EUROPEAN COMMISSION E+ Capacity Building in Higher Education

SEA-ABT: SOUTH EAST ASIA ACADEMY FOR BEVERAGE TECHNOLOGY

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Deliverable D2.4

Report on improved HE products

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Dissemination Level		
PU	Public	**X**
PP	Restricted to other programme participants (including Commission services and projects reviewers)	
CO	Confidential, only for members of the consortium (including EACEA and Commission services and projects reviewers)	

Summary

An assessment scheme for evaluation of HE modules listed in D1.4 and detailed in D2.1 was created to improve the modules according to their content and didactical/organisational issues. Each module was evaluated professionally this scheme. Feedback was given to the Thai lecturers to integrate the improvement suggestions into their drafts. In a few cases, where major changes had been suggested, the modules were evaluated for a second time.

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Contents

Introduction

To improve the module drafts from the Thai lecturers, an assessment scheme for evaluation of HE modules containing the following criteria was created:

- Is the information given in the module correct?
- Is the information current?
- How deep is the information?
- Is the teaching topic achieved?
- How is the relevance to the practice?
- How is the clarity of the presentation, is there a red thread?

Additionally, formal things were requested:

- presentation style/design
- copyright issues/citation
- didactical/organisational issues

These criteria were chosen to improve all educational products according to their content and didactical/organisational issues. Based on the individual module evaluations detailed improvement suggestions were prepared and sent to the teachers. This task has been running in parallel with task 2.1 since the physical Consortium Meeting in Bangkok in October/November 2017 during checking/evaluating also the corrections provided to the amended teaching materials, assessment method and evaluation, qualification and skill requirements for teacher, previous knowledge expected and workload for students.

An overview about the semester plan to reach the Graduate Diploma in Beverage Technology & Management can be found on https://www.sea-abt.eu/graduate-diploma-beverage-technology-management.

For each of the developed HE modules, a reviewer among the Consortium partners was designated to review the teaching materials. For this purpose, a master file was developed to organise the review process and to keep an overview of the review status of each module which was supported by BOKU and ISEKI.

Module title	**Name and affiliation of module responsible**	**Name and affiliation of reviewer**
Laws and Regulations for beverages	Kriskamol Na Jom, KU, Thailand	Frank Will, HGU, Germany
Non Alcoholic Beverage Technology	Sasitorn Tongchitpakdee, KU, Thailand	Frank Will, HGU, Germany
Alcoholic Beverage Technology	Sumalika Morakul, KU, Thailand	Frank Will, HGU, Germany
Product and Process Development	Chaleeda Borompichaichartkul, CU, Thailand	Frank Will, HGU, Germany

Hygienic Engineering and Design	Navaphattra Nunak, KMITL, Thailand	Gerhard Schleining, BOKU, Austria
QA & QC	Chaleeda Borompichaichartkul, CU, Thailand	Frank Will, HGU, Germany
Beverage chemistry & microbiology	Kriskamol Na Jom, KU, Thailand	Frank Will, HGU, Germany
Target marketing and strategic pricing for beverage industry	Sasitorn Tongchitpakdee, KU, Thailand	Hochschule Geisenheim, Germany
Supply chain management for beverage industry	Sasitorn Tongchitpakdee, KU, Thailand	Hochschule Geisenheim, Germany
Planning and project management for beverage industry	Sasitorn Tongchitpakdee, KU, Thailand	Reinhold Habla, Habla Chemie, Germany
Practical Laboratory in Beverage Industry	Chaleeda Borompichaichartkul, CU, Thailand	Frank Will, HGU, Germany
Seminar (scientific communication skills)	Sumallika Morakul, KU, Thailand	Frank Will, HGU, Germany
Special Problem	Sarn Settachaimongkon, CU, Thailand	Frank Will, HGU, Germany

The teaching materials will be available for students enrolled in the Graduate Diploma Program in Beverage Technology & Management and are also made available to the project partners in a secure location.

1 Food Law and Regulations

This module contained the topics additive regulation, Codex Alimentarius, drinking water, fruit & vegetable juice, international standards, packaging and contact materials, protein drinks, and tea. The teaching contents of most module issues of the draft were in a proper shape. The following improvement suggestions were advised: In respect to drinking water, regulations should also concern tap and process water used for beverage production. In the fruit and vegetable juice module the content was dealing solely with beverages. It should be emphasised, whether there is a differentiation between juice and beverage like it is in Europe. Standards and regulations concerning different beverage groups were presented. Therefore, also a chapter "food control" is essential and should be added. With the exception of the latter, the suggested improvements were implemented after review. Due to the time-consuming development process, the suggestion to add a chapter food control will be taken into account for the final development and implementation of the Graduate Diploma.

See Annex 1 for the complete review.

