INNOVATIVE BLOCKCHAIN TRACEABILITY TECHNOLOGY AND STAKEHOLDERS' ENGAGEMENT STRATEGY FOR BOOSTING SUSTAINABLE SEAFOOD VISIBILITY, SOCIAL ACCEPTANCE AND CONSUMPTION IN EUROPE

BENEFITS ASSOCIATED WITH SEABREAM CONSUMPTION

LAYMAN'S REPORT

Based on WP6: Life Cycle Analysis, Impact and Market Uptake

April 2026

Co-funded by the European Union

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1. INTRODUCTION

The European project SEA2SEE (https://sea2see.eu/) aims to increase consumer trust and acceptance of seafood products obtained through sustainable fishing and aquaculture in Europe. Currently, there is still a necessity to carry out operations that guarantee full transparency and traceability of aquaculture products in the EU. Some European markets still perform unsustainable fishing and aquaculture practices. To improve these activities, SEA2SEE developed an innovative traceability model based on blockchain and strategies to raise awareness of the benefits of seafood products.

This informative report is focused on seabream (Sparus aurata) farmed in the Mediterranean Sea, near Athens (Greece) and was compiled using data from the SEA2SEE project. The scientific outcomes of seabream were translated into layman's language. Estimation of nutrients content (improved nutritional status) and quality of protein and fatty acids vs contaminants (potential hazards) allowed to evaluate the favorable influence of this fish consumption on human health.

Effective communication with the public about the benefits of consuming seafood products in general will empower aquaculture farms that operate with high standards of quality, transparency, and responsible practices. In this way, consumers will be able to purchase these healthy and sustainable products knowing the risks or benefits involved. Seabream is considered a popular white fish for its pleasant taste, mild flavor, firm texture, delicate taste and nutritional value.

The objective of this report is to present, in a concise and easily understandable language, the main information derived from studies on nutritional benefits and potential risks associated with seabream produced in Greece. According to EFSA, risk-benefit analysis consists in a complex method for weighing up the risks, in terms of the incidence and severity, associated with exposure to a substance versus the likely benefits. Therefore, a very preliminary assessment of risks and benefits of the consumption of seabream is presented below.

2. BENEFITS OF SEABREAM CONSUMPTION

2.1. Nutritional Value

Seabream is a nutrient-rich food that provides many health benefits; It contains around 20 grams of good-quality protein comprising a high percentage of essential amino acids, higher than the recommended amino acid scoring pattern for children over 3 years and adults. In other words, it provides these amino acids in the necessary concentration or even higher. This helps build and repair muscles and tissues; supports enzyme and hormone production and contributes to feeling full, aiding in weight control.

The PUFAs are more abundant than SFAs which is beneficial for heart health. The average sum of EPA and DHA is 540 mg/100 g, a high dose that supports heart and brain health and

reduce inflammation. Sugar, carbohydrates or Trans-fatty acids were in very low concentrations also beneficial for our organism.

2.2. Vitamin and Mineral Content

Seabream presents micronutrients that have relevant roles in maintaining health. This fish contains vitamin D that helps bone health, immune system, and calcium absorption. Also, it provides B3, B6 and B12 vitamin complexes, essential for metabolism, converting food into energy. Together, they support the proper functioning of the nervous system (neuronal health, reduction of neuropathy), improve skin and hair conditions, and facilitate red blood cell production, preventing anemia.

Also, this fish contains minerals in high amounts that are essential nutrients, in particular magnesium, potassium, zinc, selenium, phosphorus and copper. These minerals act as structural components of the body, regulators of metabolic processes, and cofactors for enzymes.

2.3. Healthy Fatty Acids

The amount of fat in seabream is low; however it provides omega-3 (EPA and DHA), essential fatty acids that the body cannot synthesize, with great health benefits. They help to reduce blood triglycerides, blood pressure, and inflammation, lowering cardiovascular disease risk. DHA supports brain development and cognitive performance. Lipid quality indices indicate that seabream helps to prevent atherosclerosis, cardiovascular disease, hypertension and inflammation.

2.4. Additional Benefits

Seabream consumption is linked to improved metabolic and mental health outcomes. This fish contributes to a balanced diet that can help reduce the risk of heart disease, improve brain function, and support overall health.

3. RISKS ASSOCIATED WITH SEABREAM CONSUMPTION

While seabreams are generally safe and healthy, there are a few potential risks to take into account:

3 .1. Heavy Metal Contamination

Like many fish, seabream can contain small amounts of mercury, cadmium and lead from polluted waters. However, levels of heavy metals were not detected on any occasion in the farmed fish from Greece.

3.2. Other chemicals and unwanted compounds

Chemical contaminants such as inorganic arsenic, dioxins and PCBs, biogenic amines, and disinfectants were well below safety limits established by food safety authorities or not detected at all in fresh seabream. In farmed fish some undesirable compounds can also form when the cold chain is broken or when, after harvesting from the sea, handling and hygiene practices do not meet quality standards. These agents were either not detected, or their concentrations were well below the legal or recommended limit for seabream.

4.3. Microbial Contamination

Unhygienic handling practices, improper storage, transport, or cooking can lead to foodborne illnesses (e.g. *Listeria* or *Vibrio*). In the Greek seabream, those microbiological indicators studied were either not detected or present in very low concentrations and always below the legal limit and the pathogens were absent. Due to this reason, it is very important to meet hygiene standards, do not break the cold chain and acquire fish from a reputable source.

3.4. Cholesterol Content

Total fat in seabream is low but it contains a moderate amount of cholesterol (around 76 mg/100 g), like other fish. However, it is rich in omega-3 fatty acids, which are hypolipidemic and help prevent the accumulation of cholesterol in the arteries.

4. ENVIRONMENTAL CONSIDERATIONS AND SUSTAINABILITY

Seabream open-water cage farming is focused on utilizing deep, clean water environments, such as the Aegean Sea. The sustainability of aquaculture has been improved through better feeding for optimal fish growth and proper environmental management. Consumers should choose fish from responsible sources that promote sustainable aquaculture and marine conservation practices, either local fish or fish with sustainability certification.

5. CONCLUSIONS

In conclusion, seabream is a high-protein and low, but beneficial-fat food, that promotes satiety and muscle maintenance. Also, it provides essential vitamins and minerals that contribute to heart, brain, and overall health. There are no associated risks, unless those that could arise from improper handling (that is not the case). Seabream should be acquired from a guaranteed source that carries out hygienic and responsible practices. It

represents an excellent food choice that supports both human health and environmental sustainability.