Alessandro Quadri

Postdoctoral Researcher

I am currently a postdoctoral researcher in the Agricultural and Biosystems Engineering Research Group at the Department of Agricultural and Food Sciences (DISTAL), University of Bologna. My research focuses on enhancing the production of bioactive compounds (BCs) in medicinal and aromatic plants (MAPs) through the synergistic use of LED lighting, elicitors (e.g., Plasma Activated Water PAW), and biostimulants in indoor farming systems.

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SKILLS

Data Analysis | Statistical Analysis | Model Fitting | Design of Experiments | LED lighting | Indoor Farming | Protected cultivation | Controlled Environment Agriculture | Agronomy | Plant Science | Plant Physiology | Plant Phenotyping | Medicinal and Aromatic plants (MAPs) | Bioactive Compounds (BCs) | Secondary Metabolites | Horticulture | Field Trials | Precision Agriculture | Agricultural Robotics | Goal oriented | Critical thinking | Resiliency | Leadership | Creativity | Strategic vision | Team Working | Problem Solving | Change management | Stress management | Innovation

HARD SKILLS

R/R studio | DIALux evo | Apple MacOs | Microsoft Windows | Open Office | Apple works | GIMP | Lotus Notes | CAD | Zucchetti | UniCam | FLIRTools | Xeneth Software | Redmine | Fusion | Kinovea

EDUCATION

INNOVATIVE INDUSTRIAL PhD (PON) IN "HEALTH, SAFETY AND GREEN SYSTEMS"

Alma Mater Studiorum (University of Bologna)

01/2022 - Present

Research Topic

- Use of LED lighting combined with elicitors and biostimulants in indoor farming systems to enhance the production of bioactive compounds (BCs) in medicinal and aromatic plants (MAPs).

SECOND CYLCE DEGREE/TWO YEAR MASTER IN AGRICULTURAL SCIENCES AND TECHNOLOGIES CURRICULUM IN “PLANT PATHOLOGY”

Alma Mater Studiorum (University of Bologna)

09/2017 - 09/2020 *110/110 CUM LAUDE*

Thesis

- Effects of different crop densities on the quality and yield of open field zucchini (*Cucurbita pepo* L.).

FIRST CYCLE DEGREE/BACHELOR IN LAND AND AGRO-FORESTRY SCIENCES

Alma Mater Studiorum (University of Bologna)

09/2013 - 12/2016 *110/110 CUM LAUDE*

Thesis

- Foliar fertilization test on grapevine.

WORK EXPERIENCE

POSTDOCTORAL RESEARCHER

Alma Mater Studiorum (University of Bologna)

02/2025 - Present *Bologna, Italy*

Research Fellowship Project

- *Engineered LED Biostimulation Systems for the Qualitative and Quantitative Enhancement of Medicinal Plant Cultivation*

PhD CANDIDATE

Alma Mater Studiorum (University of Bologna) - C-LED S.r.l. (Cefla Group)

01/2022 - Present *Imola/Bologna, Italy*

Innovative Industrial PhD (PON) in 'Health, Safety, and Green Systems,' focused on the application of LED lighting combined with elicitors and biostimulants in indoor farming systems to enhance the production of bioactive compounds (particularly anticancer compounds) in medicinal and aromatic plants (MAPs). An additional focus has been the biofortification of leafy vegetables through the synergistic use of LED lighting and bioactive elements. Additionally, I serve as the PhD student representative.

Collaborations

- Industrial collaboration: C-LED (Host company) , a leading international company in the horticulture LED manufacturing industry.
- Academic collaborations: Department of Pharmacy and Biotechnology (FaBiT), Department of Industrial Engineering (DIN), Department of Agricultural and Food Sciences (DISTAL- Research groups of Plant Pathology and Applied plant micology - biology).

VISITING PhD CANDIDATE

Weihenstephan-Triesdorf University of Applied Sciences HSWT

06/2024 - 09/2024 *Freising (Munich)*

Research period at the Applied Science Centre (ASC) for Smart Indoor Farming, Weihenstephan-Triesdorf University of Applied Sciences (HSWT), focusing on the effects of LED lighting and soilless cultivation on the production of secondary metabolites (particulary anticancer compounds) in medicinal plants grown in vertical farming systems.

