MODULE 1: Food safety and quality in primary production

COURSE TITLE: 1.2 FOOD QUALITY IN PRIMARY PRODUCTION

Contenu

CREDITS: 3 (2 -1-4)

1 credit: 15 H
(Lecture-Practice-Self learning)
Class (including presentation + farm visit) (contact hours): 75 H
Self-learning (assignment, written report, case study, self study): 60 H
TOTAL: 135 H/SEMESTER

LANGUAGE OF COURSE DELIVERY:

ENGLISH or FRENCH, and one of these national languages (THAI, VIETNAMESE, KHMER)

Workload: 135 h

PREREQUISITES:

Microbiology, Chemistry

COURSE OBJECTIVES:

To provide the students with an understanding of the key factors influencing the quality of agricultural products and how to control and maintain the quality of agricultural products.

LEARNING OUTCOMES:

Students will be able to:
- **LO1**: Recognize and identify the attributes of food quality
- **LO2:** Recognize and identify pre-harvest and post-harvest factors that influence quality of agricultural products
- **LO3**: Analyze and implement the control measures to ensure the quality of agricultural products
- **LO4**: Evaluate food quality management systems and recommend the preventive measures

COURSE OUTLINE:

1. **Definition of food quality**
2. **Attributes of food quality**
   2.1. Microbiological
   2.2. Chemical
   2.3. Nutritional
   2.4   Organoleptic
3. **Food crops**
   3.1 Pre-harvest factors influencing the quality of agricultural products and their control
   3.2 Post-harvest factors influencing the quality of agricultural products and their control
   3.3 Food quality management system
4. **Animal production**
   4.1 Pre-harvest factors influencing the quality of animal products and their control
   4.2 Post-harvest factors influencing the quality of animal products and their control
   4.3 Food quality management system
5. **Fishery production**
   5.1 Pre-harvest factors influencing the quality of fishery products and their control
   5.2 Post-harvest factors influencing the quality of fishery products and their control
   5.3 Food quality management system
5. **Case studies: Food crop production, animal production and fishery production**

Detailed course outline

1. Definition of food quality (Food quality vs. food safety) (1 H)
2. Attributes of food quality (8 H)
   2.1. Microbiological
       - Plant products: Bacterial rot, mold rot, yeast spoilage, anthracnose, Mycotoxins
       - Animal products: Spoilage bacteria
       - Aquaculture products: Spoilage bacteria
   2.2. Chemical
       - Lipid oxidation
       - Non enzymatic and enzymatic browning
       - Biogenic amine
   2.3. Nutritional

- Nutritional profile

    2.4   Organoleptic

3.   Food crops (8 H)

    3.1 Pre-harvest factors influencing the quality of agricultural products and their control

- Cultivar type
- Agrochemical application (Fertilizer, pesticides, …)
- Infestation
- Irrigation
- Others

    3.2 Post-harvest factors influencing the quality of agricultural products and their control

- Maturation and maturity index
- Packing house operation
- Storage conditions (temp., RH, gas composition)
- Pest management
- Packaging, transportation and distribution
- Others

    3.3 Food quality management system (GAP, GHP, GMP)

4.   Animal production (5 H)

    4.1 Pre-harvest factors influencing the quality of animal products and their control

- Genotype
- Gender and castration
- Feeding practice
- Others

    4.2 Post-harvest factors influencing the quality of animal products and their control

- Slaughtering practices
- Carcass processing
- Aging and chilling
- Packaging
- Storage

    4.3 Food quality management system (GAHP, GHP, GMP)

5.   Fishery production (5 H)

    5.1 Pre-harvest factors influencing the quality of fishery products and their control

- Genotype
- Feeding practices
- Harvesting practices
- Others

    5.2 Post-harvest factors influencing the quality of fishery products and their control

- Handling
- Transportation
- Storage conditions

    5.3 Food quality management system (GAP, COC, GHP, GMP)

6.   Case studies: Food crop production, animal production and fishery production (3 H)

LABORATORY SESSION: None

Benchmark LOs				Suggested
	Knowledge	Skills	Competence	EQF levels
LO1	X	X		6
LO2	X	X		7
LO3	X	X	X	7
LO4	X	X	X	7