2 Non-Alcoholic Beverage Technology

The first draft of the module did not fulfil professional and didactical requirements for a good lecture. A lot of teaching contents had no relation to the module title thus concerning the following chapters: nutritional aspects, water, ingredients like sugar, sweeteners, preservatives, organic acids (chemistry, production). It was suggested to replace this by real technological issues. Carbonated drinks had to come more into focus.

The draft included a chapter "plant layout" which should be a separate subject as well as QC, QM, product development, hygienic and sensory issues. Outdated technology, drawings and references were presented. Web links to videos were partially not available, blurred pictures and drawings should be replaced. Generally, too much links to videos were present. Pineapple and grape processing should be added. After a major revision, all chapters fulfilled the requirements of a competent lecture about the technology of fruit and vegetable beverages (including citrus and tomato processing), soy milk, dairy beverages, sport drinks, carbonated beverages, tea, coffee, and cacao beverages.

See Annex 2 for the complete review.

3 Alcoholic Beverage Technology

Already the first draft showed a good set of issues (beer, wine, spirits like whisky, brandy, rum, vodka, Asian spirits) necessary for a comprising lecture. To complete the module contents, it was advised to add a chapter "quality control" and "cider/fruit wine". Lecturers of modules 1.3 and 1.7 should coordinate their contents to avoid doubling of teaching contents in brewery and winemaking.

See Annex 3 for the complete review.

4 Beverage Product Development

In the first draft all chapters were treated much too general. There was no direct relation to beverages or the beverage industry. The teaching contents did not meet the requirements laid down in the module handbook. It was suggested to specify clearly on the product development of beverages and to align the content to the corresponding module handbook. The process development units contained packaging of beverages in different materials, the principle of aseptic packages, new preservation technologies (HPP, PEF, OH, MW) including the corresponding microbiological aspects. They were really good, up-to-date and practice-relevant except some missing statements concerning recycling and sustainability aspects of the different packaging material. Generally, the suggested improvements were implemented after the review.

See Annex 4 for the complete review.

5 Hygienic Engineering and Design

The materials are based on the official training materials provided by EHEDG (https://www.ehedg.org)to EHEDG authorized trainers and to this project, an international organisation, established in 1989 and dedicated to hygienic design. These training materials and guidelines have been developed and checked by a team of experts from all over the world, industry and academia. EHEDG authorized trainers, like the nominated teachers at KMITL, are allowed to use these materials.

See Annex 5 for the complete review.

6 Quality Assurance and Quality Control

The module contains the following issues: food quality, types of risks associated with food and beverage, overview of food quality and safety assurance systems, sample collection techniques, sampling tools and documentation, methods of quality assessment of raw materials; physical, chemical and microbiological properties assessment of in-process and finished products, principles of sensory analysis in quality control, statistical methods for food and beverage quality control, current challenges in quality, and safety, fraud and adulteration in beverage industry. The module is complete, informative and detailed, and it shows a very good teaching concept. No further remarks or suggestions for improvements were necessary.

See Annex 6 for the complete review.

7 Beverage Chemistry & Microbiology

In the first draft the chapter beverage chemistry was essentially copied from the textbook "Chemistry and Technology of Soft Drinks and Fruit Juices" edited by Philip R. Ashurst (Wiley Blackwell). In respect to fruit juices and beverages it covered a lot of ingredients, but important secondary plant substances (polyphenols, anthocyanins, carotenoids, ...) were missing. A too big part accounted for beer. To improve the module content-related and didactically, the following suggestions were made: the chapter "beverage ingredients" should be divided into natural ingredients and additives. Because there is already a module "Alcoholic Beverages", the beer part should be reduced strictly to ingredients. A chapter "secondary ingredients of fruits and vegetables" should be added. Didactically, the lecture should be structured clearly instead of stringing together incoherent issues. For this, a proposal for a suitable module outline was given to the responsible lecturer.

The microbiology part of the module contains the issues significant organisms, sources of microorganisms in beverages, factors affecting beverage safety, prevention and control of microorganisms, pathogenic microorganisms, HACCP concepts. This part is very detailed and covers all relevant aspects. No further remarks or suggestions for improvements were made.

See Annex 7 for the complete review.

8 Target marketing and Strategic Pricing for Beverage Industry

The module was thoroughly evaluated at HGU from an expert for marketing and economics. Detailed comments and improvement suggestions were given to the issues product costs, direct survey, conjoint analysis, pricing strategy and strategic management as a feedback to the teachers. Especially the design and the development of this module was time-consuming and also difficult because of the non-availability of suitable reviewers. Therefore all suggestions will be taken into account for the final development and the implementation of the Graduate Diploma.

See Annex 8 for the complete review.

9 Supply Chain Management for Beverage Industry

Like in 1.8, it was difficult to find a suitable reviewer within the consortium. Finally the module was also evaluated at HGU from an expert for marketing and economics. Here the main issues were food and beverage management, forecasting, logistics, inventory management, logistics network configuration, and procurement. These things were based on international references and experiences. Main proposal for improvement was to adapt this to Thai or Asian conditions.

