Course Outline

Online International Training Course
via Zoom Meeting

1. **Course Title**: Prevention of postharvest loss in the value chain of agricultural crops
2. **Duration**: 4-8 July 2022
3. **Background and Rational**:

Many countries in the world especially the developing countries are facing with the problems of postharvest losses in agricultural produce. The losses in product quality and quantity occur at all stages of production chain from pre-harvest through post-harvest stages (harvesting, handling, storage, postharvest processing, packaging, transportation and marketing) and result to serious economic losses. Product loss reduction and quality assurance are deemed critical to add value to the agriculture industry and enhance economic competitiveness. Postharvest losses of agricultural commodities have been recognized since the Sixth National Economic and Social Development Plan of Thailand. Losses of durable and perishable commodities are estimated to be 10 and 20-40%, respectively, worth over 20 billion baths annually. In addition, the FAO stated that estimates of the postharvest losses of agri-food grains in the developing world from mishandling, spoilage and pest infestation are put at 25 percent; this means that one-quarter of what is produced never reaches the consumer for whom it was grown. Reduction in this wastage, particularly if it can economically be avoided, would be of great significance to growers and consumers alike. Attempts to reduce postharvest losses were stated in the National Economic and Social Development plans of Thailand and also stated in the many organizations especially FAO. In order to reduce losses and maintain quality of the agricultural commodities and also to ensure about food security in the world, qualified manpower in the field of Postharvest Technology, which is the integrated knowledge among Engineering, Agriculture, Microbiology, Physiology and Biology is urgently needed. One of the strategic to develop a manpower in postharvest technology for the developing countries can be done through the training program.

Postharvest Technology Division at King Mongkut's University of Technology Thonburi (KMUTT) is the first and only one Thai University that awards master and doctoral degrees in Postharvest Technology. The program is fully conducted in English thus we can accept Thai and Non-Thai students to study in our courses. Until now more than 35 foreign students had already graduated and all of them came from many parts of the world such as Cambodia, China, Ecuador, Laos PDR, Indonesia, Myanmar, Malaysia, Philippines, Sri Lanka, Bhutan, Timor Leste, Pakistan, Nigeria, Tanzania, Uganda and Vietnam. Most of foreign students got a supporting from the scholar of the Office of the Higher Education Commission, TICA and KMUTT. However some student selected our program for continue their education by granting from their home country such as Ecuador. These indicates the reputation of postharvest technology program at KMUTT in the international level. In addition, our program had experience to organize the international training program in postharvest technology for resource persons from many countries under supporting by FAO, Agricultural and Food Marketing Association for Asia and the Pacific (AFMA), Office of the Higher Education Commission, the Asian Vegetable Research and Development Center (AVRDC), TICA etc. One of the important output of training program in the pass is a Guide Book on Postharvest Technology that published by the FAO and it was distributed to the FAO regional office in many countries. We also have experience in producing of the training manual in postharvest technology for the APEC (The Asia-Pacific Economic Cooperation). This training manual was translated to 4 languages (Thai, China, English, Vietnam) for promoting the educational in postharvest technology field. The organizing of international symposium and national symposium in postharvest technology and postharvest education is another task of our division, we have experience to organize the symposiums almost every year. From the background of our group, we have very high confident to organize the international training program in postharvest technology and management for developing country under supporting by the TICA again.

Postharvest Technology Division at KMUTT has 100% academic staffs with Ph.D. holder who have the experiences in various postharvest researches such as ornamental plants, plant physiology and biochemistry, pathology, food safety, seed technology, packaging, microbial, food safety, etc. We also have invited has numerous visiting professors from many countries every year. Our program collaborates with many universities and research institutions around the world thus the knowledge exchange among expertise is one of strategic to develop

human resources in our division. In every year, our division have also accepted the internship students from many countries and trained them to have more skill and experience to maintain the quality and extend the quality of agricultural products. Additional, we have published many scientific articles in high impact journal. A successful of our research comes from a full research facilities that we have in the past until present.

