Innovation lump sum

Project #147

MICROBIUM
Detection and elimination of microbes

Project Partner: Microbium d.o.o.
Country: Slovenia
Industrial ecosystem: Agrifood
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~ MPN Analyser – safe water reuse in agri-food ~

Extreme weather events, caused by climate change, are drastically increasing water scarcity in the agri-food sector, which accounts for over 70% of freshwater use. Based on EU Regulation 2020/741, governing limit values for microbiological parameters, wastewater reuse in agriculture will increase to 6.6 trillion L, reducing water stress in the sector by 5%. To provide the microbiological safety of the introduced water source, fast, easy-to-use, affordable, automated methods of bacterial detection are needed.

In this project, we propose the development of the first solution in the world that allows simultaneous, automated quantification of E. coli and Enterococcus sp., representative pathogenic bacteria, in waste and reused water. Our main goal is to reduce water risk in agriculture by implementing a fast (less than 24h), automated, affordable (9€ per sample), reliable (99% compared to state-of-the-art), reusable, and digitized method for microbiological quality control of reused water. For that purpose, the MPN Analyser, which we designed for the detection of specific bacteria in drinking water, will be upgraded by:

- development of innovative water-soluble selective, differential reagents
- development of algorithms and software to allow detection and quantification of E. coli and Enterococcus sp. in waste and reused water, in collaboration with the Faculty of Electrical Engineering and Computer Science, University of Maribor
- Improvement of the sterilization processes.

Prototypes will be tested and further improved by an extensive 6-month user experience trial in wastewater treatment systems of Project Collaborators. The solution will be developed to TRL 9 by validation study of the actual system and comparison to state-of-the-art.
The developed analyser will present an innovative water quality control tool for reused water, a novel water source to battle water scarcity in agriculture. Digitalization and automation will smarten the agri-food water system.

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