**Report**

**Study visit of Prof. Dr. Pramode W. Ramteke**

Agriculture requires efficient technologies which control the pests of cultivated plants. A green and environmentally friendly approach is biological control which could effectively reduce or mitigate pests and/or their effects. Development an efficient microorganisms-based product requires the careful selection and detailed preliminary characterization of the microorganisms that make up this preparation.

According to the research plan I submitted in my application, during my visit at the Department of Microbiology, Faculty of Sciences, University of Szeged our research focused on this topic. The final aim is the development of a foliar treatment formulation for batata (sweet potato; *Ipomoea batatas*). As part of this we carried out detailed ecophysiological studies on eight *Bacillus licheniformis* strains isolated from sweet potato, which included the examination of the temperature and pH dependence, the salt tolerance of these strains, as well as the activity of four extracellular enzymes (lipase, protease, chitinase, cellulase). Furthermore, we also measured the production of indoleacetic-acid, siderophore, ammonia and phosphorus solubilization capacity of these strains. Furthermore, we are currently investigating the antagonistic effect of *B. licheniformis* strains against plant phytopathogens in *in vitro* antagonism tests, with a focus on sweet potato pathogens. In addition, we are also conducting a field test to examine the effect of the three most promising strains (SZMC 27713, SZMC 27714, and SZMC 27715) on yield in sweet potato. Our long-term goal is to develop a foliar treatment formulation with high levels of depsipeptide content, stabilized by chitosan nanoparticles, which will be applicable to a wide range of agricultural and horticultural crops. We agreed with my host department that this research cooperation will be continue even after the termination of my fellowship period in Hungary.

Furthermore, I could be involved in some other projects of the department. Some of these forms a bases for intensive cooperational research in the future.

As a result of the preparative period of my study visit, as well as my fruitful period spent at the Department of Microbiology several coauthored publications were created:

Joint conference presentation:

Ádám Bordé, Henrietta Allaga, **Pramod W. Ramteke**, Tamás Monostori, Csaba Vágvölgyi (2022) Detailed ecophysiological characterization of *Bacillus licheniformis* strains isolated from sweet potato for the development of a foliar treatment formulation. Annual Meeting of the Hungarian Society for Microbiology, Kecskemét, 12-14 October. Abstracts.

Accepted joint manuscripts:

Anuar R. Zhumakayev, Mónika Varga, Mónika Vörös, Sándor Kocsubé, **Pramod W. Ramteke**, András Szekeres, Csaba Vágvölgyi, Lóránt Hatvani, Tamás Marik (2022) Characterization of the antagonistic potential of the glyphosate-tolerant *Pseudomonas resinovorans* SZMC 25872 strain against the plant pathogenic bacterium *Agrobacterium tumefaciens*. Frontiers in Plant Science (accepted).

Submitted joint manuscript:

Anita Vidács, Erika Beáta Bencsik-Kerekes, **Pramod W. Ramteke**, Judit Krisch, Csaba Vágvölgyi (2022) Food residues diminish the anti-adhesion effect of selected essential oils on food-borne pathogens attached to stainless steel and polypropylene surfaces. International Journal of Molecular Sciences (submitted/under review).

Joint manuscripts under preparation:

Zsófia Hegedüs, Dóra Anna Papp, Mónika Varga, Csaba Vágvölgyi, **Pramod W. Ramteke**, András Szekeres (2022) Liquid-liquid chromatographic purification of ochratoxin A. Molecules (manuscript under preparation).

Apoorv Tiwari, Vikram Singh Gaur, Salej Sood, Goahr Taj, Dinesh Pandey, **Pramod Wasudeo Ramteke**, Lorenzo Pecoraro, Vijai Kumar Gupta, Csaba Vágvölgyi, Bhumi A. Mehere, Anil Kumar. Transcriptome-wide identification, characterization and expression analysis of seed storage protein genes in finger millet (*Eleusine coracana* (L.) Gaertn.) through *in-silico* approaches