGNANT WOMEN

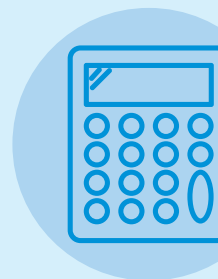
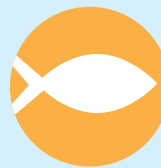
- Excessive consumption of mercury -contaminated seafood can severely impact fetal development. Women who are pregnant should choose seafood products that are low in mercury (e.g. anchovies, cod, crab, salmon, mackerel, perch, trout from sustainable sources)
- Consumption of up to three to four servings of seafood per week during pregnancy has been associated with better functional outcomes of neurodevelopment of the fetus compared to no consumption of seafood during pregnancy.
- To reduce the chance of getting sick, pregnant women should avoid eating any raw seafood during pregnancy.

## SEAFOOD TOMORROW RESULTS FOR PREGNANT WOMEN

### FishChoice: a tool to assess the benefits and risks of seafood consumption

SEAFOOD TOMORROW has developed an improved version of the FishChoice tool to help inform consumers about their seafood consumption. Highlighting pregnant women as a specific group, the tool guides consumers to make informed decisions about how they can gain the most nutritional benefit from their seafood consumption, while reducing exposure to chemical contaminants.

FishChoice compares the user's intake of nutrients and contaminants with the corresponding recommendations set by the European Food Safety Authority (EFSA). The tool then warns the user if their intake of nutrients is below the minimum recommended or above the maximum tolerable intake of contaminants. **FishChoice is free to use and available at [fishchoice.eu](http://fishchoice.eu).** An App version is also available for iOS Apple and Android from your app store.



**FISHCHOICE**  
Your personal fish calculator

### Reduced sodium seafood products

High sodium in human diets is known to increase blood pressure, which in turn puts greater strain on the heart, arteries, kidneys and brain. This can lead to heart attacks, strokes, dementia and kidney disease. It is important to manage your sodium intake, especially during pregnancy as consumption can affect fetal blood pressure.

SEAFOOD TOMORROW has developed new ways of producing two different seafood products: smoked salmon and salmon pâté that have reduced sodium content levels by at least 25 %, but don't compromise on quality, taste or food safety. While pâté should be avoided, smoked salmon is a safe option for pregnant women.

It is hoped that the SEAFOOD TOMORROW formulas will be taken-up by seafood producers and processing companies and reduced sodium content products will soon be available on your supermarket shelves!





## SEAFOOD RECIPES FOR PREGNANT WOMEN

In collaboration with research and industrial partners and culinary schools from Belgium, France, Poland, Portugal, Spain and Sweden, **SEAFOOD TOMORROW** has created new, innovative seafood dishes using sustainable and lesser-known seafood species. Each dish was specifically developed to meet the nutritional needs of pregnant women, children and older adults: groups known to benefit from seafood consumption. The dishes were judged on their nutritional quality, feasibility of scaling for use in restaurant and catering environments, and of course taste! The winning recipes have been published in the **SEAFOOD TOMORROW E-Recipe Book** which is available to download at: [seafoodtomorrow.eu](http://seafoodtomorrow.eu)



### COMMON DAB WITH WHEAT BERRY SALAD

by Kristianstad University, Sweden

**Species:** Common dab (*Limanda limanda*)

**Recipe for 4 people**

#### INGREDIENTS

- 400 g of common dab
- 20 g of rapeseed oil
- 50 g of fennel
- 100 g of wheat berries
- ½ lemon
- 30 g of feta cheese
- 10 g of dill
- 10 g of chives
- 5 g of butter
- 10 g of honey
- 80 g of beetroots
- 2 g of horseradish
- Pinch of salt
- Pinch of black pepper

#### METHOD

1. Bring water to boil and add the beetroot. Cook for 20 minutes, then drain and peel.
2. Bring half a litre of water to boil with a pinch of salt: add the wheat berries and simmer for 10 minutes, drain and let it sit for a couple of minutes.
3. Finely chop the dill and chives.
4. Slice the fennel thinly using a mandolin and squeeze 2 tablespoons of lemon over the slices.

5. Heat a frying pan and add the oil and butter.
6. Sprinkle salt and pepper on the fish.
7. Turn the fish in flour and fry it until the internal temperature reaches 55° C, checking with a food thermometer.
8. Cut the beetroots into pieces.
9. Mix the wheat berries with crumbled feta cheese, 2 tablespoons of lemon juice, a pinch of black pepper, rapeseed oil, honey, dill and chives.
10. Serve with the fennel, beetroots and fish.
11. Grate a small piece of horse radish as a garnish.



#### Suggestion

To increase the content of vitamin D and omega 3, you can replace the teaspoon of rapeseed oil in the sauce of the salad with a teaspoon of cod liver oil. There will be no effect on the taste but a greater intake of essential fats!



### FISH ROULADE

by Kristianstad University, Sweden

**Species:** Blue Whiting  
(*Micromesistius poutassou*)

**Recipe for 4 people**

#### INGREDIENTS

- 600 g of blue whiting
- 400 g of savoy cabbage
- 1 kg of potatoes
- 2 shallots
- 40 g of chives
- 40 g of dill
- 1 cup of wheat berries
- 1 cup of white wine
- 1 cup of cream
- White wine vinegar
- 60 g of butter
- Lemon zest
- Pinch of salt
- Pinch of pepper

#### METHOD

1. Boil water, blanch the cabbage leaves for 2–3 minutes and then place them in an ice bath to chill. Bring half a litre of water to boil. Add a pinch of salt.
2. Prepare and boil the potatoes and the wheat berries in separate pots.
3. Take the chilled cabbage leaves, drain and cut off the stem but keep the leaves intact as much as possible. Drain and chill the wheat berries.
4. Chop the shallots and cook in some butter on a low heat. The onions should get soft but not take on any colour.
5. Add the white wine vinegar and the white wine and let it reduce so only half of the liquid remains.
6. Cut the fish into small bites and mix with the cream, salt and pepper to a creamy yet firm paste. Add  $\frac{3}{4}$  of the lemon zest, chopped chives, dill and all of the chilled wheat berries and stir together.
7. Place the cabbage leaves on a cutting board and add 2 tablespoons of the fish paste in the



middle of the cabbage in a line going across from the root of the cabbage. Fold the bottom part of the leaves, then the sides in and roll it together.

8. Heat a pan, add the cooking oil and a little bit of butter and place the roulade seam-side down in the pan to make sure it holds its shape. Cook for 3–5 minutes per side on medium heat.
9. Drain the onions from the wine reduction and re-heat. Remove from the heat and add cubes of butter in small amounts at the time. Mix using a hand blender to make a creamy foam.
10. Place the boiled potatoes on the plate, place the fish roulades on top and add the sauce all around the fish and potatoes. Garnish with the remaining herbs and lemon.

#### Suggestions

To boost vitamin D and omega 3, add a teaspoon of cod liver oil to the roulade filling and reduce the amount of cream to balance the fats. You can add seaweed to the sauce to increase the amount of iodine and to enhance the taste. To reduce the fat content, replace the butter sauce by a milk-based sauce, with shallots, lemon juice, and starch to thicken the texture.