Research potential of Environmental Biotechnology Department

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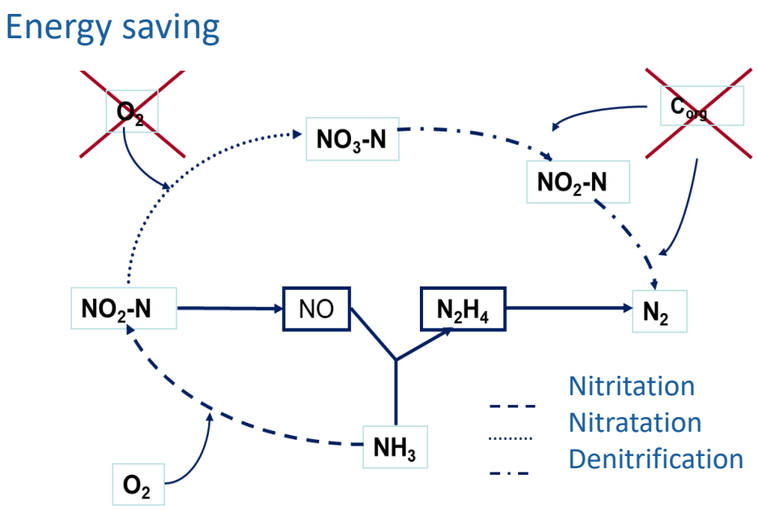
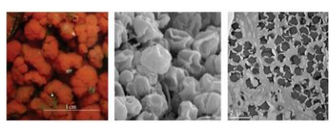
The Department of Environmental Biotechnology's staff is engaged in research on broadly defined biotechnology in environmental protection, with particular emphasis on processes involving: treatment of various types of media from biogenic elements (with particular emphasis on the transformation and removal of nitrogen compounds), recovery and production of valuable substrates from waste sources while adhering to the principles of a circular economy, soil bioremediation, biogas production, removal and transformation of anthropogenic micropollutants in the environment, estimating the environmental impact of selected substances, and many others. These processes are monitored using advanced instrumental methods, molecular biology, and ecotoxicity testing.

Selected research:

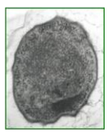
- integrated technology for improved energy balance and reduced greenhouse gas emissions at municipal wastewater treatment plants;
- physiological and ecological characterization of bacteria capable of anaerobic ammonia oxidation (anammox);

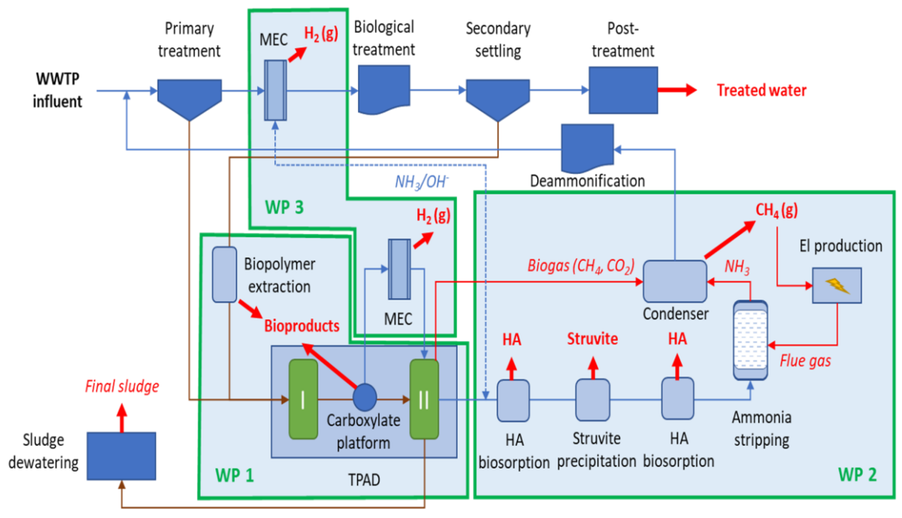




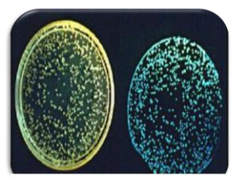
ANAMMOX

$NH_4^+ + NO_2^- \rightarrow N_2 + 2H_2O$





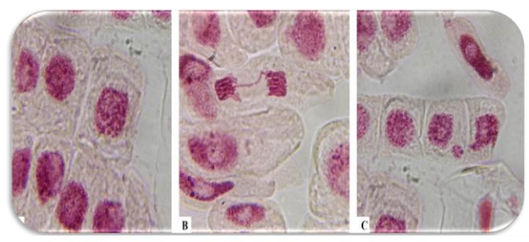
- optimization of conditions and working time of the partial nitrification/anammox process;
- improving the quality of treated wastewater and increasing the production of fermentation gas, with moderate capital expenditure;
- developing innovative technologies for recovering resources (energy, organic substances and nutrients) and producing valuable products (biopolymers, hydrogen) as well as reducing energy consumption and greenhouse gas emissions;
- degradation, transformation and removal of selected anthropogenic micropollutants (MPs) in environmental matrices using integrated biotechnological and physicochemical methods;
- environmental risk assessment - ecotoxicity testing;
- remediation of anthropogenically altered soils and many others research.

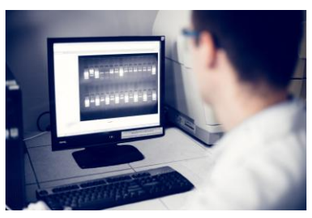

Vibrio fischeri


Daphnia magna


Lemna minor


Eisenia fetida


Micronucleus test



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