See Annex 9 for the complete review.

10 Planning and Project Management for Beverage Industry

The examination of the accuracy and completeness of the subject matter was carried out in comparison to the subject classification and the content of German training and educational institutions. It was found that a most extensive agreement with German / European requirements exists. All information and planning models are up-to-date. The subject matter is very broad and profound in theory and especially in calculations. However, more practical relevance or practical examples would be desirable. In general, the educational goals and content of this course are sufficiently taught and achieved. All in all, the presentation is very text-intensive. There should be more charts and graphs for a better understanding of the subject matter.

See Annex 10 for the complete review.

11 Practical Laboratory in Beverage Industry

This module contains the important technological processes used in the beverage industry particularly necessary for preservation including QC. The time planned for the different teaching units is appropriate. The module did not need any improvement.

See Annex 11 for the complete review.

12 Seminar

The module didn't need any improvement.

Annex 1: Review Module 1

General comments: **A lot of standards and regulations concerning different beverage groups are given. If there are regulations, there should be a control system. Therefore a chapter "food control" is essential and should be added.** **Beside that, the module is ok.**	**1.1 food law and regulations**								
	Evaluator	FW	FW	FW	FW	FW	FW	FW	
	subject	Additive Regulation	CODEX ALIMENTARIUS COMMISSION	Drinking Water	Fruit and Vegetable Juice	International Standards	Packaging and Contact Materials	PROTEIN DRINKS	Tea
	teacher	no information	no information	no information	no information	no information	no information	no information	no information
	facility	Kasetsart University	Kasetsart University	Kasetsart University	Kasetsart University	Kasetsart University	Kasetsart University	no information	no information
	information correct?	partially not evaluable for an European	yes	partially not evaluable for an European	partially not evaluable for an European	yes	yes	yes	yes
	information current?	yes	yes	yes		yes	yes	yes	yes
	depth of information	yes	yes	no	no	yes	yes	yes	no
	reaching the topic?	yes	yes	no, 1/3 of the charts deals with electrolyte drinks	no	yes	yes	yes	yes
	relevance to practice	yes	yes	not evaluable	yes	yes	yes	yes	yes
	clarity of presentation	yes	yes	yes	yes	yes	yes	yes	yes
	red thread		yes	no	yes	yes	yes	yes	yes
	presentation style/design	little bit eye-catching	good	fair	fair	good, clearly presented	good, clearly presented	good, clearly presented	good, clearly presented
	copyright issues/citation	only partially considered	yes	not considered at all	not considered at all	pictures not considered	pictures partially not considered	pictures partially not considered	pictures partially not considered

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	comments	**A more general introduction on food additives, not specified on beverages**	**meaning of Codex Alimentarius presented in detail**	**Drinking water regulations should also concern tap and process water used for beverage production. This is missing completely.**	**The title is "Fruit and Vegetable Juice" and the content deals solely with beverages. It remains unclear, whether there is a differentiation between juice and beverage as it is in Europe.**				**A lot of MRL of contaminants is given. There should be some information about the concentrations of valuable content substances in tea and herbal teas.**

Annex 2: Review Module 2

General comments: **After a major revision of the 1st draft, all chapters fulfilled the requirements of a competent lecture about the technology of fruit and vegetable beverages (including citrus and tomato processing), soy milk, dairy beverages, sport drinks, carbonated beverages, tea, coffee, and cacao beverages.**	**1.2 Non-alcoholic BT**						
	Evaluator	FW	FW	FW	FW	FW	FW
	subject	Non-alcoholic Beverage Technology	Lecture 1_Introduction and Ingregients used in beverages	Lecture 2_Beverage Production Line , Equipments and Plant Layout and Fruit and vegetable beverages (Part1)	Lecture 3_ Fruit and vegetable beverages (Part2 Apple Juice)	Lecture 4_Fruit and vegetable beverages (Part3 Citrus and Tomato Juice)	Lecture 5/6_Soy Milk Beverage (Part1 and 2)
	teacher	Assoc. Prof. Dr. Chockchai Theerakulkait	Assoc. Prof. Dr. Chockchai Theerakulkait	Assoc. Prof. Dr. Chockchai Theerakulkait	Assoc. Prof. Dr. Chockchai Theerakulkait	Assoc. Prof. Dr. Chockchai Theerakulkait	Assoc. Prof. Dr. Chockchai Theerakulkait
	facility	no information	no information on presentation	no information on presentation	no information on presentation	no information on presentation	no information on presentation
	information correct?	unable to evaluate	yes	fair	yes	yes	yes
	information current?	unable to evaluate	yes	no	no, e.g. rack&frame and screw presses are no more in use	yes	yes
	depth of information	yes, but disadvantegeously presented	sufficient	yes, but disadvantegeously presented	yes, but not up-to-date	yes	yes
	reaching the topic?	no, see comments	no, but see comments	partially	yes	yes	yes
	relevance to practice	partially	as a background information	yes, but disadvantegeously presented	yes, but disadvantegeously presented	yes	yes
	clarity of presentation	no, unsuitable for lecturing	yes	fair	yes	yes	yes