Organization/Institution

Division of Postharvest Technology
School of Bioresources and Technology
King Mongkut's University of Technology Thonburi, Bangkok, Thailand

4. Objectives:

The program is designed to:

1. Deliver superior postharvest technology and innovative information applicable for solving postharvest losses of agricultural commodities
2. Produce the man powers who have the research skills to minimize the postharvest loss in their countries
3. Provide simple postharvest technology techniques that can enhance food security of their countries
4. Building of strong postharvest technology networking and good relationship among participating countries and the participants of each country and Thailand

5. Course Contents:

5.1 Modules

Module 1 - Postharvest Supply Chain Management and Packing House Design

Objective : To understand the postharvest supply chain management of agricultural fresh produces and how it may impact on the quality of fresh produces. To increase the competitiveness of fresh produces in the various marketplaces (both local or overseas markets) and to reduce qualitative and quantitative losses of fresh produces in supply chain. To understand pack-house operations, equipment, process, and management of fresh produces.

Module 2 - Pre-cooling Technology

Objective : To understand the basic principle of precooling technique of fresh produces. Pre-cooling as quickly as possible is a very important requirement to remove field heat and vital heat, resulting in maintaining quality and prolonging shelf life of fresh produces, especially for those tropical produces with naturally high respiration rates.

Module 3 - Postharvest Sanitation

Objective : To understand the different types of plant pathogens and food borne pathogens, appropriate sanitation during postharvest handling, proper measures to minimize the potential of contamination by foodborne pathogens throughout postharvest activities.

Module 4 - Coating and Waxing Technology

Objective : To know the types of coating and waxing, its function to preserve the quality of fruits, vegetables and minimally processing produce during storage, and their limitations and implications.

Module 5 - Packaging Technology for Fruit and Vegetables

Objective : To understand type of packaging, packing method and storage of fresh produces. To know the impact of modified atmosphere packaging (MAP), controlled atmosphere (CA) and different types of plastic film on the shelf-life of fresh produces including minimally processed fresh produces.

Module 6 - Postharvest Disease Control

Objective : Identify the types of plant pathogens that caused by bacteria and fungi, give an example of each, factors affecting on pathogen infection, attached mechanism of plant pathogens, the methods to control those postharvest diseases including physical, chemicals and biological treatments.

Module 7 - Postharvest Ornamental Plants

Objective : To understand the behavior of cut flowers and potted ornamental plants, the physiological and environmental factors that affect the rate of senescence and longevity. Water uptake by cut flowers, carbohydrate supply, and response of flowers to ethylene interact alone or together to affect the length of the vase life, and postharvest treatments to prolong the longevity of cut flowers.

5.2. Virtual practices

Practice 1 - Quality Determination of Fruits

Practice 2 - Effect of Hydrocooling on the Quality of Fresh Commodity

Practice 3 - Effect of Sanitizing Agents for Microbial Disinfestation

Practice 4 - Effect of Coating on Physiological Change of Fruit

Practice 5 - Effect of Packaging on Postharvest Quality of Fresh Produce

Practice 6 - Postharvest Treatments for Reducing Fruit Rot Diseases

Practice 7 - Postharvest Handling of Cut-Flower for Extending Their Vase Life

5.3. Virtual field trips

The aim of virtual field trip is to gain more experiences in postharvest handling and management in private sectors and government sectors such as. Packing house of export company, Fruit or vegetables or ornamental exporting company, Wholesale market for agricultural produces, Ornamental plant cultivation and farm, Horticulture research institute

6. Participants Criteria:

Applicants must fulfill the following requirement:

- ☐ Be nominated by their respective government;
- ☐ Education: Bachelor degree and Master degree holder in Agriculture or Food Science and Technology or relate fields
- ☐ Language: proficiency in English (speaking, reading and writing)

7. Attendance and Evaluation

Participants who completed the online training will receive E-certificate base on:

- ☐ Real time Online Class (not less than 80%)
- ☐ Online class participation and discussion
- ☐ Online presentation and report
- ☐ Online evaluation (Pre-test and Post-test)

8. Venue:

Online training at Division of Postharvest Technology, King Mongkut's University of Technology Thonburi through the Zoom Application.

9. Expected Results:

1. Improving human resource
2. Increase the collaboration and net work
3. Improving postharvest technology skill of participants and apply to their own country
4. Exchange knowledge
5. Cultural exchange

10. Organization/ Institution:
Implementing Agency;

Division of Postharvest Technology
School of Bioresources and Technology
King Mongkut's University of Technology Thonburi
126 Pracha-Utit Rd., Bangmod, Thungkru, Bangkok 10140

Division of Postharvest Technology has resource persons in plant physiology, biochemistry, plant pathology, food science and technology, packaging technology, postharvest innovation, logistics and supply chain management. The knowledge of difference disciplinary can be integrated to solve postharvest technology problems.

