

Microbial Community Analysis in Aquatic Ecosystems Using Metagenomics Approaches

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From (Affiliation)

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Aim of the STSM

Duration (Starting date 1/9/2025. - Ending date 30/9/2025.)

- The aim of this STSM was to acquire advanced methodological and analytical skills in environmental metagenomics with a focus on microbial communities in freshwater ecosystems. The mission's main goal was to apply newly learned bioinformatics workflows to the analysis of environmental DNA samples collected from Croatian freshwater lakes, thereby strengthening the scientific foundation of my doctoral research and building capacity for metagenomic studies at my home institution.

Methodology

- During my stay at the *Probst Lab*, University of Duisburg-Essen, I completed intensive theoretical and practical training in metagenomic data processing. The training covered the complete workflow, including sequence quality control, short- and long-read assembly, automated binning, manual curation with uBin, taxonomic and functional annotation and data visualization in R. The acquired methods were applied to environmental DNA samples from Croatian freshwater lakes, enabling the reconstruction and characterization of microbial community structures and functional potential relevant to carbon cycling and ecosystem health.

Main Outcomes & Follow-up

- The STSM achieved all planned goals and produced tangible scientific outcomes. The newly acquired skills significantly supported and strengthened my doctoral dissertation by providing analytical tools for metagenomic data interpretation. Future plans include completing the ecological interpretation of the datasets, publishing results in a peer-reviewed journal, and continuing collaboration with colleagues from the University of Duisburg-Essen. This collaboration will further contribute to the COST Action's objectives by promoting knowledge exchange, protocol harmonization, and sustainable research networking.

Acknowledgments

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