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# Proceedings

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## **Promotion of local Mediterranean fermented foods through a better knowledge and management of microbial resources**

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The aim of this PhD project is to find an innovative strategy for a better knowledge and management of microbial resources of Mediterranean fermented foods, in collaboration with small and medium-sized enterprises, in order to provide new solutions for an improved control of fermentation processes. Seven different multidisciplinary research teams are involved, from 2 non-EU (Algeria and Tunisia) and 4 EU countries (France, Greece, Italy, and Spain). In particular, the research activity of the Italian group is focused on Salame Piemonte PGI and Castelmagno cheese DOP.

### **Valorizzazione di prodotti fermentati locali dell'area del Mediterraneo attraverso una gestione e conoscenza delle risorse microbiche**

Lo scopo di questo progetto di tesi di dottorato è presentare una strategia altamente innovativa per migliorare le conoscenze sui microrganismi coinvolti nella produzione di alimenti fermentati del Mediterraneo. Il lavoro viene effettuato direttamente con le piccole e medie imprese locali con l'obiettivo di fornire nuove soluzioni per il miglioramento dei processi di controllo delle fermentazioni. Il progetto è condiviso da sette gruppi di ricerca multidisciplinari: 2 partner non UE (Algeria e Tunisia) e 4 partner UE (Francia, Grecia, Italia e Spagna). Nello specifico, l'Italia, si occuperà dello studio e valorizzazione di: Salame Piemonte IGP e formaggio Castelmagno DOP.

#### **1. State-of-the-Art**

Fermented foods including dairy and meat products constitute a significant part of the so-called Mediterranean diet (MD) which was recently recognized as an Intangible Cultural Heritage of Humanity by UNESCO (2010). However, the homogenization of food behavior due to the globalization of the modern era is eroding progressively the traditional MD (Serra-Majem *et al.*, 2006). In fact, the gradual shift in food production from small local producers to large-scale processing plants is the cause of the industrialized use of starter cultures, that modify and level out the organoleptic properties of the products (Magistà *et al.*, 2017).

Instead, the microbial ecology of fermented food has become of increasing interest over the last few decades because the qualitative characteristics of naturally fermentations are known to be largely dependent on the quality of the ingredients and raw materials. The specific conditions of the processing and ripening and the composition of the microbial population have been shown to significantly affect the sensory traits of fermented products (Rantsiou and Cocolin, 2006).

In the last twenty years, the strategies used to investigate microbial communities and their associated functions have considerably changed and progressed. Indeed, the development of culture-independent methods such as community fingerprinting techniques and more recently High-Throughput Sequencing (HTS) technologies (i.e. metagenomics and metatranscriptomics) has considerably helped food microbiologists to understand microbiota composition. HTS technologies, in particular, offer several advantages such as the possibility of proficiently analyze a large number of samples simultaneously. Nevertheless, culture-dependent analyses for researchers or food manufacturers dealing with microbial culture development for food use cannot be avoided and constitute a complementary and necessary approach for the understanding of food microbial ecology and for the selection of isolates of interest (Ferrocinio *et al.*, 2018).

#### **2. PhD Thesis Objectives and Milestones**

Within the overall objective mentioned above, this PhD thesis project can be subdivided into the following activities, according to the Gantt diagram (Table 1):



- WP1) **Description of selected fermented foods** to gain knowledge of traditional foods originating from the Mediterranean area  
1.1. Use of the fermented food in the local culture  
1.2. Production process
- WP2) **Characterization of microbial diversity** of selected Mediterranean fermented products using culture-dependent and independent methods  
2.1. Food safety and hygiene  
2.2. Study of the microbial diversity with culture-dependent methods  
2.3. Study of the microbial diversity and functions with culture-independent methods
- WP3) **Creation of a collection of potentially beneficial microorganisms** involved in the fermentation process of the studied food products  
3.1. Preservation of microbial resources  
3.2. Safety evaluation of microbial resources  
3.3. Production of fermented products with selected strains
- WP4) **Dissemination, valorization and teaching**  
4.1. Results dissemination to the scientific community, publications in scientific papers and symposium conferences  
4.2. Dissemination of results and technology transfer to local producers and stakeholders  
4.3. Societal dissemination of results and promotion of Mediterranean fermented foods

**Table 1** Gantt diagram for this PhD thesis project.

WP	Task	Year 1												Year 2												Year 3													
		Month	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	
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	1.2																																						
WP2	2.1																																						
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WP4	4.1																																						
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### 3. Selected References

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