	red thread	no	reasonably	reasonably	yes	yes	yes
	presentation style/design	Bad, contains only references to figures or pictures, thus making it unable to evaluate. Seems to be more a review.	reasonably	bad	ok, but tables, drawings, pictures have to be updated	ok	yes
	copyright issues/citation	A lot of references are listed, but not assigned.	partially	partially	done, but too much is reffered to Downing (1989), which is an outdated textbook	yes	yes
	comments	A lot of stuff has no relation to the title "Non-alcoholic BT" thus concerning the following chapters: water (including body function, impurities, treatment); sugar/sweeteners/preservatives/organic acids (chemistry, production). Usually the chapter "plant layout" is a seperate subject as well as QC, QM, product development, hygienic and sensory issues. BT starts first at page 38/93. Carbonated drinks should come more into focus.	Lecture starts with an ingredients part containing water, water treatment; natural/artificial sweeteners; acids; flavor; colours; clouding agents; preservatives. According to Sasitorn, this is necessary because course attendants may have no background.	Outdated drawings and references, web links to videos partially not available, blurred pictures and drawings. Too much links to videos.	to be updated!	pineapple (Thailand!) and grape processing comes a bit too short	

General comments: **After a major revision of the 1st draft, all chapters fulfilled the requirements of a competent lecture about the technology of fruit and vegetable beverages (including citrus and tomato processing), soy milk, dairy beverages, sport drinks, carbonated beverages, tea, coffee, and cacao beverages.**	**1.2 Non-alcoholic BT**						
	Evaluator	FW			FW	FW	FW
	subject	Lecture 7_Dairy Beverage	Lecture 8_Sport Drinks	Lecture 9_Carbonated Beverage	Tea	Coffee	Cocoa Beverages
	teacher	Assoc. Prof. Dr. Chockchai Theerakulkait	Assoc. Prof. Dr. Chockchai Theerakulkait	Assoc. Prof. Dr. Chockchai Theerakulkait	no information	no information	no information
	facility	no information on presentation	no information on presentation	no information on presentation	no information	no information	no information
	information correct?	yes	yes	yes	yes	yes	yes
	information current?	yes	yes	yes	yes	yes	unable to evaluate
	depth of information	yes	yes	limited	instant tea, herbal teas and tea products are coming very short	yes	Cacao botany and some specific processing stages are coming much too short
	reaching the topic?	yes	yes	limited	yes	yes	only partially
	relevance to practice	yes	yes	yes	yes	yes	only partially
	clarity of presentation	yes	yes	yes	yes	yes	yes

	red thread	yes	yes	yes	yes	yes	too short for a red thread
	presentation style/design	yes	yes	yes	some formulas are inadequately presented, pictures show a very low resolution	good	lots of undocumented pictures
	copyright issues/citation	yes	yes	not considered	not considered	not considered	not considered
	comments			single production steps (e.g. carbonation) are coming much too short			

Annex 3: Review Module 3

General comments: **Recommendation to add a chapter "quality control" and "cider/fruit wine".** **The teachers of the modules 1.7 should come to an agreement with the teachers of 1.3 concerning their teaching contents. Brewery and winemaking in module 1.3 is really good and should not be changed or repeated in module 1.7.** **Besides that the module is fine.**	**1.3 Alcoholic BT**							
	Evaluator	FW	FW	FW	FW	FW	FW	FW
	subject	Beverage Technology I+II	Winemaking Technology	Distilled Spirits	Whisky – Cereal base distilled beverage	Brandy – Fruit base distilled beverage	Rum, Vodka, Gin	Rice spirits of Asian country
	teacher	Dr. Ulaiwan Withayagiat	Dr. Sarn Settachaimongkon	Dr. Sumallika Morakul	Dr. Sumallika Morakul	Dr. Sumallika Morakul	Dr. Sumallika Morakul	Dr. Charoen Charoenchai Dr. Sumallika Morakul
	facility	Department of Biotechnology, Faculty of Agro-Industry, Kasetsart University	Department of Food Technology, Faculty of Science, Chulalongkorn University	Department of Biotechnology, Kasetsart University	Department of Biotechnology, Kasetsart University	Department of Biotechnology, Kasetsart University	Department of Biotechnology, Kasetsart University	RMUTT and Department of Biotechnology, Kasetsart University
	information correct?	yes	yes	yes	yes	yes	yes	yes
	information current?	yes	yes	yes	yes	yes	yes	yes
	depth of information	yes	yes	yes	yes	yes	yes	yes
	reaching the topic?	yes	yes	yes	yes	yes	yes	yes
	relevance to practice	yes	yes	yes	yes	yes	yes	yes
	clarity of presentation	yes	yes	yes	yes	yes	yes	yes
	red thread	yes	yes	yes	yes	yes	yes	yes
	presentation style/design	good	good	good	font size too big, a little bit "dry", some more pictures	good	good	good

