



<p>Dottorato di Ricerca in Scienze delle Produzioni Vegetali e Animali PhD Programme in Plant and Animal Science Codice del Corso di Dottorato/PhD code: DOT1335834 Coordinatore/Coordinator: Prof. Roberta BERNINI</p>
<p>Scheda delle attività svolte/Form activities carried out</p>
<p>Informazioni generali/General information</p>
<p>Ciclo/Cycle: XXXVIII</p>
<p>Dottorando/PhD student: Muhammad Amir Muawiya</p>
<p>Posizione/Position <input checked="" type="checkbox"/> Con borsa di studio/With scholarship <input type="checkbox"/> Senza borsa di studio/Without scholarship <input type="checkbox"/> Riservata a dipendenti di enti di ricerca/Reserved for research center employees <input type="checkbox"/> Dottorato industriale/Industrial PhD <input type="checkbox"/> Altra tipologia/Other typology</p>
<p>Tutor/Supervisor Prof. Giorgio M. Balestra Affiliazione/Affiliation Department of Agricultural and Forestry Sciences (DAFNE)</p>
<p>Co-tutor Affiliazione/Affiliation</p>
<p>Attività di ricerca/Research activity</p>
<p>Sede prevalente dell'attività di ricerca/Main place of research Department of Agricultural and Forestry Sciences (DAFNE), University of Tuscia, Via San Camillo de Lellis snc 01100 Viterbo Italy</p>
<p>Breve descrizione dell'attività di ricerca/Short description of the research activity (Max 5000 caratteri, inclusi gli spazi/Max 5000 characters, included spaces)</p> <p>Hands-on Learning: A substantial portion of this period was devoted to practical training in plant pathology, with a particular focus on critical techniques such as media preparation, bacterial streaking, and restreaking. These hands-on experiences were invaluable in building a strong foundation in laboratory procedures and plant pathology research.</p> <p>In vitro Experiments: A substantial portion of our research efforts was dedicated to conducting <i>in vitro</i> experiments to explore the antimicrobial properties of plant extracts. This crucial step allowed us to fine-tune the main experimentation parameters and gain valuable insights into the potential applications of plant extracts for controlling microbial pathogens.</p> <p>Testing Antimicrobial Properties: I conducted experiments to test the antibacterial properties of pomegranate peel extract against <i>Xanthomonas campestris</i> pv. <i>campestris</i>. The extract exhibited inhibitory effects on bacterial growth, and swimming ability under <i>in vitro</i> conditions.</p> <p>Ongoing Experiments: Currently, I am conducting experiments to assess the antibacterial properties of Gallic acid and Ellagic acid, both of which are key constituents of pomegranate peel extract under <i>in vitro</i> conditions. Following the identification of suitable doses, these substances will be tested <i>in planta</i>. <i>Arabidopsis thaliana</i> and <i>Nicotiana tabacum</i> seeds are sown and will be artificially infected with <i>Xanthomonas campestris</i> pv.</p>



campestris to observe the phenotypical and biochemical responses of the plants under various applications of the selected compounds.

Literature Research: Simultaneously, I am extensively researching topics such as *Xylella fastidiosa*, susceptibility of olive cultivars, control practices, and potential solutions to address the issue.

Specialized Learning:

PhD Student Courses: I participated in following courses which were offered in both online and in-person formats, providing opportunities to acquire new knowledge and establish connections with fellow researchers.

1. Genetics and physiology of field of relevant crop species and climate changes by Prof.ssa Ljiljana Kuzmanovic (Exam Certified)
2. Principi attivi delle piante by Prof.ssa Roberta Bernini (Exam Certified)
3. Meccanismi di difesa delle piante by Prof.ssa Carla Caruso
4. Metodologie avanzate applicate ai processi di trasformazione alimentare by Prof.ssa Ilaria Benucci

2nd Summer School on Nanotechnology (June 29-30, 2023): I had the privilege of participating in the 2nd Summer School on 'Nanotechnology in Agriculture' organized by the University of Udine. This event provided in-depth insights into the chemical and physical properties of nanomaterials, their synthesis, regulatory aspects governing nanomaterials, and their applications in agriculture.

Participations:

International Congress of Plant Pathology (August 20-25, 2023): I actively attended the International Congress of Plant Pathology in Lyon, France, hosted by the International Society of Plant Pathology and the French Phytopathological Society. During this event, I presented a poster titled 'Achievements, Challenges and Future Perspectives in Controlling the Menace of *Xylella fastidiosa* by Organic Nano-compounds: The Case of ANCoSIX Project' during the '4th European Conference on *Xylella fastidiosa*,' which offered the opportunity to showcase the prospective of the National Project ANCoSIX, sponsored by MASAF. This experience significantly expanded my network and deepened my knowledge of plant pathology on a global scale.

XXVIII Congress of the Italian Phytopathological Society (September 18-20, 2023): I participated in this congress held in Naples, Italy, actively engaging in the exchange of ideas and knowledge sharing. I also had the privilege of presenting a poster titled 'Scope of Organic Nano-compounds in Controlling the Threat of *Xylella fastidiosa*: The Case of ANCoSIX Project'. This event facilitated connections with members of the Italian Phytopathological Society and offered a platform to share insights with like-minded individuals.

Nano Innovations Conference & Exhibition 2023 (18-22 September, 2023): Attended this activity with fellow researchers and learned a lot about latest findings, research and manufacturing orientations related to nanotechnology.

