Call for MSc. Research Scholarship under the project; Future Food: "Development of microbial consortia as bio-control agent for safe quality tomato

Background of the project

Tomato (*Solanum lycopersicum*) is a nutrient-rich, naturally delicious crop produced, marketed, and consumed worldwide. However, Bacterial wilt (*Ralstonia solanacearum*), early blight (*Alternaria solani),* and late blight (*Phytophthora infestans*) are key constraints in tomato production on both small-scale and commercial farms. Unfortunately, agricultural disease control has traditionally focused on total control of an organism or subset of organisms through chemicals, often leading to the buildup of chemical resistance in pathogen populations, leading to lower efficacy of the pesticide. Similarly, prolonged use of chemicals could cause harmful effects, including environmental and health hazards, residual toxicity, and resistance to pathogens, among others (Azeem et al., 2022). In light of targeted national as well as international goals (Sustainable Development Goals) that are being implemented globally to facilitate the development of sustainable solutions for agriculture (Cernava, 2021) and, more recently, the establishment of the European Green Deal (approved in 2020), the use of biological control based on beneficial microorganisms offers a highly promising alternative to conventional pesticide use.

Traditionally, microbe-based augmentative biocontrol strategies for crop protection have mainly relied on the application of single microorganisms. However, designing microbial consortia to improve the reliability of current biological control practices is now a major concern in biotechnology. The use of a group of different species of microbes that act together as a community (a microbial consortium), which is closer to natural conditions than the mass application of a single microbial strain (Cernava, 2021), is likely to be more effective and have a broad range of disease control benefits. Our teams have identified and characterized some bacterial and fungal isolates with potential biocontrol activity against pathogens causing bacterial wilt, early blight, and late blight. Interest and investment in bioproduct development in African countries like Kenya, Tanzania, and South Africa are growing. However, we still need to address the inconsistencies associated with the efficacy of biocontrol agents between laboratory and field trials, or applications.

Future Food: "Development of microbial consortia as bio-control agent for safe quality tomato"

The collaboration project, "Future Food: "Development of microbial consortia as bio-control agents for safe quality tomato," involves Sokoine University of Agriculture (SUA), Tanzania; the University of Pretoria, South Africa; the University of Embu, Kenya; and the Swedish University of Agricultural Sciences, Sweden. The project aims at developing a bio-control product using microbial consortia by enhancing natural bio-control microbiomes for the control of bacterial wilt, early blight, and late blight diseases in tomatoes. The Tanzania Commission for Science and Technology (COSTECH) funds the project in Tanzania through the National Fund for Advancement of Science and Technology (NFAST) programme. The project is part of the "Sustainable Development Goals (SDGs) Collaborative Call Funded Projects.

Areas of Support

Successfully applicant shall work on one of the following:

- Identification of local microbial communities in the symbiome and pathobiome of the tomato plant for designing a bio-control microbial consortium against *Ralstonia solanacearum*, *Alternaria solani,* and *Phytophthora infestans (1 MSc)*
- Microbial consortia establishment for a stable and healthy plant microbiome against *Ralstonia solanacearum*, *Alternaria solani,* and *Phytophthora infestans (1 MSc)*
- Inplanta and in vitro assessment of the effectiveness of biocontrol microbial consortia against *Ralstonia solanacearum, Alternaria solani, and Phytophthora infestans (1 MSc)*
- Optimisation of media and conditions for mass production of the microbial consortia bio-control agent *(1 MSc)*

The field and laboratory experiments will be implemented using resources within the project budget lines. The information generated on potential microbial communities for management of the target pathogens will be shared among researchers and/or graduate students in partner institutions.

Eligibility and Support Modality

- Applicants should be Tanzanian citizens admitted to the Sokoine University of Agriculture for MSc. Crop Science, MSc. Applied Crop Protection or Masters of Biology and Biotechnology Laboratory Sciences.
- The project will support only research components in the areas highlighted above.
- MSc students have completed their coursework and are currently working on their research proposals.
- Interested and willing to carry out their research in Tanzania's major tomato production regions.

Please send your CV, academic transcripts, and letter of motivation demonstrating a link between the advertised position and the Sustainable Development Goals (SDGs). Additionally, the letter should explain how the anticipated results can address societal issues.

How to apply

Applications should be sent to the Principal Investigator, Dr. Ramadhani Majubwa of SUA (omaryrama@sua.ac.tz), and copied to the Director of Postgraduate Studies, Research, and Consultancy (drpgs@sua.ac.tz) no later than July 7th, 2024.

Note: Only short-listed applicants will be contacted.