



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

Scheda delle attività svolte/Form activities carried out

Informazioni generali/General information

Ciclo/Cycle : Terzo anno dottorato

Dottorando/PhD student : FAKIR MATHLOUTHI

Posizione/Position

- Con borsa di studio/With scholarship
 Senza borsa di studio/Without scholarship
 Riservata a dipendenti di enti di ricerca/Reserved for research center employees
 Dottorato industriale/Industrial PhD
 Altra tipologia/Other typology

Tutor/Supervisor : Prof Francesco Rossini

Affiliazione/Affiliation : PhD Programme in plant and animal Sciences

Co-tutor

Affiliazione/Affiliation

Attività di ricerca/Research activity

Sede prevalente dell'attività di ricerca/Main place of research : Francfort Germany

Breve descrizione dell'attività di ricerca/Short description of the research activity
(Max 5000 caratteri, inclusi gli spazi/Max 5000 characters, included spaces)

During this third year of doctorat, I have enforced my research in the field of development enviromental sustainable fertilizer solutions by two scientific works .

The first work is in the field of Process of transformation and regeneration of sludge phosphate using microorganisms to create a biological friendly fertilizer. This work is a result of 3 years research wherein several improtant achievement was concretized, in instance:

- 1- Define an eco-friendly approach for the removal of heavy metals from sludge phosphate deposit using plant of Panicoideae family. More than 2200 data were collected and processed to compare the effect of the plant on reducing Cd, Pb, Al and Se in the sludge phosphate before and after treatment.
- 2- A method of extraction and transformation of sludge phosphate into a granular fertilizer using microorganisms like azotobacter and phosphor solubizing bacteria. Analysis of sludge phosphate before and after treatment was made and interpretation of the results were reported.
- 3- Define an industrial process, including equipment design and prototyping. This task has been completed by the application of a European patent in 09.2023. The patent is in the approval process.



The second work is in the field of Environmentally sustainable fertilization Solution to optimize photosynthesis during organic olive growing in the Andalusia, Spain. The focus of this work was to study evapotranspiration of olive trees and the impact of irrigation and foliar treatment on improving yields and olive oil quality.

A full report is in publication process and more than 500 data were collected during 2021, and 2022 season. The experimental field was defined of 4 plots, with / without irrigations, and with / without treatments. Data measurements were focused on quantitative parameters in instance olive yield per tree as well as branch length before vegetation start and after cropping while qualitative parameters were related to the olive oil characteristics for each case for which following data were measured.

oleique acid %
Peroxide meqO₂/kg
Total polyphenol mg/kg
O-Diphenols mg/kg
carotenoids mg/kg
chlorophylla mg/kg

Finally, I've been also involved in two workshops,

Annual Bioprocess Innovation Leaders' Summit Visualising The Future, Feb. 2023

Global Conference on Agriculture, Dec. 2022

Pubblicazioni scientifiche/Scientific publications (Indicare tutte le informazioni bibliografiche dei lavori pubblicati e sottomessi/Indicate all references of published and submitted papers)	Environmentally sustainable fertilization Solution to optimize photosynthesis during organic olive growing (Publication process) European patent (in approval process), PROCESS OF TRANSFORMATION AND VALORIZATION OF SLUDGE PHOSPHATE USING MICROORGANISMS TO CREATE AN ENVIRONMENTALLY FRIENDLY GRANULE FERTILIZER.
Comunicazioni a congressi/Conferences communications (Specificare se comunicazioni poster o comunicazioni orali/Specify if poster or oral communications)	N.D



Brevetti/Patents (Specificare/Specify)	PROCESS OF TRANSFORMATION AND VALORIZATION OF SLUDGE PHOSPHATE USING MICROORGANISMS TO CREATE AN ENVIRONMENTALLY FRIENDLY GRANULE FERTILIZER.		
Altre tipologie di pubblicazioni/Other publications (Specificare/Specify)	N.D		
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/Participation in courses	Titolo/Title	Località/Location	Data/Date
Partecipazione a seminari/ Participation in seminars	Global Conference on Agriculture,	Berlin	Dec. 2022
Partecipazione a convegni, workshop, scuole/Participation in workshop, schools	Annual Bioprocess Innovation Leaders' Summit Visualising the Future	Berlin	Fev.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)	Field Test carried in olive trees as well as collection of quantitative and qualitative data	Murcia Spain	2022/2023
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)	NA		
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	Titolo/Title	Località/Location	Data/Date
Seminari in corsi di laurea/Seminars in master degrees (Indicare il titolo, la località, la data/Specify the title, the location and the date)	NA		
Data/Date 14.10.2023			



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DIPARTIMENTO
DI SCIENZE AGRARIE
E FORESTALI

Firma Dottorando/Signature PhD student

Firma Tutor/Signature Supervisor

FAKIR MATHLOUTHI