					should be added			
	copyright issues/citation	included	included	source of literature, pictures and drawings in most cases missing	ok	completely missing!	source of literature, pictures and drawings often missing	source of literature, pictures and drawings often missing
	comments	profound summary of brewing technology focussing on the important things. Already evaluated in Oct. 2017, all comments included now	Already evaluated in Oct. 2017, all comments included now.	good overview	short but informative chapter	short but informative chapter	short but informative chapter	

Annex 4: Review Module 4

General comments: **The product development part treated much too general. There is no concrete relation to beverages or the beverage industry. Students won't get any information how to develop a new beverage or don't hear anything about flop rates (>90%) and how to manage that. Even the subject should be renamed to "beverage development" . Practical work is missing completely.** **The process dvelopment part is good.**	**1.4 Product&Process Development**									
	Evaluator	FW	FW	FW	FW	FW	FW	FW	FW	FW
	subject	Innovation: Product Development Revolution, Perspective	GLOBAL FOOD AND DRINK TRENDS	Brainstorming & Idea Screening	Glass Packaging	Paper Packaging	Plastic Packaging	Metal Packaging	Aseptic Packaging	Overview: Innovative Processing Technology for Beverage Industry
	teacher	Pisit Dhamvithee, Ph.D.	?	Sudathip Sae-tan, Ph.D.	Nathdanai Harnkarnsujarit, Ph.D.	Nathdanai Harnkarnsujarit, Ph.D.	Nathdanai Harnkarnsujarit, Ph.D.	Nathdanai Harnkarnsujarit, Ph.D.	Nathdanai Harnkarnsujarit, Ph.D.	Pitiya Kamonpatana, Ph.D.
	facility	Department of Product Development, Faculty of Agro-Industry, Kastsart University, Bangkok, Thailand	?	Department of Food Science Technology, Faculty of Agro-Industry, Kasetsart University, Bangkok, Thailand	Department of Packaging and Materials Technology, Faculty Agro Department of Kasetsart University	Department of Packaging and Materials Technology, Faculty Agro Department of Kasetsart University	Department of Packaging and Materials Technology, Faculty Agro Department of Kasetsart University	Department of Packaging and Materials Technology, Faculty Agro Department of Kasetsart University	Department of Packaging and Materials Technology, Faculty Agro Department of Kasetsart University	Department of Food Science Technology, Faculty of Agro-Industry, Kasetsart University, Bangkok, Thailand
	information correct?	not evaluable for me	not evaluable for me	not evaluable for me	yes	yes	yes	yes	yes	
	information current?	not evaluable for me	not evaluable for me	not evaluable for me	yes	no	yes	yes	yes	
	depth of information	not evaluable for me	not evaluable for me	not evaluable for me	no	skin-deep	good	good	good	
	reaching the topic?	not evaluable for me	not evaluable for me	not evaluable for me	yes	no	yes	yes	yes	
	relevance to practice	not evaluable for me	not evaluable for me	yes	good	good	yes	yes	yes	
	clarity of presentation	?	?	yes	yes	good	good	good	good	
	red thread	not evaluable for me	not evaluable for me	yes	yes	no	yes	yes	yes	

	presentation style/design	stringing together of coloured pictures, very eye-catching	stringing together of coloured pictures, very eye-catching	good	good	good	good	good	good	presentation, no lecture style
	copyright issues/citation	considered	considered	not considered	not considered	not considered	not considered	partly considered	considered	partly considered
	comments	Stringing together of coloured pictures, very eye-catching. Only a few slides with teaching content, a lot of catchphrases. Practice of beverage development is missing completely.	No lecture, stringing together of opinions of so-called experts from the British market research firm Mintel. Material copied together from internet sources. Statements of this marketing experts hardly comprehensible. No figures or statements from producers or beverage associations, therefore rather doubtful.	Suitable for teaching	Advantages, disadvantages, material science glass, manufacturing process, caoting, inspection, defects, closures are described clear and short. No statements concerning recycling or sustainability aspects are given.	Basics of paper (origin, manufacturing) are shown. Packacking boxes for fruits are irrelevant in this context. Composition, market importance, marketing possibilities of soft (carton) beverage packages and also different closure concepts are not mentioned. Too less relevance to beverages. No statements concerning recycling or sustainability aspects are given.	Basics of plastics (origin, polymerisation are shown. Important plastic types for the beverage industry including their their barrier functions are described. No statements concerning recycling or sustainability aspects are given.	Basics of metal packaging, important materials, closure concepts, the important crimp technique are shown also for beverage cans. No statements concerning recycling or sustainability aspects are given.	Definition, processing, sterilisation of product and packaging material are described shortly but effectively.	An overview is in this case unnecesserary, because the single non-thermal technologies (OH, HPP, PEF MW) are presented in detailed slides.

