

Techniques, apparatus and tools of assessing the quality of agrifood products (Ist Year of study, Ist Semester)

Credit value (ECTS) 7

Course category

Domain (Imposed)

Course holder:

Assoc. Prof. dr. Viorel-Cezar FLORIȘTEAN

Discipline objectives (course and practical works)

The course will provide student knowledge on food analysis methods both classical and instrumental. The knowledge will be useful for food quality specialist in order to expertise and monitor the technological process of food manufacturing, agrifood products quality and, consumer protection.

Also the course will improve the student's ability of critical evaluation of the issues involved by food analysis methods and obtained results and will develop practical skills in applying modern analysis methods concerning agrifood products quality and safety.

Contents (syllabus)

Course (chapters/subchapters)
Agrifood products quality analysis. The importance of laboratory analysis of agrifood products. Selecting and validity of analytical methods. Official methods of analysis.
Food Sampling: Methods of sampling; The sampling procedure; Sample preparation.
Statistical analysis of data obtained through food analysis: Data distribution; Relevance of test (precision, accuracy, specificity, sensitivity and detection limits); Analytical errors.
Classical methods of analysis used to assess food quality: Gravimetric methods; Titrimetric methods; Refractometry; Polarimetry; Potentiometry.
Application of spectroscopic methods in food quality analysis: The basic principles of spectroscopy; UV-VIS spectroscopy; Infrared spectroscopy; Atomic absorption spectroscopy; Atomic emission spectroscopy; Nuclear magnetic resonance; Mass spectroscopy.
Application of chromatographic methods in food quality analysis: The basic principles of chromatography; Liquid chromatography; Gas chromatography; Other chromatographic methods.
Applications of enzymatic methods in food quality analysis: Kinetic of enzymatic reactions; Factors affecting the activity of enzymes, methods for evaluating enzyme activity; Applications of enzyme catalyzed reaction in food quality assessment.
Applications of immunochemical methods to food quality assessment: Basics of antigen-antibody reactions; Enzyme Linked Immunosorbent Assays (ELISA); Western blotting.
Application of molecular biology techniques in assessing food quality: Polymerase Chain Reaction (PCR); Real Time-PCR; DNA Microarray; Southern blotting.

Practical works
Organization of practical (informing students on discipline objectives, the targeted skills, the evaluation criteria and methods).

Sampling techniques in the food industry: Sampling plans; Sampling methods; Use of statistical methods in the sampling process.
Classic methods for assessing food quality: Determination of water from food.
Spectroscopic methods for assessing food quality: Determination of heavy metals in food by atomic absorption spectrometry; Assessing composition of milk by spectroscopy.
Chromatographic methods for assessing food quality - Determination of organophosphate pesticides residues in food by chromatographic methods; Determination of mycotoxins in foods by HPLC.
Enzymatic methods for assessing food quality: Determination of amylase activity in honey; The determination of reductase and phosphatase activity and in milk.
Molecular biology methods used to assess food quality: Detection of genetically modified organisms from food by PCR; Identification and quantification of pathogenic bacteria in food by Real Time PCR (qPCR).

Bibliography

1. Cserháti, T., E. Forgács 1999 - Chromatography in food science and technology. Technomic Pub. Co. Lancaster, UK.
2. Hubbard, M.R., 2003 - Statistical quality control for the food industry. 3rd ed. Kluwer Academic/Plenum, New York, USA.
3. Kress-Rogers, E., Brimelow, C.J.B., 2001 - Instrumentation and sensors for the food industry. 2nd ed., CRC Press, Cambridge, UK.
4. Maurer, J., 2006 - PCR methods in foods. Springer, New York, USA.
5. Mutlu, M. 2011 - Biosensors in food processing, safety, and quality control. CRC Press, Boca Raton, USA.
6. Nielsen, S.S., 2010 - Food analysis. 4th ed. ed. Springer, London, UK.
7. Nielsen, S. S. 2010 -. Food analysis laboratory manual. Springer, London, UK.

Evaluation

Evaluation form	Evaluation Methods	Percentage of the final grade
Exam	Written and oral examination	60%
Appreciation of the activity during the semester	Oral assessment during the semester, verification tests and final practical colloquium.	40%

Contact

Assoc. Prof. Dr. Viorel-Cezar FLORIȘTEAN
Faculty of Veterinary Medicine - USAMV Iași
Aleea Mihail Sadoveanu nr. 8, Iași, 700489, Romania
telephone: 0040 232 407372, fax: 0040 232 219113
E-mail: vfloristean@uaiasi.ro