Proposal of the International Training
Theme : Food Security

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

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1. Course Title: Prevention of postharvest loss in the value chain of agricultural crop

2. Duration: 2-6 August 2021

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.

4. Objective:

4.1. Deliver superior postharvest technology and innovative information applicable for solving postharvest losses of agricultural commodities

4.2. Produce the man powers who have the research skills to minimize the postharvest loss in their countries

4.3. Provide simple postharvest technology techniques that can enhance food security of their countries

4.4. 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. Course outline

Date	Time	Activities	Type of Teaching / Contact
25-31 July 2021		Gathering a group of participants and organizer via What application or Facebook	

Mon. 2 August 2021	10.00 - 10.30	Open Remark /Introduce the Staff and Participants	Live
	10.30 - 12.00	Short Country Reports by Participants (Approximately 3 min/person)	Live
	12.00 - 13.00	Break for lunch/coffee/tea	
	13.00 - 14.00	**Module 1** : Postharvest Supply Chain Management and Packing House Design	Live
	14.00 - 15.00	**Practice 1 :** Quality Determination of Fruits	Live / Clip VDO
Tue. 3 August 2021	10.00 - 11.00	**Module 2 :** Pre-cooling Technology	Live
	11.00 - 12.00	**Practice 2 :** Effect of Hydrocooling for Maintaining the Quality of Fresh Commodity	Live / Clip VDO
	12.00 - 13.00	Break for lunch/coffee/tea	
	13.00 - 14.00	**Module 3 :** Postharvest Sanitation	Live
	14.00 - 15.00	**Practice 3 :** Effect of Sanitizing Agents for microbial disinfestation	Live / Clip VDO
Wed. 4 August 2021	10.00 - 11.00	**Module 4 :** Coating and Waxing Technology	Live
	11.00 - 12.00	**Practice 4 :** Effect of Coating on Physiological Change of fruit	Live / Clip VDO
	12.00 - 13.00	Break for lunch/coffee/tea	
	13.00 - 14.00	**Module 5 :** Packaging Technology for Fruits and Vegetables	Live
	14.00 - 15.00	**Practice 5 :** Effect of Packaging on Postharvest Quality of Fresh Produce	Live / Clip VDO
Thu. 5 August 2021	10.00 - 11.00	**Module 6 :** Postharvest Disease Control	Live
	11.00 - 12.00	**Practice 6 :** Postharvest Treatments for Reducing Fruit Rot Diseases	Live / Clip VDO
	12.00 - 13.00	Break for lunch/coffee/tea	

	13.00 - 14.00	**Module 7 :** Postharvest Ornamental Plants	Live
	14.00 - 15.00	**Practice 7 :** Postharvest Handling of Cut-Flower for Extending Their Vase Life	Live / Clip VDO
Fri. 6 August 2021	10.00-10.30	**Field Visiting 1 :** Packaging House of Tropical and Subtropical Fruits	Live / Clip VDO
	10.30 - 11.30	**Field visiting 2 :** The Export Company (Fruits / Vegetables / Ornamental plants)	Live / Clip VDO
	11.30 - 12.30	Break for lunch/coffee/tea	
	12.30 - 13.30	Working Plan Preparation	Live
	13.30 - 14.30	Proposal Presentation	Live
	14.30 - 15.00	Closing Ceremony	Live

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. 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. Study trips/ Field trips

The aim of 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

5.4. Advance Assignments

5.4.1. Country report (3 min/person)

- Postharvest losses and postharvest practice in each country
- Case study: Best practice in postharvest technology in each country

5.4.2. Reading Assignment

- Postharvest handling system of some fresh produce
- Role of logistic for reducing postharvest losses of horticultural crops

5.4.3. Project assignment

- Create the proposal (4-5 persons/group) associated with how to maintain the quality and extend shelf-life of horticultural crops in your country.

5.4.4. Others assignment

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6. Number of participants: 20 persons

7. Participants criteria:

- Good in English communication, writing and reading
- Bachelor degree and Master degree holder in Agriculture or Food Science and Technology or relate fields
- Age not over 50 years old
- Working experience that is involved with postharvest technology or agriculture
- Position: lecturer, researcher, extension workers, people who are involved with postharvest management of agricultural crops.

8. Invited Country

Country	Number of Participants
Bhutan	2
Bangladesh	2
Cambodia	2
Indonesia	2
Myanmar	2
Philippines	2
Sri Lanka	2
Timor Leste	2
Thai	2
Vietnam	2
Total	20

Remark : The number of invited country can be adjusted according to the condition.

9. Venue

- Training venue : Online learning at Postharvest Technology Division, King Mongkut's University of Technology Thonburi (Bangkhuntien Campus), Bangkok
- Training methods : By Zoom Application / What Application / Facebook / Youtube

10. Expected Results

10.1 Improving human resource

10.2 Increase the collaboration and net work

10.3 Improving postharvest technology skill of participants and apply to their own country

10.4 Exchange knowledge

10.5 Cultural exchange

11. Evaluation

- Pre-test and Post-test
- Evaluation of training course by the participants
- Hour of participate must be not less than 85%
- Class participation

12. Institution

12.1. Executing/Implementing Agency

12.1.1. Implementing Agency: Division of Postharvest Technology, KMUTT

12.1.2. Division of Postharvest Technology has resource persons in plant physiology, biochemistry, 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. In addition, the graduate students including the master course and doctoral course students can support as a buddy of foreign participants and also assist for a practical class. Moreover, KMUTT's international officer can facilitate for the international activities. According to Division of Postharvest Technology is a member of Postharvest Technology Innovation Center thus we have full facilities for supporting administration work and training practice. The accommodation at KMUTT is service as a hotel and service apartment with breakfast named Heliconia House. It is located at KMUTT, Bangmod campus. The cafeteria and convenience store are available in campus as well.

12.1.3. Affiliation of 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

12.1.4. Contact person :

Assoc.Prof. Dr. Pongphen Jitareerat

12.1.5. Telephone number: +66-(2)-470-7722 to 470-7726

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12.2. Collaborative Organizations

12.2.1. Kasetsert University

Contact person : Assist. Prof. Dr. Jutatip Poubol

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12.2.2. Ministry of Agriculture and Cooperatives

Contact person : Dr. Chuchart Wattanawan

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