General comments: **The product development part treated much too general. There is no concrete relation to beverages or the beverage industry. Students won't get any information how to develop a new beverage or don't hear anything about flop rates (>90%) and how to manage that. Even the subject should be renamed to "beverage development" . Practical work is missing completely.** **The process dvelopment part is good.**	**1.4 Product&Process Development**								
	Evaluator	FW	FW	FW	FW	FW	FW	FW	FW
	subject	Pulsed electric Field Processing	Ohmic Heating	Microwave Pasteurisation/Sterilisation	High Pressure Processing	Microbiological aspects of high pressure processing	High Pressure Homogenization for Beverage Application	UV Technology	Cold Plasma Technology
	teacher	Pitiya Kamonpatana, Ph.D.	Pitiya Kamonpatana, Ph.D.	Assoc. Prof. NantawanTherdthai	Assoc. Prof. NantawanTherdthai	Asst.Prof.Dr. Wannasawat Ratphitagsanti		Asst. Prof. Dr. Chitsiri Rachtanapun	Krit Lajaroj
	facility	Department of Food Science Technology, Faculty of Agro-Industry, Kasetsart University, Bangkok, Thailand	Department of Food Science Technology, Faculty of Agro-Industry, Kasetsart University, Bangkok, Thailand	Department of Food Science Technology, Faculty of Agro-Industry, Kasetsart University, Bangkok, Thailand	Department of Food Science Technology, Faculty of Agro-Industry, Kasetsart University, Bangkok, Thailand	Department of Product Development, Faculty of Agro-Industry, Kasetsart University, Bangkok, Thailand		Department of Food Science Technology, Faculty of Agro-Industry, Kasetsart University, Bangkok, Thailand	Febix International Co., Ltd.
	information correct?	yes	yes	yes	yes	yes		yes	
	information current?	yes	yes	yes	yes	yes		yes	
	depth of information	good	good	good	good	good		good	
	reaching the topic?	yes	yes	yes	yes	yes		yes	
	relevance to practice	yes	yes	yes	yes	yes		yes	
	clarity of presentation	good	good	good	good	good		good	

	red thread	yes	yes	yes	yes	yes		yes	
	presentation style/design	good	good	good	good	good		good	
	copyright issues/citation	considered	partly considered	considered	considered	considered		partly considererd	
	comments	Principles, basics, advantages, suitable products, applications and commercial operations are presented.	Principles, basics, advantages, suitable products, applications and commercial operations are presented.	Principles, basics, advantages, suitable products, applications and commercial operations are presented.	Principles, basics, advantages, suitable products, applications and commercial operations with close relation to beverages are presented.	Behaviour of different microorganisms, spores are described, classical D-values of thermostable test organisms are given. Killing and inactivation mechanisms at different pressure regimes, many product examples,	no lecture, SPX demonstration or application slides for high pressure homogenisation	Principles of operation, process control parameters, microbial inactivation mechanism, antimicrobial effects in beverage, effects on fluid food nutritional and quality parameters, and industrial scale-up	no lecture, FEBIX demonstration

Annex 5: Review Module 5

Evaluator	GS
subject	**Hygienic Engineering and Design**
teacher	
facility	
information correct?	
information current?	
depth of information	
reaching the topic?	
relevance to practice	
clarity of presentation	
red thread	
presentation style/design	
copyright issues/citation	
comments	The materials are based on the official training materials provided by EHEDG (https://www.ehedg.org) to EHEDG authorized trainers and to this project, an international organisation, established in 1989 and dedicated to hygienic design. These training materials and guidelines have been developed and checked by a team of experts from all over the world, industry and academia. EHEDG authorized trainers, like the nominated teachers at KMITL, are allowed to use these materials.

Annex 6: Review Module 6

Evaluator	FW
subject	**Quality Assurance and Quality Control**
teacher	Prof Dr Chaleeda Borompichaichartkul
facility	Department of Food Technology, Chulalongkorn University, Bangkok, Thailand
information correct?	yes
information current?	yes
depth of information	yes
reaching the topic?	yes
relevance to practice	yes
clarity of presentation	yes
red thread	yes
presentation style/design	very good
copyright issues/citation	source of literature, pictures and drawings often missing
comments	**informative, detailed, didactically a very good teaching concept, clearly structured slides**

