

Course title: Aspects of quality: raw material, processing and final product

Week 45-46, 6th-17th November, 2017

Required qualifications: PhD/Masters students with basic knowledge of plant sciences

Credits: 4.5 hp/ECTS

Deadline for application: **October 10**

Contact for Registration: Faiza.Rasheed@slu.se

Course coordinators: Faiza Rasheed, Ramune Kuktaite, Helena Persson Hovmalm

Number of course participants: Maximum 16

Place: Alnarp

The course will be held at the Dept. of Plant Breeding, SLU Alnarp. Involves 3-4 days visits to various industrial processing units.

Aim

Plant production has in recent times changed from local to global production chains. The organization of production chains demands knowledge of raw material, processing, and product quality determination to maintain high quality products. This course will give a detailed understanding of important aspects of plant product quality from agricultural and horticultural sectors both for food and non-food purposes. Some examples of the raw material, i.e. plant proteins from side streams and apple fruit, will be processed into various end-use products. Raw material processing and production aspects of some targeted products will be included in the course practicals. Analytical methods used to assess the product quality will be described. Also, the quality aspects involving internal and external factors of the end product assessments will be in focus.

Content

The content of the course is raw material quality, postharvest biology, with a focus on physiological and biochemical processes influencing quality and longevity of plant products, handling and transportation, storage, processing, side stream products such as proteins, protein rich food products, non-food uses of proteins, protein isolation, bioactive compounds from food wastes, quality assessment by various analytical methods, consumer preferences and behavior. *Introduction to the latest synchrotron techniques at MAX IV for food- and non-food product quality assessment. Study visit to Kivik, Äppelriket and Kiviks Musteri, Lyckeby AB, Centrum for Innovative Beverages, Balsgård and Max IV. Running of small projects in two groups at Alnarp and Balsgård.*

The course is structured as follows:

- Introductory part
- Factors determining raw material quality
- Processing

- Field and industry visits
- Product quality determination by various analytical methods
- Conduction of lab exercises

Expected Learning Outcomes

Upon completion of the course, participants will be expected to:

- Be familiar with the use of several raw materials to produce targeted end-use quality high value products
 - Describe important quality factors playing a role during raw material processing into a final product and during the final product storage.
 - Develop understanding on the main factors steering various products end-use quality, including consumer acceptance and technological-production aspects.
- Describe the use of few analytical methods for plant product quality assessments.
- Determine when the specific analytical method is appropriate to address a specific objective.

Course Scheme

Weeks 45-46, 6th-17th November, 2017

Date	Time	Subject	Tutor
November, 6th Monday Raw materials	9.00- 9.15	Introduction to the course	FR
	9.15-10.15	Lecture 1: Different aspects of cultivation	HA
	10.30-12.00	Lecture 2: Post harvest biology and maintenance	IT
	12:00-13:00	Lunch	
	13.00-14:00	Lecture 3: Growing environment impact on quality	EJ
	14.15-15.30	Lecture 4: Conversion of plant raw materials to functional food ingredients	PA
	15:30-16:30	Lecture 5: Side stream raw materials: chemistry and uses	RK/ FR
November, 7th Tuesday Processing	9:00-10:15	Lecture 1: Food/Seed processing	JCS
	10:30-12:00	Lecture 2: Structural and functional properties for protein-based materials in relation to quality	WRN
	12.00-13.00	Lunch	
	13:00-14:30	Lecture 3: Nutritional quality and bioactive compounds	KR
	14:45-16:00	Lecture 4: Quality aspects of vegetables	LM
November, 8th Wednesday Processing and quality assessment	8.30-09.15	Lecture 1: Food microbiology and safety	MO
	09:45-17:00	Bread baking course-Brödlabbet	

November, 9^h Thursday	09:00-10:15	Lecture 1: 3D Printing	OD
	10:30-11:45	Lecture 2: Sustainable packaging; Consumer aspects and choices	HL
	13:00-15:00	Lecture 3 and/or 4: Protein processing and packaging	MH

November, 10th Friday	Study visit to Kiviksmusteriet - apple production and industrial processing into products		
November, 13th Monday	Study visits to Lyckeby AB and Centre for Innovative Drinks, Balsgård		
November 14th Tuesday	Part I: Study visit to MAX IV 0900-1130 Part II: Study visit to Nordic Sugar Arlöv 1300-1600		
November 15th - 16th Wednesday-Thursday	Plant products processing projects at Alnarp Part I: Extraction of gluten proteins Part II: Separation of gluten proteins into fractions Part III: Processing into plastics Part IV: Analytical methods to assess the quality Part V: Visit to Biotron		FR, RK, MP, WRN
November, 17th Friday	9.00-12.00	Time to prepare group presentations/reports	
	12.00-13.00	Lunch	
	13.00-15.00	Project presentations	
	15:00-16.00	Concluding remarks/course evaluation	

Tutors

HA: Håkan Asp

EJ: Eva Johansson

FR: Faiza Rasheed

RK: Ramune Kuktaite

LM: Lars Morgen

JCS: Jens Christian Sørensen

PA: Patrick Adlercreutz

IT: Ibrahim Tahir

MO: Marie Olsson

KR: Kimmo Rumpunen

MH: Mikael Hedenqvist

MG: Mikael Gällstedt

HL: Helena Lindh

MP: Maria-Luisa Prieto-Linde

WRN: William Roy Newson

OD: Olaf Diegel

Pedagogical Form: Two weeks of full time with lectures, lab practices, individual study and industry visits.

Pass grade requirements/Examination

80 % attendance is mandatory to pass the course. Students are expected to have read in beforehand assigned literature and take part actively in lectures, discussions, lab practices and study visits. The last day of the course, students are expected to give an oral presentation on the plant product processing projects carried out during practicals of the course. Also, a final written “case project” report should be sent to the course responsible. The presentation and report should include reflections from the course literature, lectures, seminars and lab practicals (individual project; max 2 A4 pages).