

PhD Thesis proposal

General Information		
PhD Thesis Title	<i>Isolation and Analyses of Yeasts and Lactic Acid Bacteria from Sourdoughs developed within Different Lebanese Geographic, Historical and Environmental Ccontexts: Potential Applications in Foods and Biotechnology.</i>	
School	<i>Faculty of Agricultural and Food Sciences</i>	
Research Unit	NA	
Laboratory	NA	
Axis	Food Microbiology and Biotechnology	
PhD Supervisor	Name & Title : Lara Hanna Wakim Associate Professor Email : larahanna@usek.edu.lb	University Address : Holy Spirit University of Kaslik- USEK
Co-supervisor	Name & Title : Marc Bou-Zeidan, Assistant Professor Email : marcbouzeidan@usek.edu.lb	University Address : Holy Spirit University of Kaslik- USEK
Co-supervisor	Name & Title : Hervé Blottière Professor Director of Research - MICALIS Institute & MetaGenoPolis - INRA Email : herve.blottiere@jouy.inra.fr	University Address : - AgroParisTech - MICALIS Institute & MetaGenoPolis - INRA
Location (s)	Location 1: USEK	Work shift calendar /per year (%): 95%
	Location 2: MICALIS Institute & MetaGenoPolis - INRA	Work shift calendar /per year (%): 5%
Funding and scholarship		

Applicant Profile and/or Special Requirements	
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Subject's national or worldwide Context, Objectives & Research lines
<p>Sourdough is the traditional method to ferment bread. The main principle is to mix flour and water, followed by several backsloppings. This helps developing a wide range of microbial consortiums, depending on the raw materials, methods and environments of sourdoughs production.</p> <p>It is reported that, among others, more than 20 species of yeasts and 50 species of lactic acid bacteria (LAB) can be found in a sourdough matrix. The isolation and analysis of sourdoughs microorganisms are indispensable for the search of new features in foods and biotechnology. Such features include fermentation ability and metabolic profile, potential pre/probiotic activities, biofilm formation and environmental interaction. In this context, the aim of this study</p>

is to isolate and study yeasts and LAB from sourdoughs developed within different geographic, historical and environmental contexts.

The objectives of this study are:

- Objective 1: isolation and identification of yeasts and LAB microorganisms through culture dependent and independent techniques;
- Objective 2: analysis of the fermentation ability and metabolites production using phenotype microarray techniques and analytical chemistry;
- Objective 3: determination of the biofilm forming capacity and adhesion to biotic and abiotic surfaces;
- Objective 4: detection of probiotic characteristics through *in-vitro* analyses of resistance toward gastrointestinal stresses and antibiotics.

Last, the richness of the Lebanese ecology and biodiversity should be reflected in the sourdoughs, presenting interesting landscapes to discover.

Outcomes (OCs) : What do we wish to achieve?

OC1:	Isolate indigenous strains of yeasts and LAB
OC2:	Identify strains with potential application in fermented products
OC3 :	Detect strains with probiotic activities
OC4 :	

References (R) (5 most recent peer-reviewed publications)

R1:	Martorana, A., Giuffrè, A. M., Capocasale, M., Zappia, C., & Sidari, R. (2018). Sourdoughs as a source of lactic acid bacteria and yeasts with technological characteristics useful for improved bakery products. <i>European Food Research and Technology</i> , 244(10), 1873-1885.
R2:	Legras, J. L., Moreno-Garcia, J., Zara, S., Zara, G., Garcia-Martinez, T., Mauricio, J. C., Bou Zeidan, M & Moreno, J. (2016). Flor yeast: new perspectives beyond wine aging. <i>Frontiers in microbiology</i> , 7, 503.
R3 :	Marongiu, A., Zara, G., Legras, J. L., Del Caro, A., Mascia, I., Fadda, C., & Budroni, M. (2015). Novel starters for old processes: use of <i>Saccharomyces cerevisiae</i> strains isolated from artisanal sourdough for craft beer production at a brewery scale. <i>Journal of industrial microbiology & biotechnology</i> , 42(1), 85-92.
R4 :	Perricone, M., Bevilacqua, A., Corbo, M. R., & Sinigaglia, M. (2014). Technological characterization and probiotic traits of yeasts isolated from Altamura sourdough to select promising microorganisms as functional starter cultures for cereal-based products. <i>Food Microbiology</i> , 38, 26-35.
R5 :	Di Cagno, R., Coda, R., De Angelis, M., & Gobbetti, M. (2013). Exploitation of vegetables and fruits through lactic acid fermentation. <i>Food Microbiology</i> , 33(1), 1-10.