

## Innovative Bio-interventions and Risk Modelling Approaches for Ensuring Microbial Safety and Quality of Mediterranean Artisanal Fermented Foods (ArtiSaneFood)



### Resumen:

The overall objective of this project is to develop efficient intervention strategies, enhanced process control criteria, monitoring sampling schemes, and an easy-to-use food safety decision-support IT tool for artisanal food producers, aiming to the reduction and control of foodborne pathogens such as *Listeria monocytogenes*, *Salmonella spp.*, Shiga toxin-producing *Escherichia coli* (STEC) and *Staphylococcus aureus* in selected traditional food products produced in Mediterranean regions of Portugal, Spain, Italy, France, Greece, Morocco, Tunisia and Algeria.

The artisanal foods are 15 fermented foods of meat or dairy origin with unique technological and sensory characteristics, chosen for research because they may be potential vehicles for the transmission of foodborne diseases due to inadequate or antiquated manufacturing practices or final products' microbial instability. These artisanal foods may pose health risks to consumers as they are often produced with variable, mostly non-standardised productive processes, undergo short fermentation and, in some cases, are directly consumed without any cooking.

### Objetivos:

The successful development of the proposed project will be achieved through multinational and inter-disciplinary research activities divided into the following six specific objectives:

- Determination of the origin and routes of contamination with foodborne pathogens in the artisanal food chains to identify the manufacturing faults/risk factors favouring the growth of pathogens; which will be carried out through the conduction of manufacture surveys, and physicochemical and microbiological surveys of raw materials, mid-products and end-products sampled during actual artisanal elaboration.
- Assessment and development of biopreservation strategies based on functional starter cultures and natural plant-based antimicrobial extracts to control pathogens and extend shelf-life of each of the artisanal foods.
- Conduction of a series of fate studies of pathogens inoculated in prototype artisanal foods in order to understand the pathogens' viability during fermentation, ripening and storage under traditional manufacture process and enhanced manufacture variants (i.e., use of biopreservatives and alternative process variables).
- Development of dynamic predictive microbiology models that mathematically describe the growth, survival and inactivation of pathogens as affected by the intrinsic properties of the product (i.e., water activity, pH, and lactic acid concentration) and the enhanced manufacture variants.
- Delineation of intervention strategies, optimisation of process variables, norms/standards and design of monitoring sampling schemes for the control of pathogens during the artisanal food processing, all of which will be derived from process risk models built upon the actual artisanal production processes, alternative production processes and the predictive models of pathogens.
- Construction of a prototype safety decision-support IT framework for the artisanal producers, intended to serve as a quality and safety self-evaluation tool for assessing the lethality of their (traditional and biopreservation-based) manufacturing processes towards pathogens, predicting contamination levels in final products, designing quality monitoring tools, such as sampling schemes and control charts, upon current and target safety levels, suggesting possible corrective actions, with the notebook capability of assessing quality improvements in time and accessing traceability information.

### Objetivos contribución:

WP5. Fate studies of pathogens in artisanal foods.

### Entregables:

- D5.1. Standardisation of inoculum and optimisation of the inoculation procedure in the selected matrices.
- D5.2. Definition of the prototype artisanal products.
- D5.3. Survival of pathogens in artisanal products elaborated using enhanced process variables.
- D5.4. Biopreservation methods as inhibitors of pathogens in enhanced processes of artisanal foods.
- D5.5. Database containing dynamic data for pathogen survival and accompanying microbiota for the different food processes and scenarios.

### Impacto:

- Impact on helping Mediterranean artisanal meat and dairy sectors to introduce enhanced process elaborations and adapted biopreservation techniques to improve food quality and safety.
- Impact on strengthening consumers' trust and expectations by artisanal elaborations of quality.

- Impact on development and stimulation of market uptake using scientific evidence-based approaches, tried-and-tested bio-preservation technologies and tools enhancing food quality/safety.
- Impact on strengthening interdisciplinary research for long-lasting implementation and exploitation of results.

**Presupuesto:** 1,583,708.00

## **Equipo de investigación**

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**Enlace:** <http://www.ipb.pt/artisanefood/>

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