Module Name	Module Code
Mineral Nutrition and Quality of Plant Foods	agrarAEF890-01a

Module Coordinator
Prof. Dr. Karl H. Mühling

Organizer
Institute of Plant Nutrition and Soil Science - Plant Nutrition

Faculty
Faculty of Agricultural and Nutritional Sciences

Examination Office
Faculty of Agricultural and Nutritional Sciences - Examination Office

ECTS Credits	6
Evaluation	Graded
Duration	One Semester
Frequency	Only takes place during summer semesters
Workload per ECTS Credit	30 hours
Total Workload	180 hours
Contact Time	60 hours
Independent Study	120 hours
Teaching Language	English

Recommended Requirements
None

Module Courses

Course Type	Course Name	Compulsory/Optional	SWS
Lecture	Minerals Nutrition and Quality of Plant Foods	Compulsory	2
Seminar	Recent advances in the role of mineral nutrition on quality of plant foods	Compulsory	1
Practical Exercise	Biochemical aspects of nutrients interactions influencing quality of plant foods	Compulsory	1

Examination(s)

Examination Name	Type of Examination	Evaluation	Compulsory / Optional	Weighting
Oral Examination: Minerals Nutrition and Quality of Plant Foods	Oral Examination	Graded	Compulsory	100%

Further Information on the Examination(s)

1.+ 2. period in summer semester
1. period in winter semester

QIS: 148200 PNR: 148210

Course Content

The current module aims to provide students with an in depth understanding of food crop quality and plant minerals nutrition and their essential role in plant health and yield potentiality. Moreover, to increase students' knowledge about enhancing resistance to pests and diseases in crop plants, and inducing crops adaptability to adverse climatic conditions. Collectively, the module allows students to broaden their horizons in the field of plant mineral nutrition and its important role in promoting food crop quality characteristics including, chemical composition, health attributes, sensory properties and nutritional values. The module provides students with advanced concepts of crop quality parameters, and crop biofortification. Owing to the impact of food biofortification on fighting hidden hunger and improving nutrition outcomes, the module enhances students´ knowledge about influences of different biofortification methods to boost selenium, zinc, iodine and other minerals levels in biofortified crops. Moreover, the module allows students to increase their knowledge in mineral nutrients interrelationships (e.g. sulfur & nitrogen, selenium & sulfur, selenium & iron, Zn & other nutrients etc.), which have been recognized and become an area of research in plant nutrition. Additionally, the module provides a link between mineral enrichment and crop quality by conducting various biochemical analysis to indicate the interactions between minerals and their influence on the overall quality.
Production of high nutritional quality of food crops can be achieved by producing specialized compounds (e.g. garlic-derived organosulfur compounds, phytoalexins, glucosinolates and their breakdown products), which also enhance plant resistance to pests and diseases, in addition to their remarkable contribution to human health. In this regards, these secondary metabolites will be briefly discussed. The module is concerned on the interactive effect of enrichment of minerals and induced drought tolerance. Additionally, subject-related such as the impact of mineral nutrition on crop adaptability in response to different climatic conditions will be presented. Moreover, examples such as potato quality, and wheat quality including bread quality will be one of the essential contents of the module. The structure of the module will include text with illustrations, diagrams, and graphs of recent published findings of reputable journals covering the field. It will also focused totally on achieving the overall goal of the module.

Learning Outcome

1. The students will acquire detailed up-to-date information and expertise in the content of mineral nutrition and crop quality.
2. Lectures presented will link plant mineral nutrition and overall quality aspects including nutritional values, phytochemical composition, safety and sensory characteristics of food crops.
3. Seminars presentation will provide an opportunity for students to discuss and critically evaluate experimental designs, data and findings of research studies.
4. Exercises will allow students to develop new skills, in addition to expert and more in depth knowledge about biochemical analysis of nutrients interactions influencing crop quality. These experiences will help students to build their confidence in lab skills.

Reading List		
To be announced at the beginning of the lecture		
Use	**Compulsory / Optional**	**Semester**
Master, 1-subject,	Optional	-