Project: Valorization of wine by-product wastes

Candidates	:	
Duration	:	16 weeks – one semester
Report	:	xx.yy.zzzz, 11.59pm
Advisor	:	Thierry Chapuis
Co- Advisors	:	Simon Crelier, Thierry Heger/David Singer
Abbreviation	:	WineWasteVal
Key Words	:	Wine by-products, valorization, sustainable food engineering

1. Description

This collaborative project involves chemistry, chemical engineering, oenology, and biotechnology students. The focus is on valorizing wine by-product wastes—a significant yet underexplored area in the wine production process. Wine by-products, including grape skins, seeds, stems, and lees, are often discarded after winemaking, yet they are rich in valuable compounds like antioxidants, fibers, and polyphenols.

The project aims to explore innovative methods to convert these by-products into high-value products such as nutritional supplements, cosmetics, and biofuels, thereby addressing both waste management and creating new revenue streams. This initiative is particularly relevant in Switzerland, where environmental sustainability is a priority, and the wine industry plays a crucial economic role.

Students will develop a comprehensive project proposal that includes a thorough literature review to explore existing and emerging technologies, a strong value proposition that underlines both the economic and environmental impacts, and a detailed project plan with timelines and budget estimates. This project not only aims to enhance the sustainability of the Swiss wine industry but also sets a precedent for global practices in agricultural waste utilization.

2. Objectives

1. The candidate should perform a perform a literature review on the topic of:

   1.1. Current methods for processing and utilizing wine by-products.

   1.2. Recent advancements in biotechnology and chemical engineering related to agricultural waste.

   1.3. Economic and environmental benefits of recycling and repurposing agricultural by-products.

   1.4. Case studies of successful valorization of by-products in other industries.

2. The candidate should identify and evaluate potential high-value products that can be derived from wine by-products, exploring their market feasibility and potential environmental impact.

3. The candidate should design and propose experiments to test the viability of converting wine by-products into selected products, such as biofuels, dietary supplements, or cosmetic ingredients.

4. The candidate should estimate the budget needed for the project, including costs for materials, equipment, and labor, ensuring an economically viable proposal.

- The candidate should develop a concept and timeline for the implementation of the project, detailing each phase from initial research and development through to potential commercialization.

3. Remarks

Templates for the report and additional information can be found on the MLS pages on Cyberlearn.

On the due date of the report, the following documents have to be provided by the candidates:

- Report in electronic form (Word and PDF) to the advisor and co-advisors
- The report can be written in English, French or German and should be limited to 20 pages in length (excluding appendices).

A defense and an individual interview with the advisor and co-advisors are part of the evaluation.

Plagiarism in any form is not accepted. Any case of plagiarism or professional misconduct will be prosecuted following the rules of the HES-SO.

20.06.2024, Fribourg

Thierry Chapuis Advisor	Dr. Urban Frey Head of Master HES-SO MLS
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