Contact Person

Assoc.Prof. Dr. Pongphen Jitareerat
E-mail address: pongphen.jit@kmutt.ac.th
Tel. +66-(2)-470-7722 to 470-7726

11. Expenditure/Funding:

Expenditure : 645,435 Baht (See the list of expenses in the attached file)
Funding :

Thailand International Cooperation Agency (TICA)
Government Complex, Building B (South Zone), 8th Floor,
Chaengwattana Rd. Laksi District, Bangkok 10210 THAILAND
Website: https://tica-thaigov.mfa.go.th/en/index
Email: aitc@mfa.mail.go.th

Schedule for the Online Training Programme:

Prevention of postharvest loss in the value chain of agricultural crop

Date/ Period /Topic	Time (Thailand time)	Content	Speaker	Note
Day 1 : 4 July 2022				
	10.00-10.30	Open Remark /Introduce the speakers and Participants	Dr. Varit Srilaong Dr. Pongphen Jitareerat	
	10.30-12.00	Short Country Reports by Participants	Participants	Approximately 3 min/person
	12.00-13.00	Break for lunch/coffee/tea		
	13.00-14.00	**Module 1** : Postharvest Supply Chain Management and Packing House Design	Dr. Varit Srilaong	
	14.00-15.00	**Practice 1** : Quality Determination of	Dr. Nattachai Pongprasert	
Day 2 : 5 July 2022				
	10.00 - 11.00	**Module 2** : Pre-cooling Technology	Dr.Apiradee Uthairatanakij	
	11.00 - 12.00	**Practice 2** : Effect of Hydrocooling for Maintaining the Quality of Fresh Commodity	Dr.Apiradee Uthairatanakij	
	12.00 - 13.00	Break for lunch/coffee/tea		
	13.00 - 14.00	**Module 3** : Postharvest Sanitation	Dr. Panida Boonyaritthongchia	
	14.00 - 15.00	**Practice 3** : Effect of Sanitizing Agents for microbial disinfestation	Dr. Panida Boonyaritthongchia	
Day 3 : 6 July 2022				
	10.00 - 11.00	**Module 4** : Coating and Waxing Technology	Dr. Chalermchai Wongs-Aree	

	11.00 - 12.00	**Practice 4** : Effect of Coating on Physiological Change of fruit	Dr. Chalermchai Wongs-Aree	
	12.00 – 13.00	Break for lunch/coffee/tea		
	13.00 - 14.00	**Module 5** : Packaging Technology for Fruits and Vegetables	Dr. Varit Srilaong	
	14.00 - 15.00	**Practice 5** : Effect of Packaging on Postharvest Quality of Fresh Produce	Dr. Varit Srilaong	
Day 4 : 7 July 2022				
	10.00 - 11.00	**Module 6** : Postharvest Disease Control	Dr.Pongphen Jitareerat	
	11.00 - 12.00	**Practice 6** : Postharvest Treatments for Reducing Fruit Rot Diseases	Dr.Pongphen Jitareerat	
	12.00 – 13.00	Break for lunch/coffee/tea		
	13.00 - 14.00	**Module 7** : Postharvest Ornamental Plants	Dr. Mantana Buanong	
	14.00 - 15.00	**Practice 7** : Postharvest Handling of Cut-Flower for Extending Their Vase Life	Dr. Mantana Buanong	
Day 5 : 8 July 2022				
	10.00-10.30	**Virtual field trip 1** : Packaging House of Tropical and Subtropical Fruits	Dr. Nattachai Pongprasert	
	10.30 - 11.30	**Virtual field trip 2** : The Export Company (Fruits / Vegetables / Ornamental plants)	Dr. Mantana Buanong	

	11.30 - 12.30	Break for lunch/coffee/tea		
	12.30 - 13.30	Working Plan Preparation	All speakers	
	13.30 - 14.30	Proposal Presentation	All speakers	Approximately 5-10 min/country
	14.30 - 15.00	Closing Ceremony	Dr. Varit Srilaong	