Annex 7: Review Module 7

General comments: **1. beverage chemistry:** **this chapter is partly copied word by word from the textbook "Chemistry and Technology of Soft Drinks and Fruit Juices" edited by Philip R. Ashurst (Wiley Blackwell). Therefore the charts are overloaded with pure text and in that shape not suited for HE modules.** **The second draft did not contain significant changes with the exception of the integration of important secondary plant substances (polyphenols, anthocyanins, carotenoids,...). Still a too big part accounted for beer.** **The module should be focussed on BEVERAGE CHEMISTRY & MICROBIOLOGY and not on beverage processing. Beer and wine is already at the focus of module 1.3 Alcoholic Beverage Technology.** **2. microbiology of beverages (Prof. Warapa Mahakarnchanakul):** **this presentation is ok and covers all relevant aspects, but maybe a little bit too detailed.**	**Evaluator**	FW	FW	FW	
	subject	Fermented Beverage Beer	Chemical Composition of Beverages	Fermented Beverage Wine	microbiology of beverages
	teacher	Dr. Warapa Mahakarnchanakul	no information	Dr. Warapa Mahakarnchanakul	Prof. Warapa Mahakarnchanakul
	facility	Dept of Food Science and Technology	no information	Dept of Food Science and Technology	Dept of Food Science and Technology
	information correct?	yes	not evaluable	partially	yes
	information current?	no	not evaluable	no	yes
	depth of information	skin-deep		extremely superficial	yes
	reaching the topic?	beer chemistry is missing, too much processing	Failed nearly completely!	no, too little information	yes
	relevance to practice	fair	failed	failed	yes
	clarity of presentation	limited	didactically bad, top-down lecturing	not evaluable	yes
	red thread	no	no	no	yes
	presentation style/design	to much text on the charts	bad, striking and eye-catching presentation	to much text on the charts	good
	copyright issues/citation	not considered at all	only partially considered	not considered at all	considered
	general comments	only a coarse overview of brewing, no raw grain or rice brewing, all processes are described very superficial without depth, incorrect spelling. Beer PROCESSING is already at the focus of module 1.3 Alcoholic Beverage Technology.	670 charts are not evaluable! Presentation does not reach the topic. Non-relevant issues are covered excessively (nutrition and medical aspects, nutrients, non-relevant beverage ingredients, other foods than beverages, microbiology, processing technology, milk and dairy technology).	Presentation contains too little information for being evaluated	very detailed

Annex 8: Review Module 8

Module 1.8: Target marketing and strategic pricing for beverage industry					
Evaluator	Prof. Dr. Jon Hanf, HGU	Prof. Dr. Jon Hanf, HGU	Prof. Dr. Jon Hanf, HGU	Prof. Dr. Jon Hanf, HGU	Prof. Dr. Jon Hanf, HGU
subject	Cost of Product	Direct Survey - Stated Preference	Conjoint Analysis	Pricing Strategy for Beverage Business	Strategic Marketing for Beverage Industry
teacher	Jumpol Vorasayan	Jumpol Vorasayan	Jumpol Vorasayan	Jumpol Vorasayan	Asst. Prof. Dr. Ajchara Kessuvan
facility	Kasetsart University	Kasetsart University	Kasetsart University	Kasetsart University	Department of Agro-Industrial Technology, Kasetsart University
information correct?	fair	fair	fair	fair	yes
information current?	no date given	no date given	fair	fair	no dates given
depth of information	should be improved; 30 slides are not enough	should be improved; 24 slides are not enough	fair	17 slides is by far not sufficient	42 slides are Ok, however should be extended
reaching the topic?	fair	fair	good	fair	good
relevance to practice	fair; very simplified examples	not addressed on slides	fair	fair	Ok
clarity of presentation	fair	fair	good	fair	good
red thread	somehow; should be improved	OK	good	fair	fair
presentation style/design	fair	fair	fair	OK	good
copyright issues/citation	not existing	citations are not on each side: compiled list at the end is not sufficient	citations are not on each side: compiled list at the end is not sufficient	not existing	not existing
general comments	introduction as well as agenda is missing; graphs are "nice" but what are the functions behind; examples have to be improved	is this lecture on (direct) survey (as in the title) or on WTP? The latter one is much more important, thus it should be in the focus and much more explained. Surveys would only a part describing how to operationalize it.	Is a whole lecture on conjoint necessary? There are other tools for market research which are not at all introduced. Thus, I would advice to broaden the topic on market research methods.	The topic of pricing is very important. Thus, this topic has to be much deeper addressed. Target Costing is missing as well as a good example how to calculate margins etc.	Neither strategy is explained nor stregy schools are introduced. 5 Forces as well as SWOT is to general - in that way not usable.

