

SUBJECT OUTLINE DETAILS

1. Subject: FOOD MICROBIOLOGY (VI SINH THỰC PHẨM)

- Code: FS440C
- Credits: 2
- Hours: 27 theory hours including virtual video lecture, 3 seminar and discussion hours

2. Management Unit:

- Department: Microbial Biotechnology
- Faculty/Institute: Biotechnology Research and Development Institute

3. Prerequisites: BT304C – Food Fermentation (Lên men thực phẩm)

4. Subject objectives:

4.1. Knowledge:

- 4.1.1. Having knowledge about the spoilage and pathogenic microorganisms in food; understanding sources causing the microbial food spoilage and food-borne diseases; learning to predict the pathogens that can be happened during the preparation, manufacture and storage of food.
- 4.1.2. Having knowledge about the factors effecting on the growth, survival and performance of microorganisms in food.
- 4.1.3. Strengthening the awareness on the principle of manufacture of some representative fermented products that have the participation of yeasts, moulds and lactic acid bacteria.
- 4.1.4. Having basic knowledge about the evaluation method and microbial analysis employed in research of food microbiology.
- 4.1.5. Having basic and necessary knowledge about the hazard analysis and critical control of food processing manufacture.

4.2. Skill:

- 4.2.1. Being able to apply the microbial analysis to detect, evaluate and determine some common spoilage and pathogenic microorganisms causing food-borne diseases.
- 4.2.2. Being able to analyze the experimental data and to set up research experiments.
- 4.2.3. Being able to apply the gained knowledge to solve some certain issue relating to the food microbiology.

4.2.4. Having skills to use and to apply informatic technology in study and research. Having ability for team work, writing and presenting scientific seminar.

4.2.5. Having skills of communication, presentation, learning, and research in terms of specializations relating to food biotechnology in English. Having ability for higher study abroad, self-study and self-research.

4.3. Attitude:

4.3.1. Having a sense of serious and diligent self-study.

4.3.2. Having effort, inquiring mind and solidarity spirit.

4.3.3. Having honesty and responsibility.

5. Brief description of subject content:

The main contents of a subject including: introduction of the spoilage and pathogenic microorganisms in food; sources causing the microbial food spoilage and food-borne diseases; prediction on the pathogens that can be happened during the preparation, manufacture and storage of food; factors effecting on the growth, survival and performance of microorganisms in food; manufacture principles of some representative fermented products that have the participation of yeasts, moulds, lactic acid bacteria and their microbial, physiological, biochemical conversions; evaluation methods and microbial analyses employed in research of food microbiology; hazard analysis and critical control of food processing manufacture.

6. Subject content structure:

	Content	Hours	Objectives
Chapter 1. Overview of microorganisms in food microbiology			
1.1.	Introduction of food microbiology	1	4.1.1; 4.1.3; 4.3
1.2.	Microorganisms associated in food microbiology	1	4.1.1; 4.2.1; 4.3
1.3.	Research scope of food microbiology	1	4.1.1; 4.3
1.4.	Factors effecting on the growth, survival and performance of microorganisms in food	2	4.1.1; 4.2.1; 4.3
Chapter 2. Food-borne diseases caused by different kinds of microbial pathogens			
2.1.	Introduction to food-borne diseases	1	4.1.1; 4.2; 4.3
2.2.	Enteric family and related bacteria	2	4.1.1; 4.2; 4.3
2.3.	<i>Staphylococcus aureus</i>	1	4.1.1; 4.2; 4.3
2.4.	Endospore-forming food pathogens	2	4.1.1; 4.2; 4.3
2.5.	<i>Listeria monocytogened</i>	1	4.1.1; 4.2;

			4.3	
2.6.	Food-borne viral diseases	1	4.1.1;	4.2;
			4.3	
2.7.	Fungal toxins and yeast spoilage	1	4.1.1;	4.2;
			4.3	
Chapter 3. Microorganisms in food fermentation				
3.1.	Introduction to kinds of fermentation and associated microorganisms	1	4.1.3;	4.2;
			4.3	
3.2.	Fermented products from yeasts	1	4.1.3;	4.2;
			4.3	
3.3.	Fermented products from moulds	1	4.1.3;	4.2;
			4.3	
3.4.	Fermented products from acid lactic bacteria	1	4.1.3;	4.2;
			4.3	
Chapter 4. Basic evaluation methods and analyses in food microbiology				
4.1.	Standard plate count, Total viable count, Most probable number	2	4.1.4;	4.2;
			4.3	
4.2.	Identification and enumeration of total aerobic bacteria, moulds, yeasts	1	4.1.4;	4.2;
			4.3	
4.3.	Identification and enumeration of Coliforms, <i>E. Coli</i>	1	4.1.4;	4.2;
			4.3	
4.4.	Identification and enumeration of <i>Salmonella</i> , <i>Bacillus</i>	1	4.1.4;	4.2;
			4.3	
Chapter 5. Controlling methods and hazard analysis				
5.1.	Assessing contamination of the processing environment	1	4.1.5;	4.2;
			4.3	
5.2.	Criteria for foods	1	4.1.5;	4.2;
			4.3	
5.3.	Hazard analysis and critical control for food safety	2	4.1.5;	4.2;
			4.3	

7. Teaching method:

- lecture (including virtual video lecture)
- case study and seminar presentation (in group)
- discussion
- problem solution

8. Duties of student:

Students have to do the following duties:

- Attend in class at least 80% theory hours. Ask permission of lecturer in advance for any absence.
- Pre-study materials before coming to class (based on syllabus and references)
- Implement group seminar assignments and get the result assessment.
- Organize actively for self-study hours.
- Attend seriously the final written exam and submit of task as assigned.

