

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; 4.3	4.2;
Chapter 3. Microorganisms in food fermentation			
3.1. Introduction to kinds of fermentation and associated microorganisms	1	4.1.3; 4.3	4.2;
3.2. Fermented products from yeasts	1	4.1.3; 4.3	4.2;
3.3. Fermented products from moulds	1	4.1.3; 4.3	4.2;
3.4. Fermented products from acid lactic bacteria	1	4.1.3; 4.3	4.2;
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; 4.3	4.2;
4.2. Identification and enumeration of total aerobic bacteria, moulds, yeasts	1	4.1.4; 4.3	4.2;
4.3. Identification and enumeration of Coliforms, <i>E. Coli</i>	1	4.1.4; 4.3	4.2;
4.4. Identification and enumeration of <i>Salmonella</i> , <i>Bacillus</i>	1	4.1.4; 4.3	4.2;
Chapter 5. Controlling methods and hazard analysis			
5.1. Assessing contamination of the processing environment	1	4.1.5; 4.3	4.2;
5.2. Criteria for foods	1	4.1.5; 4.3	4.2;
5.3. Hazard analysis and critical control for food safety	2	4.1.5; 4.3	4.2;

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 from moulds</p> <p>3.4. Fermented products from acid lactic bacteria</p>	3	<ul style="list-style-type: none"> - Pre-study material [1]: chapter 5. - Pre-study material [5]: chapters 9, 11, 12.

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, 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**

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HEAD OF DEPARTMENT