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

BENEFITS ASSOCIATED WITH TROUT CONSUMPTION

LAYMAN'S REPORT

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

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1. INTRODUCTION

This report is based on data from the SEA2SEE project (https://sea2see.eu/), a European initiative aimed at increasing consumer trust and acceptance of sustainably sourced seafood, whether wild-caught or farmed. Despite ongoing efforts, there is still a need to fully implement practices that ensure transparency and traceability across fisheries and aquaculture products in the EU. In several European markets, unsustainable fishing and farming practices remain a significant concern. Within the framework of the SEA2SEE project, an innovative blockchain-based traceability model was developed, alongside strategies designed to raise public awareness about the benefits of seafood consumption.

This Layman report focuses on Rainbow trout produced by Piscicultura Checa in Spain. Its aim is to present, in clear and accessible language, the scientific findings of the project regarding the effects of trout consumption on human health. The potential benefits are assessed based on factors such as nutrient content (supporting improved nutritional status), high-quality protein, beneficial fatty acid composition, and the possible presence of contaminants or risks, which together could contribute to reducing potential health risks.

Communicating the benefits of seafood consumption is essential to support aquaculture producers that uphold high standards of quality, transparency, and responsible practices. This enables consumers to make informed choices and confidently purchase healthy and sustainable products. Rainbow trout is a nutrient-dense, heart-healthy food with relatively low contaminant risk compared to many other fish.

The main objective of this report is to present, in clear and easy to understand language, evidence-based information on the nutritional benefits and potential risks associated with consuming trout produced by Piscicultura Checa in Spain. According to the European Food Safety Authority (EFSA), risk–benefit analysis is a complex approach that weighs the likelihood and severity of risks linked to exposure to a substance against its expected benefits. In this context, a preliminary assessment of the risks and benefits of rainbow trout consumption, considering different aspects, is outlined below

2. BENEFITS OF RAINBOW TROUT CONSUMPTION

2.1. Nutritional Value

Rainbow trout is a high-protein, moderate-fat fish, providing roughly 17 g of protein and 4.5 g of healthy fats (including 1 g of PUFAs and 0.4 g Omega-3) per 100 g serving. PUFAs are more abundant than SFAs, constituting a healthy nutritional profile. Rainbow trout boasts a high essential to non-essential amino acid ratio, ensuring it as a complete protein source. The amount of essential amino acids in trout is higher than the recommended amino acid scoring pattern for children over 3 years and adults, so it provides these compounds in appropriate or even higher amounts.

2.2. Vitamin and Mineral Content

Rainbow trout provides mainly vitamin B12, essential for the nervous system, brain, and blood formation, helping to maintain energy and cardiovascular health and vitamin B3, involved in metabolic processes to produce energy and for the functioning of the nervous system. Also, trout provides a large amount of essential nutrients since it has high content in or is rich in magnesium, zinc, copper, selenium and potassium, vital components that play key roles in enzymatic functions, structural integrity and metabolic regulation. Together, these nutrients make trout a strong candidate for inclusion in a balanced diet.

2.3. Healthy Fatty Acids

Lipid quality in trout is primarily determined by a high PUFA content, including high levels of omega-3 (EPA/DHA), which offer high nutritional value. Key quality indices include a high PUFA/SFA which indicates good effect on cholesterol metabolism. Other indices suggest that this fish has good potential for the prevention of inflammation, as well as for cardiovascular and chronic diseases.

2.4. Additional Benefits

Consuming rainbow trout is associated with several health benefits, including reduction of triglyceride levels and modulation of chronic inflammation. Overall, it provides good protection against cardiovascular disease, as well as supporting heart and brain function.

3. RISKS ASSOCIATED WITH RAINBOW TROUT CONSUMPTION

Even though rainbow trout is generally considered a low-risk fish, it is worth mentioning some potential risks.

3 .1. Heavy Metal Contamination

The levels of heavy metals, such as Hg, are well below safety threshold in the Piscicultura Checa farmed trout. In general, trout are often harvested young and raised on controlled diets, accumulation is minimal compared to larger predatory fish.

3.2. Other chemicals and unwanted compounds

Some contaminants that could be present in trout are dioxins and PCBs, that accumulate in fatty tissue. Although farmed fish historically had higher levels, regulation and improved feed have reduced this risk. These contaminants were either not detected, or the concentrations were far below the legal or recommended limit in fresh trout. Other non-frequent chemical contaminants, antibiotics, antiseptics and disinfectants, were not

detected. All freshness indicators reflected optimal values, according to the quality conditions used in the harvesting, maintenance and transport of the fish.

4.3. Microbial Contamination

Poor hygiene during handling, transport, or storage can lead to bacterial contamination in fish. Rainbow trout from Piscicultura Checa is free of pathogens, and microbiological contamination indicators are at very low levels. Foodborne illnesses could occur if the fish does not meet quality standards or is undercooked. To reduce the risk, it is recommended to buy fish from known sources and store it at a temperature of 4°C or lower.

3.4. Cholesterol Content

Trout is considered a fatty fish; however, a significant part of fats are PUFAs. Therefore, although it contains a moderate amount of cholesterol, the omega-3 fatty acids can lower blood triglycerides and cholesterol. Culinary preparation affects health impact, so grilling, baking and steaming are the healthiest methods.

4. ENVIRONMENTAL CONSIDERATIONS AND SUSTAINABILITY

This Piscicultura Checa farming has a positive impact on environmental protection, animal welfare, and sustainability due to several reasons: rainbow trout is raised using traditional methods in ponds on riverbanks, which continuously oxygenates the water. It is not a large-scale industrial fish farm; the trout have ample space, are kept at low stocking densities, and receive a balanced and moderate diet; the goal is not fattening them. The trout are intended for human consumption and for restocking rivers, lakes, and lagoons.

5. CONCLUSIONS

This farmed rainbow trout is a highly nutritious food, rich in PUFAs and high-quality protein, offering a safe and sustainable alternative to overfishing. It is rich in omega-3 fatty acids, protein, and vitamins such as B12 and B3, promoting heart health thanks to its low saturated fat content and high level of omega-3. Potential contaminants were not detected, so people can benefit from including trout in their diet, if it’s sourced responsibly and properly prepared.