Methods in Food Mycology and Mycotoxicology

Organising Institution

Polytechnic Institute of Bragança, Portugal

Partner Institutions

Cranfield University, United Kingdom

Universidad Complutense de Madrid, Spain

Universidade do Minho, Portugal

Università Cattolica del Sacro Cuore - Piacenza, Italy

Universitat de Lleida, Spain

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www.ipb.pt/go/e110

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Polytechnic Institute of Bragança Portugal

INSTITUTO POLITÉCNICO DE BRAGANÇA

IP Intensive Programmes

Education and Culture DG · Lifelong Learning Programme

UNIVERSIDAD COMPLUTENSE MADRID

Cranfield UNIVERSITY

Universidade do Minho

UNIVERSITÀ CATTOLICA del Sacro Cuore

Universitat de Lleida

Methods in Food Mycology and Mycotoxicology

ERASMUS intensive programme

Mycotoxins are secondary metabolites produced by fungi that frequently contaminate agricultural commodities, thus causing serious health hazards to humans and animals, as well as great economic loss. As a consequence, significant concern has been devoted to the rapid and robust detection and quantification not only of the major mycotoxins contaminating foods, but also of the fungi producing them. The potential impact of climate change on food security has been widely debated. It is recognized that climate change may give rise to food shortages, which will bring immediate and direct drawbacks in terms of food security, and, additionally, can induce changes in the dominant mycoflora, boosting food safety problems. This topic needs to be addressed and fully investigated by advanced predictive modelling methods.

Aims of the IP

The Intensive Program (IP) on Methods in Food Mycology and Mycotoxicology aims to demonstrate and teach classical methods as well as innovative molecular, chemical and immunological systems for rapid, robust and user-friendly identification and quantification of mycotoxins and toxigenic fungi in the food chain. Additionally, the IP intends to study the effect of climate changes on food safety and security.

This IP will combine knowledge from various scientific fields: food mycology, food mycotoxicology; methods of food analysis; mathematical modelling. This is an excellent opportunity for students from various fields of knowledge (microbiology, food safety, agriculture, biotechnology, mathematics, …) to interact and learn not only the theoretical fundamentals but also state-of-the art methods that are transversal to their academic disciplines.

Target Groups

This IP is directed to students from partner institutions: final year BSc, MSc and PhD students from Biology, Chemistry, Agriculture, Biotechnology, Food Science, Food Processing, Mathematical Modelling and other related fields.

Students will be entitled with a proficiency certificate corresponding to 6 ECTS credits, which will be fully recognised in students Diploma or as a supplement to the diploma, according to the course the student is attending in each institution.

Financial support: All students from partner institutions are free from registration and tuition fees. Also, all travel and accommodation costs are covered for by the Programme.

Course contents

Module 1
Food mycology and mycotoxicology

1.1 The impact of Climate changes on Food security and Food safety
1.2 Mycotoxins of major concern and associated fungi: biology, physiology and ecology of fungi and mycotoxin production
1.3 Hurdle technology approaches applied to fungal development and mycotoxin production in foods

Module 2
Predictive modelling in food mycology and mycotoxicology

2.1 Modelling, predicting and mapping the emergence of mycotoxins in the EU
2.2 Predictive models for fungal growth
2.3 Modelling of fungal growth and mycotoxin production under post-harvest conditions: theory on experimental activities

Module 3
Methods in fungal identification and quantification

3.1 Classic methods of fungal identification and quantification, and of their toxigenic ability
3.2 Measurement of fungal germination, growth and inactivation
3.3 Modern methods of fungal identification and quantification, and of their toxigenic ability: molecular methods
3.4 Modern methods of fungal identification and quantification: mass spectrometry (MALDI-TOF ICMS)

Module 4
Methods in mycotoxin analysis

4.1 Methods and in-house validation
4.2 Sample preparation, extraction, cleanup and detection

Learning Outcomes and Competences

At the end of the IP, the student is expected to:

- ✔ Acknowledge the major mycotoxins and toxigenic fungi present in different foods and food commodities;
- ✔ Understand the biology, physiology and ecology of toxigenic fungi, and the ecology of mycotoxin production;
- ✔ Acknowledge the expected effects of climate changes on fungal ecophysiology and on their toxigenic ability;
- ✔ Understand the hurdle technology approach applied to fungal development and mycotoxin production in foods.
- ✔ Know and apply the various methods for fungal and mycotoxin detection, quantification and identification in foods;
- ✔ Understand and develop predictive modelling studies in food mycology and mycotoxicology.