Pubblicazioni scientifiche/Scientific publications
(Indicare tutte le informazioni bibliografiche dei lavori pubblicati e sottomessi/Indicate all references of published and submitted papers)

1. **Muawiya, M. A.,** Schiavi, D., Francesconi, S., Rongai, D., Valentini, F., El Beaino, T., & Balestra, G. M. (2023). Achievements, Challenges and Future Perspectives in Controlling the Menace of *Xylella fastidiosa* by Organic Nano-compounds: The Case of ANCoSIX Project. Poster presented at the 4th European conference on *Xylella fastidiosa* on August 20, 2023, during the International Congress of Plant Pathology held in Lyon, France.
<http://dx.doi.org/10.13140/RG.2.2.18038.57923>



	2. Muawiya, M. A. , Schiavi, D., Francesconi, S., Rongai, D., Valentini, F., El Beaino, T., & Balestra, G. M. (2023). Scope of Organic Nano-compounds in Controlling the Threat of <i>Xylella fastidiosa</i> : The Case of ANCoSIX Project. Poster presented at the XXVIII Congress of the Italian Society of Plant Pathology, September 18-20, 2023, Naples, Italy. http://dx.doi.org/10.13140/RG.2.2.13310.97606			
Comunicazioni a congressi/Conferences communications (Specificare se comunicazioni poster o comunicazioni orali/Specify if poster or oral communications)	1. Poster presentation in 4th European Conference on <i>Xylella fastidiosa</i> during International Congress of Plant Pathology held in Lyon, France (August 20-25, 2023) 2. Poster presentation in XXVIII Congress of the Italian Phytopathological Society held in Naples, Italy (September 18-20, 2023)			
Brevetti/Patents (Specificare/Specify)				
Altre tipologie di pubblicazioni/Other publications (Specificare/Specify)				
Attività formative/Training activities (Elencare tutte le principali attività svolte e, per ciascuna di esse, indicare i dati richiesti/List the main activities and for each specify of them the data)				
Frequenza di corsi/Partecipation courses	di in	Titolo/Title	Località/Location	Data/Date
		1. Genetics and physiology of field of relevant crop species and climate changes	Aula Magna, Aula 5 and Online via zoom by Ljiljana Kuzmanovic	June 13 – 16, 2023
		2. Principi attivi delle piante	Aula Magna, Aula 5 and Online via zoom by Prof.ssa Roberta Bernini	June 19 – 22, 2023
		3. Meccanismi di difesa delle piante	Aula Magna, Aula 5 and Online via zoom by Prof.ssa Carla Caruso	June 13 – 16, 2023
		4. Metodologie avanzate applicate ai processi di trasformazione alimentare	Aula Magna, Aula 5 and Online via zoom by Prof.ssa Ilaria Benucci	June 19 – 22, 2023
Partecipazione a seminari/Partecipation in seminars + Schools		1. 'European green deal and farm to fork strategy. What short-term impacts for italian farms, and what strategies in the	Online by Prof. Raffaele CORTIGNANI/Dr. Davide DELL'UNTO	April 14, 2023



	medium-long term?’		
	2. ‘The role of endogenous enzymes in the evolution of sensorial characteristics of plant-based foods’	Online by Prof.ssa Katia LIBURDI	April 17, 2023
	3. ‘Modelling pest and diseases: an overview from theoretical to practical aspects’	Online by Dr. Luca ROSSINI	April 19, 2023
	4. ‘Point-of-care tools for plant pathogens detection’	Online by Dr. Sara FRANCESCONI	April 21, 2023
	5. ‘Protoplast technology for DNA- free genome editing’	Online by Dr. Cristian SILVESTRI	April 27, 2023
	6. ‘Enhancing the nutritional quality of major food crops through classical and new breeding techniques’	Online by Dr. Samuela PALOMBIERI	April 28, 2023
	7. ‘Microbiome-based approaches for a sustainable agriculture’	Online by by Dr. Annamaria BEVIVINO	May 8, 2023
	8. ‘Plant cell cultures: back to the future’	Online by Dr. Silvia MASSA	May 10, 2023
	9. ‘The two-faced plant viruses: from plant pathogen to smart nanoparticles’	Online by Dr. Chiara LICO	May 15, 2023
	10. ‘High performance molecular dynamics simulations to assess the impact of the environment on human health and for the designing of new	Online by Dr. Caterina RCANGELI	17 May, 2023




	therapeutic approaches'		
	11. 'Plant-based production of veterinary vaccines and diagnostics'	Online by Dr. Selene BASCHIERI	May 22, 2023
	12. 'Preclinical research models and their applications in drug discovery'	Online by Dr. Francesca PALONE	May 24, 2023
	13. 2 nd Summer School on 'Nanotechnology in Agriculture'	University of Udine, Italy	June 29 - 30, 2023
Stage in Italia e/o all'estero/Internship in Italy and/or abroad (Indicare la località e descrivere brevemente il tipo di attività svolta/Indicate the location and describe briefly the activity carried out)			
Altre attività formative/Further educational activities (Indicare la località e descrivere brevemente il tipo di attività svolta/Indicate the location and describe briefly the activity carried out)	Nano Innovations Conference & Exhibition 2023: Attended this activity with fellow researchers and learned a lot about latest findings, research and manufacturing orientations related to nanotechnology.	Sapienza Università di Roma, Rome, Italy	18-22 September, 2023
Attività di didattica integrativa/Teaching activity (Elencare tutte le attività svolte e, per ognuna, indicare i dati richiesti/List all activities and specify for each of them the data)			
Attività di tutoraggio e didattico-integrative/Tutorship activities			



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Seminari in corsi di laurea/Seminars in master degrees (Indicare il titolo, la località, la data/Specify the title, the location and the date)			
Data/Date: October 20, 2023			
Firma Dottorando/Signature PhD student: 			
Firma Tutor/Signature Supervisor:			