

FISH AND SEAFOOD – ALL SAFE, ALL GOOD

More transparency and safety-tools for fishermen, consumers, importers and distributors of fishery products through PARASITE

The project: Monitoring marine food, detecting sicknesses, securing value chains

Safe fish and seafood, free of risk, is in the interest of all consumers of sea and water-products. Apart from safety risks for consumers of marine food, parasites destroying the quality of the fishery products represent a substantial economic threat for the seafood industry. The researchers from the PARASITE project go out on their boat to the sea in order to look at the origins of fish-borne parasites, and at the light tables in their laboratories they explore methods for better seafood safety.



In 2010 scientists working on Biological Hazards Panel (BIOHAZ) of the European Food Safety Authority (EFSA) published a report identifying several risks of parasites in fishery products. The EU fishing industry is one of the largest worldwide. Consumer trust and quality perception is of crucial value for the industry. Since international markets grow, since the food chains are globalised and supported by quick transportation systems, fishery-product-borne zoonoses are on the rise, with extended geographical limits and populations at risk coupled with demographic changes. The EFSA therefore asked for the improved collection of systematic data on the complete life cycle, geographical and seasonal distribution, prevalence, intensity, anatomical location of parasites in wild-caught fishery products, infectivity and inactivation treatments and methods. The PARASITE project tackles the problem from epidemiology to risk assessment and impact-mitigation alternatives.

The product: Detecting methods, mitigation and data banks

Three technological products, well advanced and soon to be industry applicable, can be presented now.


The UV press detection method: this method is particularly useful for detecting nematode larvae in fish flesh in the processing

industry. It consists in the observation of pressed and deep-frozen fish fillets (or viscera) under UV light. The fluorescence of frozen anisakid larvae allows their visual detection and quantification. Although this method is currently being used in large scientific surveys, the automation of the pressing and larvae detection steps are being carried out to make it more efficient and user-friendly. This is a simple, accurate and cheap technique; characteristics that may contribute to its adoption as the routine inspection method.

The RT-PCR detection method: this detection method is particularly useful for detecting the presence of parasite traces in highly processed fishery products. The molecular method consists of a RT-PCR¹ assay targeting the mitochondrial cytochrome oxidase II (mtDNA *cox2*). Although the presence of traces of anisakids DNA does not represent a risk for most consumers, highly sensitised citizens may benefit from this rapid technique. It allows the detection and identification of anisakid nematodes to species level, even at a low concentration of DNA.

The mitigation method: we have developed an electronic device to treat offals on board in order to minimise the reintroduction of viable parasites to the environment. The gutting and discarding of viscera on board is an extended practice in all European fisheries. This practice represents a way of reintroducing viable parasites to the environment, which may increase the parasite infection levels in wild fish. Within the project, the device to inactivate these larvae by using electronic radiation is being developed.





The Biobank: To improve the fisheries' management of systematic monitoring programs, the collected samples and the related data are stored and managed in a sample Biobank. This innovative tool will lead to a computer-aided epidemiological, geo-referenced database for zoonotic parasites in fish stocks and products marketed in Europe.

The end-users: Food inspectors, fish and seafood industry, policy makers, consumers

Our project outcomes mainly focus on food-safety authorities as well as the fish and seafood industry, including fishermen, processors, importers and distributors.

Policy makers, food safety authorities, fishmarketers and seafood-market managers will be enabled to take better informed decisions.

From a wider point of view, consumers may benefit from the reduction of risk exposure.

The inventors: Academics, research institutions and SMEs

The PARASITE project has 21 partners, 15 RTD performers and 6 SMEs from Europe and Asia.

Regarding the three technological products presented here:

UV press method: it is based in a prior methodology developed by Karl and Leinemann in 1993. The work developed within the PARASITE project will be focused to improve this technique in order to mechanise the press and detection of larvae steps. Viability determination will be included as an asset. This work is being carried out by CSIC-IIM, NIFES, MRI and TechNet, all consortium partners.

RT-PCR methodology is being developed by UT-URS team, based in their previous works on this topic.

The device to treat offals on board is being developed by CSIC-IIM and ARVI. This device is an improvement of a prototype developed within a previous project in which CSIC-IIM was also involved.

Development stage: Technology transfer, pilot stage of tools, industrial up-scaling

Different detection methods will be validated in laboratories and tested on an industrial scale. As a result, sensitive, specific, accurate and industrially applicable methods will be obtained, which can be recommended as the routine detection method by food safety authorities and industries.

Policy impact: A better food safety policy and enhanced competitiveness

PARASITE aims to support the European Food Safety Policy. This way, the project will yield the basic information and technological tools to facilitate the implementation of strategies that can mitigate the problem of fish parasites. Concerns about food allergies are increasing worldwide and those industries capable of producing a completely safe product may have a competitive advantage. As part of the project, the willingness to pay for parasite-free products will be analysed, providing new data on consumers' preferences.

Next steps: Feasibility studies, beta-tests, industry workshops, new research roadmaps, communication

To raise the impact on food safety policy, a permanent dialogue with food safety authorities was started through the European Reference Laboratory for Parasites and other national and European agencies.

The implementation of tools at industrial level is partially guaranteed by the involvement of industrial partners in the project. Moreover, intensive technology transfer was developed within the project. This way, workshops targeted to the industry will be organised as well as short-term stays for people from the industry in RTD facilities.

A beta-testing exercise on detection methods will be carried out by the industrial partners to check their implementation feasibility.

Our communication strategy will use different media channels to reach a wide audience and to help the PARASITE consortium become a reference for the topic of fishery-products-borne parasites. The outline of an action plan and cost-benefit scenarios will be elaborated on.



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