Learning Outcomes (LOs)- Course Content Matrix

	1	2	3	4	5	6
LO1	X	X	X	X	X	X
LO2			X	X	X	X
LO3			X	X	X	X
LO4			X	X	X	X

Skills Development

Skills Development Matrix

Skills (Discipline specific)	
Food quality attributes	IP
Pre-harvest control measures	IPA
Post-harvest control measures	IPA
Food quality management systems	IPA
Transferable Skills	
Independent learning	P
Time management	P
Oral communication	PA
Written Communication	PA
Co-operative learning	P
Leadership	P

I: Introduced, P: Practice, A: Assessed

OUTCOME-METHOD TABLE

Intellectual Outcomes

Intellectual outcomes	Teaching methods or activities
Students will be better able to:	
Recognize and identify the food quality attributes	Classroom lecture, assignment (written report), pre and post test, case studies
Recognize and identify the key pre-harvest and post-harvest factors influencing the quality of agricultural products	Classroom lecture, review and compare articles, pre and post test, case studies (guest speaker, self-study, written report and presentation)
Understand how to apply the control measures and to implement the food quality	Classroom lecture, case studies (guest speaker, self-study, written report and

management systems	presentation)

Skills Outcome

Skills outcome	Teaching methods or activities
Students will demonstrate the ability to:	
1. Develop and implement food quality management plan for primary production	Classroom lecture, case studies, farm visits, virtual visit (video), presentation
2. Evaluate food quality management systems and recommend the control measures	Classroom lecture, case studies, farm visits, virtual visit (video), presentation, audit and inspection exercise (role play)

*1 for QC/QA manager *2 for inspector and auditor

Attitudinal Outcome

Attitudinal outcomes	Teaching methods or activities
Students will increasingly be able to:	
1. Systemically search, select and evaluate the literature and other relevant materials on food quality	Case studies (individual or group), farm visits
2. Plan and manage to do the research and identify issues related to food quality in primary production	Case studies (individual or group), farm visits
3. Be responsible towards food quality	Case studies (individual or group), farm visits

TEACHING AND LEARNING METHODS

The course is delivered via lectures, reading materials including the recent literatures and practical problem solving in food quality issues. Additional online and recent information will be provided to enhance self-learning experiences. Active learning is encouraged and students' understanding of each modules or subtopics is evaluated via featured examples, practical questions, relevant case studies, assignments and presentations.

1. Lecture
2. Reading (self study, gloassaries)
3. Practical (guest-speakers, role play).
4. Online material (videos)
5. Group assignment (quality assurance plan)
6. Case study (group discussion, group work, presentation)
7. Farm visit (orientation, observation report, check list practice, group presentation)
8. Seminar attendance (written report)
9. Peer and self assessment (group presention)
10. Evaluation

TIME DISTRIBUTION AND STUDY LOAD:

1. Lecture: 30 hours
2. Assignments: 15 hours
3. Case study and presentation: 30 hours
4. Self-study: 60 hours

Chapter	Lecture hour	Farm visit	Presentation	Self-study/Assignment	Report
1	1			2	
2	8			8	
3	8	5	6	6	5
4	5	5	6	8	5
5	5	5	6	8	5
6	3		12	8	5
Total	30	15	30	40	20

ASSESSMENT

Total (%)		LO_1	LO_2	LO_3	LO_4
16	Written report (attributes, seminar attendance)	10	2	2	2
24	Case study (group)	4	8	8	4
20	Farm visit (report and group presentation, roleplay, quality management plan)	2	6	6	6
40	Final exam	12	12	12	4

Report: structure of report (20%) , writing skills (20%) , analysis results (20%), discuss and explanation of results (40%).

EVALUATION SCHEME

An "A" would be awarded if a student can show the ability having elaborative knowledge on; elaborate, formulate and solve problems related to this module. A "B" would be awarded if a student shows an overall understanding of the topics covered, a "C" would be given if a student meets below expectation on both knowledge acquired and analysis. A "D" would be given if a student does not meet basic expectations of the topics presented in the course.

