



UNIONE EUROPEA  
Fondo Sociale Europeo



**TABLE 11 – PhD programme AGRICULTURAL SCIENCES AND BIOTECHNOLOGY**

THE PhD PROGRAMME	
Administrative location	University of Udine - Department of Agricultural, Food, Environmental and Animal Sciences (DI4A) – via delle Scienze n. 206, 33100 Udine, ITALY (tel. +39 0432 558600)
Associated location	-
Location for training, teaching and research activity	Teaching and other training activities will take place primary at the administrative programme location or in other locations of the University of Udine. The research program will be mainly developed, with reference to the assigned scholarship, at one of these locations: administrative location, enterprise.
Coordinator	Prof. Francesco Nazzi (francesco.nazzi@uniud.it)
Programme duration	3 years
Curricula	A. Biology and plant production; B. Biology and livestock science; C. Biology of pathogens and plant protection.
Programme website	<a href="https://www.uniud.it/it/ateneo-uniud/ateneo-uniud-organizzazione/dipartimenti/di4a/content/didattica/dottorati-di-ricerca/copy_of_PHD%20Schoole%20ASB/PhD%20School%20Agricultural%20Science%20and%20Biotechnology">https://www.uniud.it/it/ateneo-uniud/ateneo-uniud-organizzazione/dipartimenti/di4a/content/didattica/dottorati-di-ricerca/copy_of_PHD%20Schoole%20ASB/PhD%20School%20Agricultural%20Science%20and%20Biotechnology</a>

ADMISSION REQUIREMENTS	
Required degree	Italian Laurea (before DM 509/99) or Italian Laurea specialistica/magistrale (ex DM 509/1999 and DM 270/04). Foreign degrees and titles: refer to art. 3 and 4 of the call.
Knowledge of the following foreign language	English

DOCUMENTS AND QUALIFICATIONS TO BE ATTACHED TO THE APPLICATION FOR ADMISSION	
Compulsory documents (art. 5 of the Call)	<ol style="list-style-type: none"> <li>1. Certification or self-certification (refer to art. 5 paragraph 5 of the Call) of the academic title needed for admission to the PhD programme and list of the exams (with grades) passed during the Italian Laurea Specialistica/Magistrale programme or during the Italian programmes before D.M. 509/99 or during the foreign academic programmes;</li> <li>2. Curriculum vitae et studiorum, dated and signed;</li> <li>3. Copy of a valid identity document (citizens of countries not belonging to the European Union a copy of a valid passport, comprehensive of the pages containing the holder's photo, personal details, passport number, date and place of issue, date of expiry);</li> <li>4. A research project, dated and signed, developed in accordance with the description of the research topic of interest, which highlights the contribution that the applicant can offer to the development of the same topic (approximate limit 10,000 characters, spaces included, in English language).</li> </ol>
Optional documents (art. 5 of the Call)	<ol style="list-style-type: none"> <li>1. Master thesis ("Tesi di Laurea") associated to the degree/title providing access to the PhD programme. Applicants who are not graduated on the expiration date of this call can submit an extended abstract in place of the complete thesis, in Italian or English language, signed by themselves and by their thesis Supervisor (approximate limit: 25.000 characters, spaces included);</li> <li>2. Publications (max 2);</li> <li>3. Letters of reference (max 2), from university professors, scientific researchers or other experts in the field (art. 6 of the Call).</li> </ol>

SELECTION COMMITTEE	
Appointed members	Giuseppe Firrao – Full Professor – University of Udine Francesca Tulli – Assistant Professor – University of Udine Marco Zancani – Associate professor – University of Udine
Substitute members	Francesco Nazzi – Associate Professor – University of Udine

## ADMISSION

### GENERAL COMPETITION (art. 8 of the Call for Applications)

Positions available: 3						
Detailed description	N.	Funding	Annual gross amount	Period abroad	Period in enterprise (identified by the Univ. of Udine)	Research topic



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Positions available: 3						
<b>Positions WITH SCHOLARSHIP: 3</b>	<b>1</b>	National Operational Program (PON) Research and Innovation 2014-2020 "Education and research for recovery – REACT-EU (M.D. 1061/2021) and University of Udine	€ 15.343,28	max 6 months optional	min 6 - max 12 months mandatory	1.1 Green Topic "Sustainable and innovative approaches to control fruit and vegetable diseases caused by plant pathogenic fungi" (PON RI 2014/2020 Axis IV Action IV.5)
	<b>1</b>	National Operational Program (PON) Research and Innovation 2014-2020 "Education and research for recovery – REACT-EU (M.D. 1061/2021) and University of Udine	€ 15.343,28	-	min 6 - max 12 months mandatory	1.2 Green Topic "Valorization of agricultural byproducts by intensive rearing and transformation of <i>Hermetia illucens</i> (H.I.)" (PON RI 2014/2020 Axis IV Action IV.5)
	<b>1</b>	National Operational Program (PON) Research and Innovation 2014-2020 "Education and research for recovery – REACT-EU (M.D. 1061/2021) and University of Udine	€ 15.343,28	-	min 6 - max 12 months mandatory	1.3 Green Topic "Production of secondary metabolites with nutraceutical interest from cell cultures of <i>Coffea</i> spp." (PON RI 2014/2020 Axis IV Action IV.5)

