Study of the olive orchard as a source of autochthonous starter culture for table olives fermentation

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BACKGROUND

Table olives are one of the oldest fermented foods in the Mediterranean area, significant both economically and nutritionally due to their rich bioactive compounds. Despite their importance, olive fermentation remains largely **traditional and artisanal**, leading to variability and unpredictability in the final product.
Research suggests that a consistent and ideal fermentation process begins with examining the **natural microbiota** in olives, with the most effective starter cultures being a combination of **lactic acid bacteria (LAB) and yeasts**. LAB and yeasts work synergistically during fermentation, with yeasts enhancing the organoleptic qualities by producing metabolites that support LAB growth, stabilizing the product, and preventing spoilage.

Key traits in LAB for successful fermentation include the ability to **degrade oleuropein**, **tolerate high salt** and **phenol concentrations**, endure **low temperatures**, and **rapidly acidify** brines. Yeasts contribute by synthesizing volatile compounds like alcohols and esters, improving the flavor and preservation of olives.

Activities	Months	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
A1)	**Sampling collection of orchard and tree specific fermentation**																								
	1) Microbiome monitoring																								
	2) Biobank development																								
A2)	**Living lab on fermented food**																								
	1) Consumers visioning sessions																								
	2) Pathways to impact sessions																								
A3)	**Characterization of yeasts and LAB**																								
	1) Microplate screening																								
	2) Enzimatic tests																								
A4)	**Fermentation scale up**																								
	1) Assessment of the microbial community dynamics																								
	2)Starter efficiency assessment																								
A5)	**Final product testing**																								
	1) Metabolomic analysis																								
	2) Metagenomic analysis																								
A6)	**Thesis and Paper Preparation**																								

Table 1: Gantt diagram for this PhD thesis project.

Figure 1: Orchard in Chiusavecchia (IM) where samples were collected.

OBJECTIVES AND KEY MILESTONES

This research project aims to identify and characterize yeasts and lactic acid bacteria (LAB) strains community along the Taggiasca olive orchad system in Chiusavecchia (IM) with the aim of developing a microbial autochthonous starter culture with improved features, as vitamins and bioactive compounds production for an innovative healthy food fermentation.

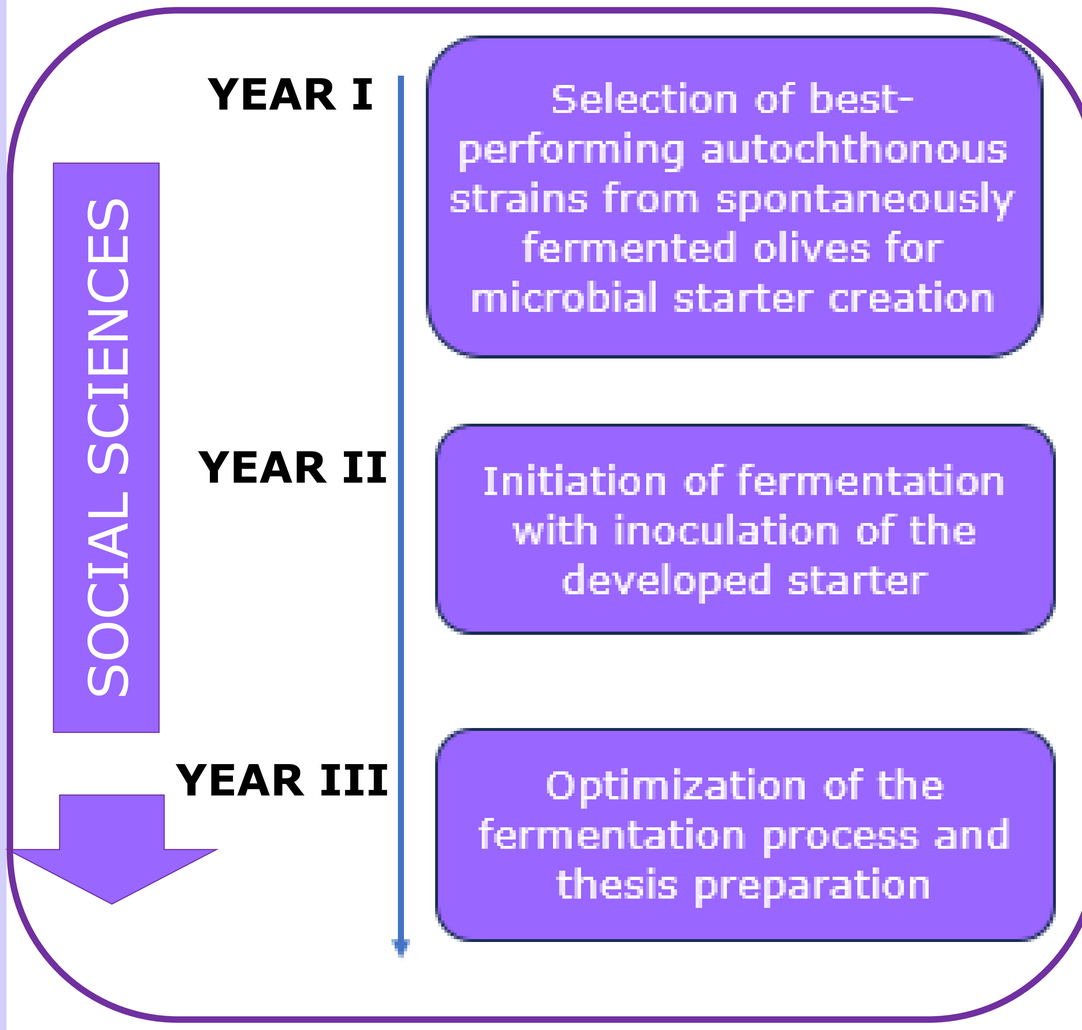

Diagram 1: Representation of milestones as a timeline.

References

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