PhD: Food Science

Title: Innovative solutions to foster soil health and food safety in the urban agricultural systems of Naples

Supervisor: Dott. Caporale Antonio Giandonato (RTDB, AGR/13 or AGRI-06/B)

Objectives of the research project and interdisciplinary collaborations:
The project aims to develop an innovative approach, which allows the soil and food produced in urban green areas to reach and maintain high quality standards. These, in turn, could support sustainable and resilient use of soil and resources, improve food safety and environmental protection, and enable the prediction and management of possible environmental and health risks. To this regard, soils will be selected and studied in the metropolitan area of Naples, used for agricultural production, for the following purposes:

- evaluate the physico-chemical properties and fertility of the soil and the possible presence of contaminants, in collaboration with Dr. Paolo Nasta (AGR/08);
- define specific quality indicators for agricultural soils located in urban areas;
- promote biodiversity and improve the sustainability of production techniques;
- monitor and increase the quality and safety of agri-food products, in collaboration with Prof. Francesca De Filippis (AGR/16);
- predict and manage any environmental and health risks, using integrated modeling approaches;
- develop guidelines for sustainable and site-specific management of agricultural soils in urban areas, resilient to climate change and inclusive towards the community and stakeholders involved during the project.

Innovation and originality of the project in relation to the state of the art:
The technical-scientific assessment of the state of health of agricultural soils in the metropolitan area of Naples, and of the quality and healthiness of the produced foods, in relation to the pedoclimatic and management characteristics of the study sites, could offer useful information for improving, more generally, the quality of life of citizens, ecosystem services and food safety in urban agriculture systems.
The definition of specific quality indicators and indices for agricultural soils will guide and assist producers, associations and local authorities in the virtuous and sustainable management of urban agricultural areas and will allow to mitigate the risks of transfer of chemical and microbiological contaminants in the food chain.

Grant availability:

- Project PRIN 2022 - Innovative approach enabling soil and food quality in vegetable gardens of the metropolitan area of Naples (HealthySoil4QualityFood, CUP E53D23011040006). Call PRIN 2022 (Directorial Decree n. 104 of 02-02-2022). Coordinator: Dr. Antonio G. Caporale.
- National Research Centre for Agricultural Technologies (AGRITECH) - Spoke 3, task 3.2.1, financed by European Union Next-GenerationEU (Piano Nazionale di Ripresa e Resilienza (PNRR) Missione 4, Componente 2, Investimento 1.4 - D.D. 1032 17/06 /2022, CN00000022).

Collaborations with foreign institutions:

- Dr. María José Sáiz, National Center for Food Technology and Safety (CNTA), San Adrián (Navarra), Spain. Possible research activities: assessment of the antioxidant capacity and content of carotenoids and polyphenols in food products. Available analytical techniques: HPLC-DAD, UPLC-MS(ORBITRAP) and UV-VIS spectroscopy.