

<b>Subject name</b>	<b>Food Fermentations</b>	
<b>Subject code</b>	B.2s.FFE.SM.BBTSX	
<b>Department</b>		
<b>Faculty</b>	<b>Food Technology</b>	
<b>Subject supervisor/Lecturer</b>	<b>Professor Krzysztof Żyła</b>	
<b>General information</b>	<b>semester</b>	<b>winter</b>
	<b>ECTS credits</b>	<b>2</b>
	<b>Lectures total</b>	<b>30</b>
	<b>Laboratories/classes</b>	<b>0</b>
<b>Objective and general description</b>	<p>Lectures:</p> <ul style="list-style-type: none"> <li>- Food fermentations – an overview. Traditional fermentations used to produce microbial cells or biomass. Production of microbial enzymes and metabolites. Production of fermented foods used for therapeutic purposes</li> <li>- Lactic acid bacteria and their metabolism . Sugar metabolism in lactic acid bacteria. Propionic acid pathway for Propionibacterium sp. Genetics of the thermophilic lactic acid bacteria, examples of genetically modified l.a.b</li> <li>- Yeast and mould metabolism . Induction and repression of carbohydrate enzymes. Ideal yeast- properties that need genetic changes. Examples of yeast transformation in the brewing and wine industries. Examples of filamentous fungi transformation</li> <li>- Fermentation cultures. Developments in fermentative cultures</li> <li style="padding-left: 20px;">Lactic acid bacteria bacteriophage, phage resistant starters</li> <li>- Dairy fermentations. Carbohydrate and nitrogen sources in milk. Fermented dairy foods. Cheesemaking – basic steps, texture and cheese ripening. Manufacture of Cheddar and Mozzarella cheese.</li> <li>- Fermented meats. Fermented sausages. Desirable properties of sausage starter cultures, flavor and aroma development in sausage</li> <li>- Fermentation of bread. Yeast-leavened products and short-time breadmaking systems. Conversion of dough components by microorganisms and enzymes. Sourdough starter microbials</li> <li>- Lactic acid fermentation of vegetables. Flow charts for fermented vegetables</li> <li>- Fermentation of beer and wine. Flow diagram and description of beer manufacture. Chemicals and enzymes in wine manufacture. Killer yeasts associated with wine.</li> <li>- Fermentation of organic acids by microorganisms. Citric acid, gluconic acid and glutamic acid production. Fermentation of nucleic acids</li> <li>- Fermentation of soy sauce by the Koji cultures. Flow chart for the shoyu fermentation. New processing methods using immobilized systems. Fermentation of miso (Japan) and tauco (Indonesia), fermentation of tempeh and sufu.</li> <li>- Therapeutic uses of fermented foods. Bacteriocins produced by lactic acid bacteria and propionic acid bacteria. Probiotics and intestinal replacement phenomena. Prebiotics and symbiotics, functional foods</li> </ul>	
<b>Assessment method</b>		
<b>References</b>	<p>Bamforth, C. W. 20015. Food, fermentation and Micro-organisms. Blackwell Science Publishing. University of California, Davis.</p> <p>Board, R.G.J., Jones, D., Jaris, B. 1995. Microbial Fermentations: Beverages, Foods and Feeds, Blackwell Science, Oxford, UK.</p> <p>Mazza, G. 2013. Handbook of Fermented Functional Foods, CRC Press, Boca Raton.</p> <p>Shi, J., Mazza, G., Le Mauger, M. 2002. Functional Foods: Biochemical</p>	

	<p>and Processing Aspects. CRC Press, Boca Raton.</p>
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Wood, B.J.D. 1998. Microbiology of Fermented Foods, Volumes 1 and 2,  
Academic Press , New York