Assessment Specification Grid

Activities	LO1	LO2	LO3	LO4	Total
Assignment 1	8				8
Assignment 2	2	2	2	2	8
Assignment 3	2	6	6	6	20
Case study	4	8	8	4	24
Examination	12	12	12	4	40
Total	28	28	28	16	100

*Assignment 1: written report (Food quality attributes)
 Assignment 2: Written report (Seminar attendance)
 Assignment 3: Report and presentation of farm visit
*Case study: food crops, animal food, fishery products
Assessment of Case study and Assignments:

- Understanding the concept and topics properly

- Demonstrate the specifically sound of the evident-based case analysis
- Concise reviewing the relevant literature on relevant topics
- Interpret the acquired data and analyze scientifically
- Describe the results comprehensively and writing skills in the report
- Clear oral presentation

REFERENCES

Websites :
FAO (Food and Agricultural organization): http://www.fao.org/home/en/
Codex alimentarius: http://www.fao.org/fao-who-codexalimentarius/codex-home/en/
EFSA (European Food Safety Authority): http://www.efsa.europa.eu/

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ALIGNMENT MATRIX OF MODULE LEARNING OUTCOMES

Corresponding EQAS LO	Module LO	Units developing the LO	Extent of alignment with EQAS LO (maximum total for an EQAS LO 100%)
Learning Outcomes for Food Safety and Microbiology			
Describe the properties of common food spoilage organisms. Experimentally determine their presence and numbers. Demonstrate a critical understanding of instances of food spoilage, causation and prevention.	LO1: Recognize and identify the attributes of food quality	2 – 3 – 4-5 -6	
	LO2: Recognize and identify pre-harvest and post-harvest factors that influence quality of agricultural products	3-4-5-6	
Describe the properties of common food poisoning organisms, their toxins and means of detection. Experimentally determine the presence of food poisoning organisms. Demonstrate a working knowledge of food-borne infections/intoxications, evaluating causation and prevention.	LO2: Recognize and identify pre-harvest and post-harvest factors that influence quality of agricultural products	3-4-5	
Recognize and describe the principles and limitations of food preservation. Exercise appropriate judgment on the suitability of different preservation methods to particular foods; give some practical examples. Critically discuss the effects of intrinsic and extrinsic factors on shelf-life and safety of foods. Give practical examples and some indications of the benefits of predictive modelling.	LO3: Analyze and implement the control measures to ensure the quality of agricultural products	3-4-5-6	
Learning Outcomes for Food Chemistry and Analysis			
Demonstrate understanding of the basic concepts of organic chemistry, physical chemistry and biochemistry related to food. Demonstrate an understanding of the structure and function of major food components. Describe the physical and chemical properties of foods in production and supply chains. Demonstrate a comprehensive understanding of the structure, function and interactions of major and minor food components, vitamins, flavours, taste and colour.	LO2: Recognize and identify pre-harvest and post-harvest factors that influence quality of agricultural products	2	
	LO3: Analyze and implement the control measures to ensure the quality of agricultural products	2	
Demonstrate an awareness of the relationship between food, nutrition and health.	LO2: Recognize and identify pre-harvest and post-harvest factors that influence quality of agricultural products	2-3-4-5	
Food processing and engineering			
Identify sources of raw material; explain the variability and the impact on food processing operations. Propose alternative ways of utilization of lower	LO1: Recognize and identify the attributes of food quality	2-3-4-5	
	LO2: Recognize and identify pre-harvest and post-harvest	2-3-4-5	

Corresponding EQAS LO	Module LO	Units developing the LO	Extent of alignment with EQAS LO (maximum total for an EQAS LO 100%)
quality raw materials.	factors that influence quality of agricultural products		
Quality Management and the Law			
Demonstrate an understanding of the principles of quality management systems in the food industry, the range of documentation required and its use.	LO4: Evaluate food quality management systems and recommend the preventive measures	3-4-5	
Demonstrate a critical understanding of the role of food provenance in maintaining food quality. Undertake an analysis demonstrating how a food product can be authenticated.	LO2: Recognize and identify pre-harvest and post-harvest factors that influence quality of agricultural products	3-4-5	
	LO4: Evaluate food quality management systems and recommend the preventive measures	3-4-5	
Generic Competences Communication abilities, ethics and personal skills			
Able to plan and carry out an experimental investigation under supervision and write a scientific report following standard conventions.	LO4: Evaluate food quality management systems and recommend the preventive measures	3-4-5	
Communicate scientific ideas through written, oral and visual means in English. Able to discuss these ideas at a higher level.	LO2: Recognize and identify pre-harvest and post-harvest factors that influence quality of agricultural products	3-4-5-6	
	LO4: Evaluate food quality management systems and recommend the preventive measures	3-4-5-6	
Demonstrate autonomy, self-direction, initiative and effective decision making in complex and unpredictable situations.	LO3: Analyze and implement the control measures to ensure the quality of agricultural products	3-4-5-6	
	LO4: Evaluate food quality management systems and recommend the preventive measures	3-4-5-6	