

## Brief information about the project

Name of the project	CPEA-LT-2017/10061 «Network for research-based higher education in microbial biotechnology»
Relevance	Studying thermophilic bacteria and developing a course in microbial biotechnology will help prepare qualified professionals capable of effectively applying biotechnological methods in various fields. Thermophilic bacteria inhabiting the extreme conditions of Central Asia represent a unique and underexplored source of biotechnological potential. Studying them may lead to the discovery of new biologically active compounds, enzymes, and metabolic pathways that can be utilized in various industries, including medicine, industry, and agriculture
Purpose	The goal of the project is to study the biodiversity of thermophilic bacteria in Central Asia and to implement the course "Microbial Biotechnology" into the educational process
Objectives	<ul style="list-style-type: none"><li>- Conducting field expeditions to collect thermophilic bacteria samples in Central Asia.</li><li>- Isolating and identifying thermophilic bacterial strains from the collected samples.</li><li>- Characterizing the physiological and biochemical properties of the isolated thermophilic bacteria.</li><li>- Assessing the potential biotechnological applications of the isolated strains.</li><li>- Developing course materials and curriculum for the "Microbial Biotechnology" course.</li><li>- Implementing the course into the educational program and evaluating its effectiveness.</li><li>- Disseminating research findings through publications and presentations to the scientific community</li></ul>
Expected and achieved results	<ul style="list-style-type: none"><li>- Through field expeditions and laboratory work, a comprehensive understanding of the diversity of thermophilic bacteria in Central Asia will be achieved.</li><li>- Successful isolation and identification of thermophilic bacterial strains from collected samples will contribute to the expansion of known microbial species in the region.</li><li>- Detailed characterization of the physiological and biochemical properties of isolated thermophilic bacteria will provide insights into their metabolic capabilities and adaptations to extreme environments.</li><li>- Evaluation of the biotechnological potential of isolated strains will identify novel enzymes, metabolites, or bioproducts with applications in various industries, including medicine, agriculture, and biotechnology.</li><li>- Creation of educational materials and curriculum for the course "Microbial Biotechnology" will facilitate the</li></ul>

	<p>dissemination of knowledge and skills in the field of biotechnology among students and researchers.</p> <p>Integration of the "Microbial Biotechnology" course into the educational program will equip students with practical knowledge and expertise in microbial biotechnology, enhancing their career prospects and contributing to the advancement of biotechnological research in the region.</p> <p>- Assessment of the effectiveness of the course will ensure continuous improvement and optimization of the educational program to meet the needs of students and educational institutions.</p> <p>- Publication of research findings in scientific journals and presentations at conferences will contribute to the global scientific community's understanding of thermophilic biodiversity and biotechnological applications in Central Asia.</p>
<p>Research team members with their identifiers (Scopus Author ID, Researcher ID, ORCID, if available) and links to relevant profiles</p>	<p>Kistaubaeva A.S., Candidate of Biological Sciences, Associate Professor. ResearcherID – ORCID – <a href="https://orcid.org/0000-0002-9385-7155">https://orcid.org/0000-0002-9385-7155</a> Scopus Author ID – 57197801138</p> <p>Head of project from Central Asia: Kistaubaeva A.S. Head of project from Norway: Birkeland Nils-Kore</p>
<p>List of publications with links to them</p>	<p>1. <a href="#">Metagenomics and Culture-Based Diversity Analysis of the Bacterial Community in the Zharkent Geothermal Spring in Kazakhstan</a> Mashzhan,A ; Javier-López,R; Kistaubayeva, A; Savitskaya, I; Birkeland, NK; CURRENT MICROBIOLOGY - <b>Volume 78, Issue 8, Page 2926-2934, DOI 10.1007/s00284-021-02545-2;</b></p> <p>2. <b>Polycladomyces zharkentsis sp. nov., a novel thermophilic cellulose - and starch - degrading bacterium from a geothermal aquifer in Kazakhstan</b> Akzhigit Mashzhan, Aida Kistaubayeva, Rubén Javier-López, Ulzhan Bissenova, Akerke Bissenbay, Nils-Kåre Birkeland // Int. J. Syst. Evol. Microbiol. DOI 10.1099/ijsem.0.006269 – 2024.</p>
<p>Patents</p>	<p>-</p>