



# Holy Spirit University of Kaslik

## Doctoral College

### Doctoral Studies Rules and Regulations/ Article 2

## PhD Thesis Proposal (PTP)<sup>1</sup>

General Information		
<b>PhD Thesis Title</b>	<b>Development of a new high quality healthy non-alcoholic fermented beverage from grape</b>	
USEK Doctoral Program	<b><i>PhD in Agricultural and Food Sciences</i></b>	
Joint Guardianship/Cotutelle	<input type="checkbox"/> Yes	Partnership university's doctoral program:
	<input checked="" type="checkbox"/> No	
Research Center	NA	
Research Group	NA	
Research Axis	<b>Sustainability</b>	
PhD Supervisor	Name & Title: Dr. Youssef El Rayess Email : youssefrayess@usek.edu.lb	University Address: Holy Spirit University of Kaslik - USEK
Co-supervisor (if applicable)	Name & Title: Dr. Alain Abi Rizk Email: alainabirizk@usek.edu.lb	University Address: Holy Spirit University of Kaslik - USEK
Location (s)	Location 1: USEK	Work shift calendar /per year (%): 70-80%
	Location 2: University of Bologna (UNIBO)	Work shift calendar /per year (%): 20-30%
Potential funding and scholarship	Prima project NOAlBev if funded (Results in December)	

Applicant's Name and Profile		
<b>Comps Exam Language (to be check-marked by the PhD Supervisor)</b>	<input checked="" type="checkbox"/> Oral Assessment <input type="checkbox"/> Written Assessment <input type="checkbox"/> Arabic <input type="checkbox"/> French <input checked="" type="checkbox"/> English	

Subject's national or worldwide context, objectives & research lines
<p>In the past year, consumer demand for healthy and functional beverages have experienced significant growth. Higher demand has pushed the entrepreneurs and innovators to enter the market, with the number of new suppliers in the last five years increasing at an annualized rate of 1.8%. Alongside healthy and functional beverages that compete directly with traditional drinks, the market for low- and no-alcohol drinks suitable is rising steeply. Rising health consciousness hurting soft drink makers, and the continuous innovation of</p>

<sup>1</sup> The PhD Thesis Proposal should not exceed three pages. It shall be approved by the School/Faculty.

products, acts as one of the prime catalysts for the healthy beverage market, thus, the non-alcoholic fermented beverage proposes an innovative, optimized, scalable, and affordable process to produce dealcoholized and enriched wines with healthy compounds.

The production of dealcoholized wine is a sustainable alternative to reduce the alcohol consumption or proposing new healthy products into the market designed specifically for people who won't consume alcohol for various reasons (i.e. diet, believes, etc.). The main technological challenge in wine dealcoholization is the removal of ethanol without affecting the overall wine quality, in particular its volatile profile. Since the consumption of wine is mainly linked to hedonistic motivations, the challenge is to obtain high quality alcohol-free wines that keep unchanged the sensory characteristics and peculiarities that consumers look for in traditional wines. In this sense, there is still ample room for improvement with respect to the technologies currently used as regards in particular: a) the selectivity of the dealcoholization process, especially in relation to the volatile component of wines, b) the reduction of corrective measures on dealcoholized products to restore the gustatory balance possessed by the original non-dealcoholized wines.

This project will fill up the existing gaps in scientific knowledge on wine dealcoholization mainly focused on partial alcohol removal only (e.g. removal of 2-5% alcohol). In this view, the proposal aims at designing and validating a new methodology for developing the next generation of high quality healthy non-alcoholic wine with less than 0.5% v/v ethanol, according to regulatory policy.

The key objective of this project is to develop a new high quality value-added beverage valorizing grape-derived products from the traditional Mediterranean area, thus enabling the transition to healthy and sustainable dietary behaviour.

The project targets the grape as a signature crop of the Mediterranean area. At least three new dealcoholized quality wines enriched in bioactive compounds, and potential health-related benefits are expected within the duration of the project (36 months). Moreover, selected winery by-products will be exploited to extract bioactive ingredients to enhance the nutritional and sensory quality of Mediterranean dealcoholized wines.

<b>Outcomes (OCs): What do we wish to achieve?</b>	
OC1:	Designing and validating a new technological strategy (process innovation) for the development of innovative dealcoholized wines
OC2:	Dealcoholized wines with improved health benefits and prolonged shelf-life (product innovation)
OC (n):	

<b>References (R) (5 most recent peer-reviewed publications in the field)</b>	
R1:	Sam, F. E., Ma, T. Z., Salifu, R., Wang, J., Jiang, Y. M., Zhang, B., & Han, S. Y. (2021). Techniques for dealcoholization of wines: Their impact on wine phenolic composition, volatile composition, and sensory characteristics. <i>Foods</i> , 10(10), 2498.
R2:	Corona, O., Liguori, L., Albanese, D., Di Matteo, M., Cinquanta, L., & Russo, P. (2019). Quality and volatile compounds in red wine at different degrees of dealcoholization by membrane process. <i>European Food Research and Technology</i> , 245(11), 2601-2611.



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R3:	Liguori, L., Albanese, D., Crescitelli, A., Di Matteo, M., & Russo, P. (2019). Impact of dealcoholization on quality properties in white wine at various alcohol content levels. <i>Journal of food science and technology</i> , 56(8), 3707-3720.
R4:	Sam, F. E., Ma, T., Liang, Y., Qiang, W., Atuna, R. A., Amagloh, F. K., ... & Han, S. (2021). Comparison between Membrane and Thermal Dealcoholization Methods: Their Impact on the Chemical Parameters, Volatile Composition, and Sensory Characteristics of Wines. <i>Membranes</i> , 11(12), 957.
R5:	Pham, D. T., Ristic, R., Stockdale, V. J., Jeffery, D. W., Tuke, J., & Wilkinson, K. (2020). Influence of partial dealcoholization on the composition and sensory properties of Cabernet Sauvignon wines. <i>Food chemistry</i> , 325, 126869.