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Scientific supervisor: **Dr. habil. Silke Ruppel**, Leibnitz-Institute of Vegetables and Ornamental Crops, Großbeeren, Germany, Department of Plant nutrition

Assistant supervisor: **will be assigned**

Title of the project

Vegetables free of human pathogenic microorganisms (HPMOs)

Scientific description of the project

(zwięzła informacja na temat projektu w formie opisu hipotezy badawczej, metod badawczych, spodziewanych wyników; max. 1 strona A4 włączając rysunki. Prosimy nie zmieniać czcionki ani marginesów w niniejszym dokumencie)

Introduction

The growing awareness regarding a healthy lifestyle has encouraged society to eating healthy food based mostly on fresh vegetables. Unfortunately, the resulting nutrition habits are not accompanied by increased understanding of the existing environmental problems. Therefore, in the past few years, the increased production and consumption of fresh vegetables, was accompanied by increased number of reports of food-borne diseases caused by **human pathogenic microorganisms (HPMOs)**. The origin of HPMOs can be diverse: polluted soils enriched with organic fertilisers, crops irrigated with contaminated waters, or the faeces of free-living animals. It should be noted that many of the microorganisms that naturally accompany plants (endophytic or rhizosphere microorganisms) might be opportunistic human pathogens.

The main goal of the project is: (i) to determine the diversity and incidence of HPMOs in rhizosphere and tissues of crops communities, (ii) to determine HPMOs influence on plant as well as on microbiome diversity and the endophytes abundance *in vitro* and in pot experiment.

We hypothesise that: (i) some crops may be less susceptible to colonization by HPMO; (ii) the number of HPMOs in this plant's tissues will be low or they will be absent, due to an endophytic microbiome, or the synthesis of particular, previously unknown, antibacterial compounds.

Methodology: (i) to determine the diversity and incidence of HPMOs in rhizosphere and tissues of selected crops; (ii) to determine HPMOs influence on plant as well as on microbiome diversity and the endophytes abundance *in vitro* and in pot experiment.

Expected results. Received results will: (i) extend the knowledge of plant–HPMO interactions with staple crops, (ii) reveal mechanisms limiting or preventing infection of plants by HPMOs.

In this proposal we investigate whether staple crops synthesizes specific compounds with anti-HPMO properties and whether its unique microbiome limits the colonization of tissues by HPMOs. Complexity of mechanisms determining interaction between plants and pathogens results in the lack of repeatability and predictability in terms of infection outcome and level. It will

probably take many years of work to develop technologies for producing vegetables that are free of HPMOs or have increased susceptibility to infection by HPMOs. The production of safe food (i.e., HPMOs-free) is an extremely important issue, especially considering the increasing number of HPMOs present in plant production systems. The PhD project will be conducted under the framework of COST Action 16110 Control of Human Pathogenic Microorganisms in Plant Production Systems. Supervisor of this project prof. K. Hryniewicz is part of the Management Committee of this Action (<https://www.cost.eu/actions/CA16110/#tabs|Name:management-committee>).

Promotor: **Prof. dr hab. Katarzyna Hryniewicz**, Chair of Microbiology, Faculty of Biology and Environmental Protection, Nicolaus Copernicus University in Torun, Poland.

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