Universität für Bodenkultur Wien

University of Natural Resources and Life Sciences, Vienna

Curriculum

for the

University Continuing Education Program

(Universitätslehrgang, 2.5 ECTS)

Mass Spectrometry in Food Safety

Vienna, January 1st, 2023

§ 1 Preamble

The increasing concern about the safety of food and feed is a result of the global marketplace, climate change and the rise in public awareness about health and quality. Liquid chromatography coupled to mass spectrometry (LC-MS) is one of the most selective and sensitive analytical technique to unambiguously identify and accurately quantify food contaminants and residues. The multiplexing capability of LC-MS offers the concurrent determination of many different undesired substances in food and feed. While the instrumentation is costly compared to other techniques, analysis time and running costs can be saved by so called multi-toxin methods. In addition, high resolution MS (HRMS) method can be used for screening for both known and currently unknown chemical hazards in food. LC-MS is becoming more widespread and methods are used in food industry as well as for the verification of regulatory limits by national and international authorities.

The university course “Mass Spectrometry in Food Safety” offers a one-week training course. Various aspects of LC-MS, including tandem mass spectrometry, high resolution mass spectrometry, multi-analyte methods, method development and validation, etc. are presented in lectures and laboratory courses. Within the frame of this course the analytes to be determined include a wide range of chemical substances as prioritised by the European Food Safety Authority. These include natural toxins (plant toxins, mycotoxins) and a wide range of other contaminants and residues, such as veterinary drugs and pesticides, respectively.

§ 2 Qualification Profile

2.1) Theoretical and practical aspects of LC-MS, pros and cons of different instrumentation, method development and validation, and their application to food samples are the core content of the " Mass Spectrometry in Food Safety" university course. Moreover, sampling and sample preparation and the use of MS for related aspects, e.g. to determine contaminant biomarkers, will be covered. A competent answer to the analytical issues of food safety by state-of-the-art analysis is offered with this course.

2.2) Knowledge, personal and professional skills

Graduates are equipped with highly specialized theoretical and practical knowledge to analyse and evaluate various problems in relation to food safety applying mass spectrometry. They are ready to communicate this knowledge nationally as well as internationally and to tie in with latest findings in the field of food safety. Furthermore, graduates have the ability to use their knowledge gained in order to understand LC-MS acquisition, method development, validation and application.

Graduates have acquired a basic understanding of mass spectrometry and its application, which helps them to increase food and feed safety as instrument users or (laboratory) managers. Furthermore, they are in a position to develop, apply and communicate new skills across the disciplines as a reaction to newly arising threats. MSFS graduates are trained to work independently as well as in small research or analytical teams. Graduates find themselves in the position to communicate state-of-the-arts results, MS methods and underlying principles to a professional audience as well as non-specialists. They can respond to questions on a scientific but also social level of food safety.

2.3) Professional qualifications

Graduates of the course should be able to represent the topic of mass spectrometry for food analysis, but in particular also for the determination of contaminants and residues, in their

professional environment competently and effectively. Graduates shall acquire additional skills in their core area. In particular, the participants are taught a deeper understanding about the meaning, impact and the detection of mycotoxins – as example of an important class of food contaminants. An essential aspect in this context is the acquisition of knowledge about the analysis of mycotoxins by various analytical methods. Sustainable learning experience is mediated by practical teaching methods and hands-on lab work. In addition, subject-specific exchange enables the creation of networks.

§ 3 Study Form

"Mass Spectrometry in Food Safety" is designed as a modular university course of category 3 in form of a "Summer University". The course lasts one week and results in a student workload of 2.5 ECTS. The course is held solely in English language.

§ 4 Course Administration

Scientifically and academically qualified persons - in compliance with the applicable BOKU guidelines - are appointed to administer the course. The course administration decides on all matters of the course, if they are not assigned to other organs.

§ 5 Duration and Structure

"Mass Spectrometry in Food Safety" offers a one-week training course.

An overview of mass spectrometry is provided as well as numerous aspects for instrument acquisition, maintenance and proper use, in particular for the development and application of LC-MS methods to determine chemical hazards in food. The course duration is one week and comprises in a student workload of 2.5 ECTS.

§ 6 Admission Requirements and Admission

6.1) Required for admission to the university course "Mycotoxin Summer Academy" is a completed degree (e.g. B.Sc., M.Sc., PhD) in natural scientific and/or equivalent studies at a domestic or foreign university.

6.2) In exceptional cases, appropriate professional experience and proven existing expertise in the field also allow to participate in the university course. This decision is taken by the course administration and cannot be appealed.

6.3) The admission of students is based on the following criteria: field of study according to the contents of the academic course; existing skills; motivation; subject-specific experience after consultation with the course administration.

6.4) Command of English: Evidence of a sufficient command of English which is required for the successful completion of the course must be provided for admission if requested by the course administration (in the form of one of the following certificates):

- BOKU language course (at least level English III)
- Cambridge certificate of Advanced English
- IELTS – test (results 6.0 or better)
- Completion of a study programme that was entirely taught in English
- TOEFL – test (560 paper based; 82 internet based)

§ 7 University Places

7.1) The maximum number of students is set to 15 students. This number ensures a high-quality working environment for the students.