Annex 9: Review Module 9

Module 1.9: Supply chain management for beverage industry						
Evaluator	Prof. Dr. Jon Hanf, HGU	Prof. Dr. Jon Hanf, HGU	Prof. Dr. Jon Hanf, HGU	Prof. Dr. Jon Hanf, HGU	Prof. Dr. Jon Hanf, HGU	Prof. Dr. Jon Hanf, HGU
subject	Food and Beverage Management	Introduction to Forecasting (forecast.pdf)	Introduction to Logistics and Supply Chain Management (Intro to SCM & Log eng.pdf)	Inventory Management	Logistics Network Configuration	Procurement
teacher	Assoc. Prof. Dr. Pornthipa Ongkunaruk	Assoc. Prof. Dr. Pornthipa Ongkunaruk	Assoc. Prof. Dr. Pornthipa Ongkunaruk	Assoc. Prof. Dr. Pornthipa Ongkunaruk	Assoc. Prof. Dr. Pornthipa Ongkunaruk	Assoc. Prof. Dr. Pornthipa Ongkunaruk
facility	Department of Agro-Industrial Technology, Kasetsart University	Department of Agro-Industrial Technology, Kasetsart University	Department of Agro-Industrial Technology, Kasetsart University	Department of Agro-Industrial Technology, Kasetsart University	Department of Agro-Industrial Technology, Kasetsart University	Department of Agro-Industrial Technology, Kasetsart University
information correct?	yes	yes	yes	yes	yes	yes
information current?	fair	OK	yes	yes	yes	yes
depth of information	too short	85 slides are a bit too long; but don't shorten it too much	55 slides are just fine	OK; a few slides could be taken off	72 slides are too much; should and could be shortened	good
reaching the topic?	fair; focus too much on HoReCA	yes	yes	yes	yes	yes
relevance to practice	should be improved	should be improved by more case studies	more local examples	more local examples	more local examples	more local examples
clarity of presentation	OK	OK	OK	OK	OK	OK
red thread	somehow yes	yes	yes	yes	OK	yes
presentation style/design	fair					
copyright issues/citation	citations are not on each side: compiled list at the end is not sufficient	citations are not on each side: compiled list at the end is not sufficient	citations are not on each side: compiled list at the end is not sufficient	citations are not on each side: compiled list at the end is not sufficient	citations are not on each side: compiled list at the end is not sufficient	citations are not on each side: compiled list at the end is not sufficient
general comments	Additionally to restaurant business also general Food Business should be	Overall the structure is OK; It would be good if also some examples from	Overall the structure is OK; It would be good if also some examples from	Overall the structure is OK; It would be good if also some examples from	Overall the structure is OK; It would be good if also some examples from	Overall the structure is OK; It would be good if also some examples from

	addressed; some more general aspects on Strategy & Management should be covered	Thailand / Asia could be used. This would improve the relavance for the practise	Thailand / Asia could be used. This would improve the relavance for the practise	Thailand / Asia could be used. This would improve the relavance for the practise	Thailand / Asia could be used. This would improve the relavance for the practise	Thailand / Asia could be used. This would improve the relavance for the practise

Annex 10: Review Module 10

Evaluator	Reinhold Habla
subject	**1.10 Planning and project management for beverage industry**
teacher	
facility	
information correct?	The examination of the accuracy and completeness of the subject matter was carried out in comparison to the subject classification and the content of German training and educational institutions. It was found that a most extensive agreement with German / European requirements exists. In terms of content, the lecture contains all relevant topics in order to fully cover the field of "Production Planning for Beverage Industry". The students are provided with all relevant information.
information current?	yes
depth of information	The subject matter is very broad and profound in theory and especially in calculations. However, more practical relevance or practical examples would be desirable.
reaching the topic?	yes
relevance to practice	It would be more practical orientation desirable
clarity of presentation	fair
red thread	yes
presentation style/design	The presentation is very text-heavy. It seems a bit boring. While the design is consistent, more charts, images, and examples should be included for better understanding and illustration.
copyright issues/citation	only partly considerer´d
comments	In general, the presentation is very suitable for the course. It contains all the essential information, only for better understanding should be inserted at the next update more pictures and boards and a little more practical relevance.

Annex 11: Review Module 11

Evaluator	FW
subject	
teacher	
facility	
information correct?	
information current?	
depth of information	
reaching the topic?	
relevance to practice	
clarity of presentation	
red thread	
presentation style/design	
copyright issues/citation	
comments	This module contains the important technological processes used in the beverage industry particularly necessary for preservation including QC. The time planned for the different teaching units is appropriate. The module did not need any improvement.

Annex 12: Review Module 12

Evaluator	FW	FW	FW
subject	Academic Presentation and Publication	Oral Presentation Guidelines	Seminar talk structuring
teacher	Dr. Sumallika Morakul	Dr. Sumallika Morakul	Dr. Pathima Udompijitkul
facility	Department of Biotechnology, Kasetsart University	Department of Biotechnology, Kasetsart University	no information
information correct?	yes	yes	yes
information current?	yes	yes	yes
depth of information	yes	yes	yes
reaching the topic?	yes	yes	yes
relevance to practice	yes	yes	yes
clarity of presentation	yes	yes	yes
red thread	yes	yes	yes
presentation style/design	good	good	too much text colours, font size too big, some charts overloaded
copyright issues/citation	not necessary	not necessary	
comments			