Goals/Tasks

- Investigate the interaction between LED light (PAR and UV-A spectra) and soilless cultivation systems to enhance the production of anticancer compounds
- Application of innovative soilless cultivation systems (hydroponics, gelponics with alginate hydrogel, and aeroponics) to medicinal crops of industrial interest.

R&D AGRONOMIST PROJECT COORDINATOR

Unitec S.p.A

12/2020 - 12/2021 *Lugo, Italy*

Reporting directly to company management, I served as an R&D Agronomist Project Coordinator.

Main responsibilities

- Coordination of several industrial research projects.
- Company Teacher and Tutor for 2 CFU of the "Trend in Food Industry LAB" course of the M. Sc. in "Food Engineering" (Politecnico di Milano).

RESEARCH ASSISTANT, HORTICULTURAL CROPS AND INDOOR CULTIVATION SYSTEMS

Greenhouse DISTAL complex (Alma Mater Studiorum - University of Bologna)

10/2019 - 03/2020 *Bologna, Italy*

Master's degree internship which involved a research project focused on various horticultural species cultivated using indoor cultivation systems, specifically hydroponic systems (deep water culture), growth chambers, and artificial lighting with LED lamps. This traineeship was organized into three distinct phases: 1) Preparation of samples for experimentation; 2) Experimental phase; 3) Bibliographic research.

Goals/Tasks

- Studying the plant-light interaction.
- Studying the effects of LED lights on plant growth and its production of secondary metabolites.
- Evaluating the impact of nutrient solutions on the growth and yield of selected horticultural species.
- Analyzing the environmental conditions within indoor cultivation systems to optimize plant development.
- Utilizing image analysis software, such as GIMP, to calculate leaf area and assess its correlation with growth parameters.

WORK EXPERIENCE

R&D SPECIALIST IN HORTICULTURAL CROPS

Rijk Zwaan

04/2018 - 04/2019 *Bologna, Italy*

Master's degree thesis internship which consisted of an experimental field study aimed at verifying the effect of different plant densities on the quality and yield of open-field courgettes (Cucurbita pepo).

Goals/Tasks

- Cultivation follow-up from field transplant to harvest.
- Evaluation of the best plant density on zucchini crops.
- Check of different agronomic techniques applied to zucchini cultivation.
- Collection of qualitative and quantitative data on the different agronomic techniques and on the different varieties.
- Statistical analysis of the collected data.

R&D SPECIALIST IN PLANT NUTRITION

Haifa Italia S.r.l. (Haifa Group)

04/2016 - 10/2016 *Bologna, Italy*

Bachelor's degree thesis internship that consisted of an experimental study on foliar fertilization in grapevines, conducted at the Caretti farm in San Giovanni in Persiceto (BO). The experiment was carried out on two grape varieties, Grechetto Gentile and Moscato Bianco, to compare two fertilization protocols: (1) the Haifa protocol, which used Haifa foliar fertilizers alongside the standard soil fertilization practiced by the farm; and (2) the Caretti farm's protocol, which used BMS products in addition to traditional soil fertilization.

Goals/Tasks

- Better qualitative results (i.e. increasing the acidity, freshness and aromatic characteristics of the grapes).
- Better quantitative results (in terms of greater production).

CERTIFICATES

Haifa U Seminar (11/2015 - 11/2015)
"NUTRIGATION: OPTIMIZING WATER-MINERAL NUTRITION OF THE CROPS".

Let's Start from the Soi: Biocontrol, Biostimulation, Microorganisms, and Microalgae for an Innovative and Sustainable Agriculture (12/2022 - 12/2022)
Webinar Certificate of Participation .

Applied Research and Innovation in the Food and Industrial Hemp Supply Chain" (09/2023 - 09/2023)
Conference certificate of participation (Department of Agricultural and Food Sciences DISTAL, Alma Mater Studiorum - University of Bologna).

Cold Plasma Workshop for the decontamination of food and food packaging (03/2021 - 03/2021) (03/2021 - 03/2021)
Conference certificate of participation (CIRI Agro-food - Alma Mater Studiorum -University of Bologna).

CONFERENCES & COURSES

Shedding Light on Medicinal Plants: Indoor Cultivation Experience and Pharmaceutical Applications (Rimini, Italy) (05/2024 - 05/2024)
Macfrut FRUIT & VEG PROFESSIONAL SHOW

- Oral presentation title (presenter): *Indoor cultivation of medicinal plants: LED biostimulation to increase bioactive compounds production.*

AgEng2024 (Athene, Greece) (07/2024 - 07/2024)
The European Society of Agricultural Engineers (EurAgEng), The Hellenic Society of Agricultural Engineers (E.G.M.E.)