7.2) Course participants are enrolled as extraordinary (non-degree programme) students at BOKU University.

§ 8 Curriculum

8.1) The university course consists of 5 consecutive days. The student workload is 2.5 ECTS. The three-pillar principle is the central identifying characteristics of programmes offered at the University of Natural Resources and Life Sciences, Vienna.

- Overall course type: VU
- Credits: 2.5 ECTS
- Pillars: technology and engineering: 25%
  natural sciences: 70%
  economic and social sciences, law: 5%

8.2) Internationally renowned experts will provide lectures (VO), workshops (SE) and hands on training courses (UE) with emphasis on:

- Introduction to liquid chromatography and mass spectrometry
- Tailored LC-MS/MS methods
- LC-MS/MS multi-toxin methods
- High resolution mass spectrometry
- Quantification strategies, including stable isotope dilution assays
- Appropriate quality assurance
- Official methods, intercomparison studies, laboratory accreditation
- Instrument acquisition and maintenance

Lectures (VO) are courses in which certain areas of a subject and the methods used in this area are imparted through didactic presentation.

Lab courses (UE) are courses in which students are instructed in specific practical skills, based on theoretical knowledge.

Seminars (SE) are courses in which students are required to work independently on the respective subject, deepen their knowledge of the topic and discuss relevant issues.

Lectures with courses (VU) combine both VO and UE and allow to students to receive both theoretical knowledge and practical experience.

§ 9 Type of Courses

The types and dates of the individual lessons are to be announced by the course administration before each pass in advance via the respective BOKU web service pages.

§ 10 Examination Regulations

10.1) At least 80% participation of all lessons is mandatory to successfully complete the course.

10.2) A discussion about the course topics is to be held on the final day.

10.3) The following aspects are taken into consideration of the overall mark: percentage of participation in the course lessons; level of commitment in the lectures and lab courses; level of contribution to discussions.

§ 11 Evaluation and Quality Improvement

Quality assurance provides an evaluation of the academic course based on a survey, including complaints and suggestions which will be carefully considered by the course administration before the next pass. Furthermore, the university teachers of the course as well as the course administration are the contact point to report all obstacles, complaints or suggestions.

§ 12 Course Completion

After successful completion of the students will receive a course completion certificate.

§ 13 Course Fee

13.1) Participation is subject to payment of a designated course fee. The fee is published in advance on the respective BOKU web service pages and printed course information media for the corresponding year of the course.

13.2) Any recognition of study parts, individual courses, etc. will not constitute a right for participation fee reduction.

13.3) The course administration is entitled to offer scholarships or reduce/waive course fees for selected individuals, especially for participants from developing countries or participant of regular BOKU master of PhD studies.

§ 14 Place

14.1) The courses will be conducted in the premises of the BOKU campus Tulln or Vienna.

14.2) For the purposes of a practical and sustainable learning experience excursions (e.g. to relevant industry facilities) are included in the program.

§ 15 Entry into force

This Regulation shall take effect on the first day of the month, following the announcement in the official bulletin of the university (“Mitteilungsblatt”).

Anhang zum Curriculum: Studiendauer, Überschreitung

Laut Universitätsgesetz §56 kann im Curriculum eine Höchststudiendauer vorgesehen werden, die mindestens die vorgesehene Studienzeit zuzüglich zwei Semester umfasst.

Im Curriculum ist eine vorgesehene Studienzeit definiert.

Für diesen Universitätslehrgang gilt eine Höchststudiendauer im Umfang der vorgesehenen Studienzeit zuzüglich 2 Semestern.

Bei Überschreiten dieser Höchststudiendauer fallen zu Lasten der/des Studierenden seitens der Universität zusätzliche Gebühren an (siehe Allgemeine Geschäftsbedingungen für die Teilnahme an Universitätslehrgängen der Universität für Bodenkultur Wien).

Beschluss des Senats der Universität für Bodenkultur Wien vom 14. April 2020, zur Geltung für alle bestehenden Curricula der BOKU Universitätslehrgänge

[**Appendix to the curriculum: Duration of Studies, Exceedance**

According to the Federal Act on the Organisation of Universities and their Studies (Universities Act 2002 – UG) §56, a maximal duration of studies may be determined in the curriculum, which shall comprise at least the requested duration of studies plus two semesters.

A requested duration of studies is defined in the curriculum.

For this University Programme a maximal duration of studies equal to the requested duration of studies plus two semesters is determined.

If this maximal duration of studies is exceeded, the student will be charged additional fees by the university (see General Terms and Conditions for attendance at continuing education university programmes of the University of Natural Resources and Life Sciences, Vienna).

Resolution of the Senate of the University of Natural Resources and Life Sciences, Vienna, April 14th, 2020]