Environmental traceability and eco-labelling of food supply chains under a life cycle approach

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Introduction

Usually, environmental problems have been tackled in isolation, considering the production on the one hand, and the consumption of goods, products and services, on the other. Additionally, quality and safety of food supply chains are frequently considered individual questions. This traditional approach has often led to inconsistencies between proposed policies and strategies. The most advanced management models are changing towards integrated approaches that allow establishing relations between production and consumption, and environmental aspects and quality. The European Food Policy on environmental and safety issues, which focuses its efforts on establishing and responding to approaches in a coordinated manner, is an example of this approach.

In line with the European policies, the Spanish Ministry of Agriculture, Fisheries and Food [1] has defined an ambitious strategy to highlight the quality of the Spanish food agri-food system. The strategy bet on consider food as the basis of a recipe that includes other ingredients such as sport, gastronomy, culture, fashion or tourism, the environment and health. Based on these policies the ECO-SMART-TraceFOOD project aims to develop more advanced tools for traceability, authenticity, and sustainability monitoring of the Spanish food system. The project that started at the end of 2023 will aid to solve environmental and socio-economic issues and at the same time boost consumers' trust in sustainability-oriented certification schemes of fish and seafood products. The solutions in use these days are outdated and do not match the fast-moving and highly complex global market. There is an urgent need to provide the Spanish food industry with reliable tools which are simple in operation with high speed/turn-around harnessing recent technical developments (Figure 1).

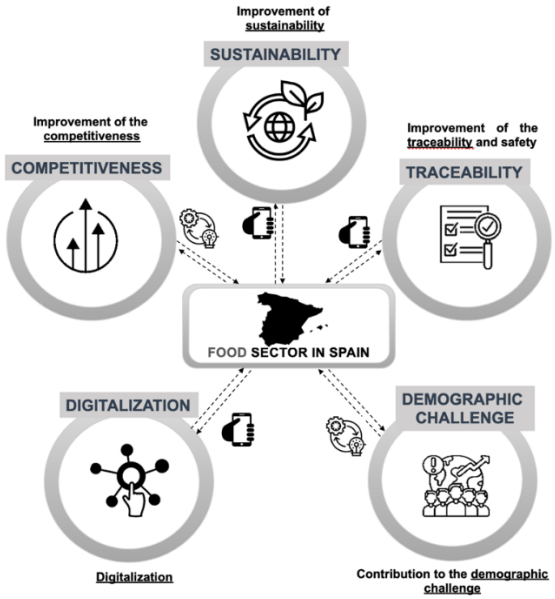

Figure 1. Description of the ECO-SMART-TraceFOOD project for the Spanish food supply chain.

Methods

The methodology of the ECO-SMART-TraceFOOD comprises seven work packages (WP). The first two WPs are designed to guarantee the viability and success, and the following WPs involve the technical work: WP3 addresses the analytical techniques and procedures to assess the traceability of food; WP4 is focused on the environmental assessment of the food (fish and seafood) supply chain; WP5 proposes to create the ECO-SMART-TraceFOOD application; WP6 aims to integrate an eco-labelling and traceability certification system; and WP7

represents the case studies in which the ECO-SMART-TraceFOOD app will be tested. These WP are based on 5 key pillars that will allow us to reach a successful industrial demonstrator (Figure 2):

1. **Development of testing methods**. We will develop a multi-layered traceability scheme employing both analytical and data-driven assessment methods. We will explore capabilities of commercially available, hand-held NIRS (Near Infra-red Spectroscopy) scanners to answer a broad range of food traceability related questions, including geographical origin assignment, production methods and freshens. Such diverse application of this miniaturized equipment for rapid food testing has not been reported yet. Moreover, environmental assessment of food products will be performed using the life cycle assessment (LCA) methodology.
2. **ICT infrastructure**. We will develop a tailored infrastructure to support analytical and meta data handling, processing, and results dissemination. We will rely on a state-of-the-art architecture type based on Data Lake and Warehouse data storage architecture. Those easy-access, flexible storage repository solutions will account for the variety and volume of data collected in the project and allow for its expedient further processing.
3. **Creation of user-friendly interface**. We will develop a user-friendly mobile application that will unify all previously created solutions in an easy-to-use format. On one hand, producers and fishermen will be able to communicate the information on their catch of the day. This means the digitalization of the product trail, digital verification of the manual inputs through GPS tagging, and meta data supply. Customers will be able to access the full information on the product route, confirmation type and identity, freshness and LCA score, as well as to browse a list of locally available catches and/or receive customizable notifications on local catch availability.
4. **Industrial demonstrator**. Large scale demonstrators will be organized in collaboration with industrial partners.
5. **Management.** We will actively engage in meetings with industry, retailers, and wider society to ensure awareness, relevance, and acceptance.

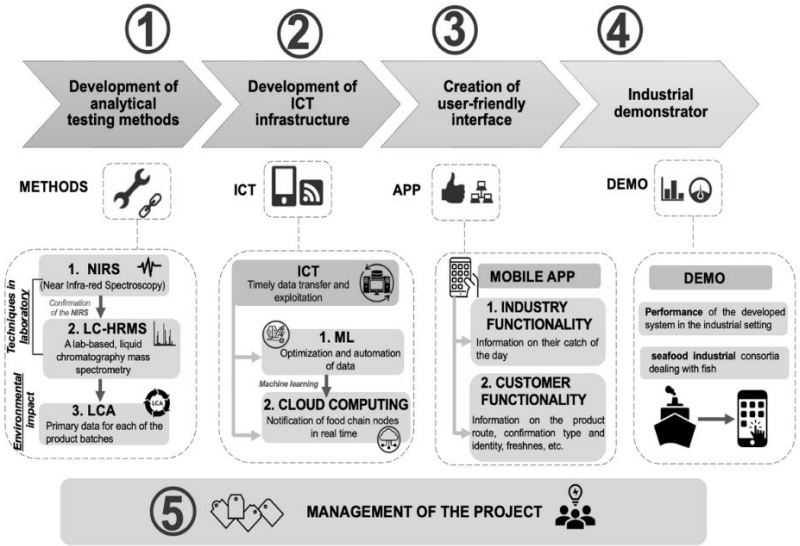

Figure 2. Project flow diagram with the 5 key pillars.

Results

As a result of the first year of the project, we will elaborate the analytical infrastructure and the life cycle model. In the former, we will start with the compilation of a DNA barcode library for fish authentication and with the development of the NIR method Standard Operating Procedure to determine the origin, production methods and freshens of fish product. Regarding the environmental aspects, LCA will be applied to determine the environmental performance of fish products and to quantify the environmental consequences of food fraud by means of: (i) creation of a custom database, (ii) development of a life cycle model for the food supply chain and, (iii) calculation of the impact of food fraud along the food supply chain questions.

References

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