- Oral presentation title: *Enhancing alkaloid production in Catharanthus roseus through synergistic effects of LED lights and mycorrhizae-based biostimulant in a vertical farming system.*

International Horticultural Expo 2023 (Doha, Qatar) (02/2024 - 02/2024)
International Horticular Exhibition EXPO 2023 Doha Qatar

- Oral presentation title: LED biostimulation and digital simulations in greenhouse and vertical farming

LightSym 2024 - X International Symposium on Light in Horticulture (Seul, South Korea) (05/2024 - 05/2024)
ISHS (International Society for Horticultural Science)

- Oral presentation title (presenter): *Use of LED light and plasma-activated water (PAW) to stimulate pharmaceutical compound production in Catharanthus roseus plants.*
- Oral presentation title: *Enhancing secondary metabolites accumulation in Coleus blumei through LED light application.*

International Symposium on Protected Cultivation, Nettings and Screens for Mild Climates (Athene, Greece) (09/2024 - 09/2024)
ISHS (International Society for Horticultural Science)

- Oral presentation title (presenter): *Use of LED light and biostimulants to enhance Alkaloid production in Catharanthus roseus grown in an Indoor Farming systems.*

II International Symposium on Growing Media, Compost Utilization and Substrate Analysis for Soilless Cultivation (09/2025 - 09/2025)
ISHS (International Society for Horticultural Science)

- Poster (Abstract accepted, presenter): *Natural Alginate based hydrogel as an alternative hydroponic substrate for indoor farming systems.*

PUBLICATIONS

Research Article

Use of LED light and plasma-activated water (PAW) to stimulate pharmaceutical compound production in Catharanthus roseus plants

Author(s)

Quadri A., Bertaccini A., Contaldo N., Mercolini L., Protti M., Montalbetti R., Laurita R., Tassinari P., Torreggiani D.

Reviewed and accepted for pubblication

Acta Horticulturae (ISHS)

Research Article

Use of LED light and biostimulants to enhance Alkaloid production in Catharanthus roseus grown in an Indoor Farming system

Author(s)

A. Quadri, B. Sambuco, M. Trenta, P. Tassinari, D. Torregiani, L. Mercolini, M. Protti, A. Zambonelli, F. Puliga, A. Barbaresi

Under review

Acta Horticulturae (ISHS)

Research Article

Enhancing secondary metabolites accumulation in Coleus blumei through LED light application

Author(s)

Sambuco B., Quadri A., Trenta M., Tassinari P., Torreggiani D., Mercolini L., Protti M., Barbaresi A.

Reviewed and accepted for pubblication

Acta Horticulturae (ISHS)

Research Article

Green roof management in Mediterranean climates: evaluating the performance of native herbaceous plant species and green manure to increase sustainability

Author(s)

Trenta M., Quadri A., Sambuco B., Perez Garcia C.A., Barbaresi A., Tassinari P., Torreggiani D.

Under review

Buildings

Research Article

Green roofs: performance of native plant species in a multifunctional perspective for the mitigation of impacts in urban environments

Author(s)

Trenta M.; Quadri A.; Sambuco B.; Perez Garcia C.A.; Torreggiani D.; Tassinari P.; Mercolini M.; Protti M.; Zambonelli A.; Puliga F.; Barbaresi A.

Under review

Science of the total environment

Research Article

Enhancement of vindoline and catharanthine production in Catharanthus roseus by LED light and plasma activated water

Author(s)

Quadri A., Bertaccini A., Contaldo N., Mercolini L., Protti M., Montalbetti R., Laurita R., Tassinari P., Torreggiani D.

Published

PLOS ONE

HONOR AWARDS

ISA Doctoral Prize by (2022 - 2023)

Institute of Advanced Studies (University of Bologna)

- Prize for PhD students at the University of Bologna for interdisciplinary research

LANGUAGES

English
Full Professional Proficiency

Italian
Native or Bilingual Proficiency

INTERESTS

Reading | Photography | Music | Basketball | Gym | Scientific literature | Ancient history | Modelism | Astronomy