



In view of the health context linked to the spread of the coronavirus, the methods of organisation and evaluation of the learning units could be adapted in different situations; these possible new methods have been - or will be - communicated by the teachers to the students.

4 credits	30.0 h + 15.0 h	Q1
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Teacher(s)	Alvarez Costales Pablo ;Declerck Stephan (coordinator) ;Maudoux Marc ;
Language :	French
Place of the course	Louvain-la-Neuve
Aims	<i>The contribution of this Teaching Unit to the development and command of the skills and learning outcomes of the programme(s) can be accessed at the end of this sheet, in the section entitled "Programmes/courses offering this Teaching Unit".</i>
Evaluation methods	<p><b>Due to the COVID-19 crisis, the information in this section is particularly likely to change.</b> The evaluation methods are based on</p> <ol style="list-style-type: none"> <li>1. a written examination containing the main theoretical notions taught</li> <li>2. an evaluation of the practical work reports (structuring of the report, clarity and rigor of the reported and commented results, critical analysis of the results, conclusions)</li> </ol>
Teaching methods	<p><b>Due to the COVID-19 crisis, the information in this section is particularly likely to change.</b> The teaching takes place in three phases:</p> <ol style="list-style-type: none"> <li>1. theoretical (master) teaching in which the main concepts relating to (1) yeasts (systematic, cycle, walls, membranes, etc.) are taught, (2) the different stages of the brewing process involving biochemical mechanisms and (2) ) the technology of fermentation.</li> <li>2. practical teaching through which the student will be familiar with the main yeast manipulations (isolation, enumeration, identification ...) and the physiological properties of the yeast (vitality, flocculation, limiting attenuation ...) relevant to brewing processes .</li> </ol> <p>These two courses are complementary and allow the student to put into practice the main</p>
Content	<p><b>Theoretical notions:</b></p> <ul style="list-style-type: none"> <li>- Yeast characterization and structure (yeast systematics, life cycle, yeast cytology, cell wall characteristics, cell membrane characteristics)</li> <li>- Metabolism of sugars by brewery yeasts (assimilation of monosaccharides, assimilation of disaccharides / maltose, other carbohydrates, catabolism of sugars, respiration versus fermentation, fermentative power)</li> <li>- Metabolism of nitrogenous materials by brewery yeasts (roles of amino acids, entry of amino acids from the point of view of the biologist and the brewer, degradation of amino acids: the Ehrlich pathway, biosynthesis of amino acids: the Genevois way, case of valine, leucine and isoleucine, case of methionine)</li> <li>- Products of primary yeast fermentations: biosynthesis of acids, aldehydes, alcohols, esters and sulfur compounds</li> <li>- Technology of brewing fermentations and problems associated with cylindro-conical vessels</li> <li>- Guarding and excretion by yeast (roles of the guard, problem of diacetyl)</li> <li>- Propagation and conservation of yeasts (fluidity of the plasma, goals and technical aspects of propagation, long-term storage)</li> </ul> <p><b>Practical work:</b></p> <ul style="list-style-type: none"> <li>- Isolation and culture on appropriate medium of yeasts taken from three types of beer</li> <li>- Enumeration by the Thoma cell technique of total and living cells (following the use of vital dyes)</li> <li>- Physiological characterization of yeasts</li> <li>- Yeast identification by molecular route</li> <li>- Storage of yeasts by freeze-drying and cryopreservation</li> </ul>
Inline resources	Moodle
Bibliography	<p>Les supports de cours se composent de syllabi sur les trois parties théoriques du cours et d'un syllabus sur la partie pratique.</p> <p>Course materials consist of syllabi on the three theoretical parts of the course and a syllabus on the practical part.</p>

Faculty or entity in charge	AGRO
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<b>Programmes containing this learning unit (UE)</b>				
Program title	Acronym	Credits	Prerequisite	Aims
Master [120] in Chemistry and Bioindustries	BIRC2M	4		
Master [120] in Agricultural Bioengineering	BIRA2M	4		
Advanced Master in Brewing Engineering	BRAS2MC	4		