

课程教学大纲

课程基本信息 (Course Information)					
课程代码 (Course Code)	FS340	*学时 (Credit Hours)	34	*学分 (Credits)	2
*课程名称 (Course Name)	(中文) 食品发酵				
	(英文) Food Fermentation				
课程性质 (Course Type)	专业核心课程 core course				
授课对象 (Target Audience)	食品科学与工程专业本科生 Undergraduate student majoring in Food Science and Technology				
授课语言 (Language of Instruction)	双语 bilingual				
*开课院系 (School)	农业与生物学院 (School of Agriculture and Biology)				
先修课程 (Prerequisite)	食品微生物学、食品生物化学、微生物学 (Food Microbiology, Food Biochemistry, and Microbiology)				
授课教师 (Instructor)	张建华、孙向军 Jianhua Zhang, Xiangjun Sun	课程网址 (Course Webpage)	无 (No webpage)		
*课程简介 (Description)	《食品发酵》重点介绍发酵与酿造的基本理论和工艺控制，阐述酒精发酵（厌氧）、白酒酿造（固态）、啤酒酿造（液态）、谷氨酸生产（好氧、深层）、柠檬酸发酵、及食醋酿造（多菌株传统酿造）的发酵微生物、发酵机理和发酵工艺。同时，介绍酶制剂、发酵功能食品和添加剂的发酵工艺及食品工业废弃物的生物学处理等。				
*课程简介 (Description)	Food Fermentation specific to the principles of fermentation as well as the processing control. Course focuses on a wide variety of microbes, fermentation foundation, and fermentation technology of alcohol fermentation, distilled spirit fermentation (solid-state, anaerobic), beer fermentation (liquid, anaerobic), glutamic acid fermentation (deep aerobic fermentation), citric acid fermentation, and vinegar fermentation (multi-strain). The process of fermented enzymes, healthy foods and additives are discussed, as well as the biological treatment of industrial waste.				
课程教学大纲 (Course Syllabus)					
*学习目标 (Learning Outcomes)	<ol style="list-style-type: none"> 1. 掌握食品发酵的基本原理和相关的科技知识。 2. 掌握发酵过程中微生物的相互作用及生态变化，微生物代谢对产品的作用。 3. 掌握如何应用食品发酵的基本知识解决发酵过程中的问题。 <ol style="list-style-type: none"> 1. Fundamental understanding of food fermentation science and technology 				

	<p>knowledge and principles;</p> <p>2. Interactions between microorganisms and microbial ecology, metabolic activities of microorganisms and their influence on product attributes,</p> <p>3. Application of scientific knowledge to assess and solve food fermentation science and technology problems.</p>					
<p>*教学内容 进度安排及要求 (Class Schedule & Requirements)</p>	教学内容	学时	教学方式	作业及要求	基本要求	考查方式
	绪论 Introduction	2	讲授 lecture		了解发酵食品生产的特点及其分类、发酵食品生产历史、我国发酵食品产业的现状及存在的问题及发酵食品的发展趋势 Introduction of fermented foods, including their classification, history and developmental tendency.	
	发酵食品微生物种类、相互作用及微生物生态学 Microbial variety, interaction and ecology	2	讲授 lecture		掌握不同微生物的发酵特点和微生物生态学的研究方法 Characteristics of microorganism involving in fermentation and microbial ecology	
	食品微生物发酵机制及代谢调控 Mechanism and metabolism regulation for food fermentation	2	讲授 lecture	作业 Homework 1	掌握微生物发酵的代谢调控机制及微生物代谢工程的应用 Mechanism of microbial metabolism regulation and application of metabolism engineering	
	食品微发酵的控制参数 Parameters of food fermentation	2	讲授 lecture		掌握不同参数对食品微生物的发酵的影响 The effect of parameter change on food fermentation	

	<p>发酵控制及发酵动力学 Parameters control and fermentation dynamics</p>	2	讲授 lecture		<p>固态和液态发酵的主要调控因素及其控制措施 Regulated factors and control measures of solid state and liquid fermentation</p>
	<p>益生菌发酵 Probiotics fermentation</p>	2	讲授 lecture		<p>掌握益生菌发酵食品对胃肠道健康、免疫功能和新陈代谢的影响 Effects of probiotics fermented foods on gastrointestinal health, immunologic function and metabolism</p>
	<p>酒精发酵生产与白酒酿造 Fermented alcoholic beverages</p>	2	讲授 lecture	作业 homework 2	<p>掌握酒精发酵微生物及发酵机理、白酒的生产工艺 Mechanism and microorganisms involving in alcohol production. Fermented technology of alcoholic beverages</p>
	<p>啤酒和葡萄酒酿造 Beer brewing and wine making</p>	2	讲授 lecture		<p>掌握啤酒和葡萄酒发酵微生物及发酵机理 Mechanism and microorganisms involving in beer brewing and wine making</p>
	<p>有机酸发酵 Organic acid fermentation</p>	2	讲授 lecture		<p>掌握柠檬酸、乳酸发酵菌种、发酵机理及发酵工艺 Mechanism, technology and microorganisms involving in citric acid fermentation</p>
	<p>氨基酸与核酸发酵 Amino acid and nucleotide fermentation</p>	2	讲授 lecture	作业 homework 3	<p>掌握谷氨酸、核苷酸发酵菌种、发酵机理及发酵工艺</p>

					Mechanism, technology and microorganisms involving in amino acid and nucleotide fermentation	
	传统调味品发酵 Traditional seasoning fermentation	2	讲授 lecture		掌握食醋和腐乳（霉菌）发酵菌种及发酵工艺 Mechanism, technology and microorganisms involving in vinegar and sufu fermentation	
	传统餐桌发酵食品 Traditional fermented table foods	4	讲授 lecture		掌握发酵肉制品、发酵乳制品及发酵果蔬制品生产工艺 Technology of fermented meat, dairy, fruit and vegetable products	
	微生物制剂及发酵食品添加剂 Microbial agents and fermented food additives	4	讲授 lecture		掌握单细胞蛋白、酶制剂等发酵制品生产工艺 Technology of single cell protein, enzyme products	
	发酵食品的安全性及清洁生产 Safety and clearer production technology of fermented foods	2	讲授 lecture		讨论发酵食品的安全性及发酵工业清洁生产 Safety of fermented foods and clearer production technology	
*考核方式 (Grading)	考试 (70%) 作业与课堂讨论 (30%) Exam (70%) Homeworks and discussion (30%)					
*教材或参考资料 (Textbooks & Other Materials)	《发酵食品原理与技术》张兰威主编，科学出版社，2014。 Food fermentation principle and technology, Lanwei Zhang, Science Press, 2014 Advances in Fermented Foods and Beverages: Improving Quality, Technologies and Health Benefits, Wilhelm Holzapfel, Woodhead Publishing, 2014					
其它 (More)						

备注 (Notes)	
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备注说明：

1. 带*内容为必填项。
2. 课程简介字数为 300-500 字；课程大纲以表述清楚教学安排为宜，字数不限。