

Project: Biotechnological Valorization of Wine By-Products

Candidates	: TBD
Duration	: Fall Semester 2026-2027
Report	: 11.12.2026, 11.59pm
Advisor	: Matthias Rüdert
Additional Advisors HES	: Thierry Chappuis, Scott Simonin
Expert / Company	:
Abbreviation	:
Key Words	:

1. Description

This study project brings together master students from three specializations of the Master of Life Sciences, namely AB, CDP, and VE. The primary goal is to develop a research proposal focused on the biotechnological valorization of wine by-products. These by-products, including grape pomace, grape stalks, and wine lees, are generated during the winemaking process and are rich in various chemical components. Despite their potential, they are often underused or discarded.

The students are to propose a strategy of valorizing a by-product through biotechnological conversion resulting in a high-value product. A high-value product, in this context, refers to a substance or material derived from these by-products possessing significant economic potential due to its applications in industries such as food, pharmaceuticals, and cosmetics.

Students will be divided into sub-teams planning different aspects of the project proposal:

- **Logistics Team:** Responsible for sourcing, management, and preprocessing of raw materials, ensuring a consistent and high-quality supply chain for the project and thereafter.
- **Bioprocess Engineering Team:** Tasked with developing and optimizing the biological conversion processes that will transform the by-products into valuable compounds.
- **Downstream Processing Team:** Focused on the purification, isolation, and refinement of target compounds from the bioconversion processes.
- **Analytical Development Team:** Responsible for developing and implementing analytical methods to characterize and quantify the analytes throughout the valorization process.

In the first part of the semester, students will be tasked with identifying and evaluating potential high-value products. They need to perform literature reviews to identify promising products. In the second part of the semester, they will develop a research plan, time planning and a budget to enable pilot production after the execution of the research project.

2. Objectives

- Perform a literature review on the biological valorization of wine by-products. Select suitable raw materials and refined product in a systematic, knowledge-based manner.
- Project design:
 - Conceptualize the production consisting of the raw materials logistics, bioprocess development, downstream processing and analytical development.
 - Identify the scientific gaps of knowledge which need to be closed as part of the project.

- Collaborate and exchange regularly with your team members. Assess interactions between the different project areas. Utilize synergies between the different areas to achieve a convincing and coherent project.
- Construct project proposal for establishing a valorization process at lab scale by addressing the key gaps of knowledge. Provide a project structure, activities as well as a financial projection.

3. Remarks

Templates for the report and additional information will be provided by the advisor.

A draft report must be submitted on 10.11.2026 and will be discussed during an online session on 17.11.2026.

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).

4. Evaluation

The final grade of the module will take into account the report (40%), the defense (30%) and an individual interview (30%).

The report will be evaluated according to the following criteria:

	Very good	Good	Slightly insufficient	Significantly insufficient
Context and objectives	Permanent vision of the project context, mastery of all objectives	Sufficient understanding of the context and main objectives of the project, with occasional refocusing required	Insufficient understanding of context and objectives, regular refocusing necessary	Constant reframing of context and objectives or ignoring context and objectives
State of the art	Relevant selection of existing resources, clear summary, clear positioning of the project	Selection of relevant resources, partial summary, positioning of the project presented but not very in-depth	Selection of irrelevant resources, unclear or non-existent project summary and positioning	Selection of irrelevant resources or missing state of the art
Research methodology	Appropriate and well-described research methods. The innovation sought will enable proven advances to be made	The research methods have minor shortcomings which impact the clarity of the research proposal. By large, the innovation actions will allow to fulfill the goals of the project.	The research methods have major shortcomings which significantly impact the clarity of the research proposal. By large, relevant parts of the proposal objectives will not be fulfilled.	Research methods are inappropriate or incomprehensible. The innovation sought will not lead to proven advances
Planification	Tasks and deliverables broken down and planned in a relevant and autonomous manner, realistic planning including resources and costs	Tasks and deliverables cut out and planned in a relevant way after a few modifications	Numerous corrections needed to arrive at a definition of tasks and deliverables and a workable schedule	Unworkable breakdown and planning despite multiple iterations
Clarity and legibility	Clean, concise writing, precise vocabulary, high-quality illustrations described in the text, attractive layout	Acceptable writing (a few spelling mistakes), generally appropriate vocabulary, mostly legible illustrations	Several spelling mistakes per page, often insufficient vocabulary, poor quality or inappropriate illustrations	Spellchecker not used, inappropriate vocabulary, poor quality/inappropriate illustrations, sloppy layout

The defense will be evaluated according to the following criteria:

	Very good	Good	Slightly insufficient	Significantly insufficient
Structured presentation and ability to summarise (15%)	Introduction of context, clear structure, clear, well-argued summary	Adequate structure, some awkward transitions, partial or unargued summary	Unconvincing structure, missing transitions, unconvincing synthesis	Context not introduced, lack of main theme and summary
Presentation materials (15%)	Clean, error-free and legible material, good linkage between presentation and material content	Appropriate support material, usually error-free and legible, used for the presentation	Loaded and illegible media or no control over media content	Overloaded and illegible media and no control over media content
Posture and oral expression (15%)	Open posture, captures the listener's attention, good elocution, appropriate and specific vocabulary	Open posture, lack of dynamism, adequate elocution, mostly appropriate vocabulary	Closed posture, limited contact with the public, limited and/or inappropriate vocabulary, poorly comprehensible oral expression	Closed posture with no contact with the audience, incomprehensible or inaudible speech
Technical depth of the presentation (15%)	Fully convinced of the quality and depth of the work carried out and of its original contribution to TM	Impression that the work carried out has an appropriate technical depth for a TM	The presentation does not allow us to assess the quality and depth of the work carried out	Impression of surface work, no new technical elements linked to TM, the presentation is a smokescreen
Presentation management (15%)	Time limit respected, prepared slides were all dealt with in the same level of detail, self-assessment included in 30 min.	Slight overrun (3 min max) or necessary acceleration during the presentation with a different level of detail for the last slides, self-assessment included in the 33 min.	Overrun of more than 3 minutes or necessary acceleration with more than 3 slides not dealt with or no self-assessment	Overrun of more than 6 minutes or necessary acceleration with more than 6 slides that are not processed or no reaction to the supervisor's warning.
Interacting with listeners and answering questions (25%)	Constructive attitude in discussions, clear answers in line with the questions asked	Constructive attitude in the discussion, imprecise answers in line with the questions	Lack of commitment to the discussion, answers not in phase with the questions	Defensive and/or negative attitude in the exchange, irrelevant responses (avoidance, deflection)

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

XX.XX.2026, Sion

Advisor

Urban Frey
Head of Master HES-SO MLS

Candidate

Candidate

Candidate

Candidate

Candidate

Candidate

Candidate

Candidate

Candidate

Candidate

Candidate

Candidate