9. Assessment of student learning outcomes:

9.1. Assessment

No.	Point components	Rules and Requirement	Weights	Objectives
1	Diligent and active study	- Hours of attendance - Active participation and discussion in class	5%	4.3
2	Group oral assignment	Case study, Seminar presentation, discussion and assessment of implementation results	25%	4.1; 4.2; 4.3
3	Final exam result	Serious implementation for written exam, submission of task as assigned	70%	4.1; 4.2; 4.3

9.2. Grading

- Grading components and final test scores will be marked on a scale of 10 (0 to 10), rounded to one decimal place.
- Subject score is the sum of all the components of the evaluation multiplied by the corresponding weight. The subject score is marked on a scale of 10 and rounded to one decimal place, then is converted to A-B-C-D score and score on a scale of 4 under the academic provisions of the University.

10. Materials:

Materials information	Code number
[1] Food Microbiology / Ngo Thi Phuong Dung, Huynh Xuan Phong – Syllabus (in English). Can Tho University Publishing House, 2013.- 219 p., 16x24 cm, 05/QĐ-NXB.ĐHCT.	CNSH.029
[2] Food microbiology : An introduction / Thomas J. Montville.- Washington: ASM Press, 2005.- 380 p., 27 cm, 1555813089.- 664.001579/ M814	<u>NN.004509</u>
[3] Food microbiology / M R Adams, M O Moss.- 1st.- Cambridge: The Royal Society of Chemistry, 1995, 574.163p., 0 85404 509 0.- 576.163/ A216	<u>1c 147901</u>
[4] Modern food microbiology / James M. Jay.- 6th ed.- Gaithersburg, Md: Aspen Publishers, 2000.- xvi, 679 p. ; ill., 26 cm, 083421671X.- 664.001/ I.42	<u>CN.013796</u>
[5] Food Fermentation- Part 1 / Tjakko Abee [et. al.] ; editor: Siemen Schoustra.- Netherland: Wageningen Agricultural, 1999.- 197 tr. ; ill., 30 cm.- 664/ F686/P.1	<u>DIG.000137;</u> <u>CNSH.000159</u>
[6] Food mycology: A Multifaceted approach to fungi and food / Edited by Jan Dijksterhuis, Robert A. Samson.- Boca Raton: CRC Press, 2007.- 403 p., [9] p. of plates ; ill. (some col.), 27 cm, 9780849398186.- 664.001/ D536	MON.029677

11. Self-study Guide:

Week	Content	Theory / Seminar (hours)	Students' duties
1	<p>Chapter 1: Overview of microorganisms in food microbiology</p> <p>1.1. Introduction of food microbiology</p> <p>1.2. Microorganisms associated in food microbiology</p> <p>1.3. Research scope of food microbiology</p>	3	<ul style="list-style-type: none"> - Pre-study material [1]: chapters 1, 2. - Refer relevant information from materials [2], [3], [4].
2	<p>1.4. Factors effecting on the growth, survival and performance of microorganisms in food</p> <p>Chapter 2: Food-borne diseases caused by different kinds of microbial pathogens</p> <p>2.1. Introduction to food-borne diseases</p>	3	<ul style="list-style-type: none"> - Pre-study material [1]: chapters 3, 4. - Refer relevant information from materials [2], [3], [4]. - Preparation for case study and group oral assignment (follow list of groups, 2 students/group): presentation of seminar on required topics that instructed in handout.
3	Presentation of group seminar and discussion	3	Presentation of group seminar: 5-7 minutes/group presentation, and 3-5 minutes for discussion.
4	<p>2.2. Enteric family and related bacteria</p> <p>2.3. <i>Staphylococcus aureus</i></p>	3	<ul style="list-style-type: none"> - Pre-study material [1]: chapter 4. - Refer relevant information from materials [2], [3], [4].
5	<p>2.4. Endospore-forming food pathogens</p> <p>2.5. <i>Listeria monocytogenes</i></p>	3	<ul style="list-style-type: none"> - Pre-study material [1]: chapter 4. - Refer relevant information from materials [2], [3], [4].
6	<p>2.6. Food-borne viral diseases</p> <p>2.7. Fungal toxins and yeast spoilage</p> <p>Chapter 3: Microorganisms in food fermentation</p> <p>3.1. Introduction to kinds of fermentation and associated microorganisms</p>	3	<ul style="list-style-type: none"> - Pre-study material [1]: chapter 4. - Refer relevant information from materials [2], [3], [4], [6]. - Pre-study material [5]: chapter 1.
7	<p>3.2. Fermented products from yeasts</p> <p>3.3. Fermented products</p>	3	<ul style="list-style-type: none"> - Pre-study material [1]: chapter 5. - Pre-study material [5]: chapters 9, 11, 12.

	from moulds 3.4. Fermented products from acid lactic bacteria		
8	Chapter 4: Basic evaluation methods and analyses in food microbiology 4.1. Standard plate count, Total viable count, Most probable number 4.2. Identification and enumeration of total aerobic bacteria, moulds, yeasts	3	- Pre-study material [1]: chapter 6. - Refer relevant information from materials [2], [3], [4].
9	4.3. Identification and enumeration of Coliforms, <i>E. Coli</i> 4.4. Identification and enumeration of <i>Salmonella</i> , <i>Bacillus</i> Chapter 5: Controlling methods and hazard analysis 5.1. Assessing contamination of the processing environment	3	- Pre-study material [1]: chapters 6, 7. - Refer relevant information from materials [2], [3], [4].
10	5.2. Criteria for foods 5.3. Hazard analysis and critical control for food safety	3	- Pre-study material [1]: chapter 7. - Refer relevant information from materials [2], [3], [4].

**ON BEHALF OF RECTOR
DEAN/ DIRECTOR**

Can Tho,/...../20...
HEAD OF DEPARTMENT