Competition procedure and test schedule		
<p>Evaluation of qualifications and oral examination.</p> <p>For the evaluation of applicants' attitude for scientific research and their knowledge to develop the topic of interest, the Selection Committee can attribute up to 100 points to each applicant: max 30 points to the titles and max 70 points to the oral examination. The applicant is admitted to the interview if his/her titles receive at least 21 points. The oral examination is passed with at least 49 points. The applicant is eligible to the PhD programme if he/she passes the oral examination. Only for eligible applicants, the points attained in the oral examination will be added to the points of the titles.</p> <p>Scholarships are assigned according to the provisions of art. 10 of the Call.</p> <p><b>DATE FOR THE PUBLICATION OF THE ADMITTED APPLICANTS TO THE INTERVIEW: within November 3, 2021</b></p> <p><b>DATE FOR THE PUBLICATION OF THE FINAL RANKING LIST: within November 11, 2021</b></p>		
<b>Foreign language that can be used for examination</b>	Italian or English	
<b>Evaluation Criteria of qualifications</b> <i>During the preliminary meeting the Selection Committee may establish sub-criteria for the evaluation</i>	Curriculum vitae et studiorum	10
	Research project	10
	Scientific publications	2
	Thesis/Abstract	6
	Letters of reference	2
<b>Oral examination</b>	The oral examination is based on a discussion on the scientific titles submitted and includes an evaluation of English language knowledge.	
<b>Calendar of the oral examination</b>	<b>Date</b>	<b>November 4, 2021</b>
	<b>Time</b>	9:00 a.m.
	<b>How to conduct the examination</b>	The oral examination will be held online (MS Teams)
	Based on the number of applicants, the oral examination may take place in more than one day. Applicants must exhibit a valid ID.	

**Research Topics Description**



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**Research topic 1.1: Sustainable and innovative approaches to control fruit and vegetable diseases caused by plant pathogenic fungi**

The project focuses on the application of methods alternative to the use of synthetic molecules for the control of pre- and post-harvest fungal diseases, including the possible containment of toxic metabolites derived from them. The use of microorganism based methods contributes significantly to the reduction of environmental pollution with pesticides and to the prevention of the occurrence of pathogen strains resistant to pesticides. In this project, particular emphasis will be given to the study of strains of known antagonistic microorganisms and their formulation as an effective alternative to the use of synthetic fungicides. Obtaining a stable formulation, able to keep the biocontrol agent vital and active for long periods of time, is one of the most important aspects to consider in the perspective of its use in agricultural practice. This theme is therefore a point of strong connection between academic and industrial research. The main objective of the study will be to verify the stability and effectiveness of different bioformulates (powder, granules, liquid, cream) against the main fungal pathogens of fruit species. The formulations obtained will be tested by applying in vitro protocols to verify their antifungal efficacy and subsequently with in vivo protocols.

**Research topic 1.2: Valorization of agricultural byproducts by intensive rearing and transformation of *Hermetia illucens***

The research proposal aims to enhance pre-consumer organic by-products aimed at obtaining derivatives intended for animal feed and for industrial purposes using pupae of *Hermetia illucens* (BSF). The importance of insects as a new source of animal proteins is evident and confirmed by the recent legislation (EU 2015/2283). BSF is one of the insects that the European Union has authorized as a novel food and for the production of feed and has thus allowed the breeding on an industrial scale. This species has the ability to efficiently convert various organic wastes into body mass and, as such, BSF pupae can be sustainable food ingredients for pigs, poultry and fish, as well as alternatives with conventional ingredients or as food. The general objective of the project proposal will be achieved through

- Development of an intensive breeding protocol in a pilot plant for the production of BSF and identification of the corresponding innovative technological solutions that can be applied in an industrial plant.
- Evaluation of the effectiveness of the technological processes of transformation and characterization of potential derived products.
- Studying the effects of the dietary inclusion of some of the derived products on the performance and welfare in a finfish target species.

**Research topic 1.3: Production of secondary metabolites with nutraceutical interest from cell cultures of *Coffea* spp.**

In recent years, the need has emerged to exploit the ability of plants to synthesize organic compounds of high nutraceutical value in a biotechnological function. In particular, the pharmaceutical industry would receive an appreciable improvement in sustainability, converting the current conventional techniques of synthesis, characterized by heavy consumption of plant biomass and large quantities of solvents and energy, towards production of natural molecules with less impactful strategies. Therefore, the prospect of exploiting the biosynthetic capacities of plant cells for low-environmental-impact production of molecules such as drugs, biostimulants, supplements, etc. appears promising.

The protocols for cell culture of *Coffea* spp. are still under development. It will therefore be necessary to identify in detail the optimal conditions for the growth and maintenance of cell cultures, with the aim of obtaining a consistent production of metabolites. Several molecules produced by plants of the genus *Coffea*, whose chemical characteristics are already known, have biological activity and potential for use in pharmacological and nutritional fields for animals, or as biostimulants for plants. This project aims to improve in vitro cultivation techniques of solid and liquid cell cultures, obtained by isolation from either leaf tissues, seeds or embryos of different species of the genus *Coffea*. This initial objective will be followed by the identification of optimal growth conditions for inducing the synthesis of various secondary compounds, mainly present in the cell vacuole or released into the culture medium. To this end, the effect of modifications in various environmental parameters (temperature, intensity and duration of lighting) and breeding substrates (macro- and micronut