



Laboratory of Bio-processing

I. Location of the laboratory:

Research, Education and Innovation Centre of Earth and Environmental Science
University of Miskolc building C/2 hall 1

II. Operating institute of the laboratory:

Institute of Raw Material Preparation and Environmental Technology

III. Scientific Head of the laboratory:

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IV. Responsible Researcher/person:

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The aims and tasks of the laboratory in the educational, scientific and research fields:

The target of the laboratory is the fundamental and applied experimental research, as well as further development of bio processes.

Tasks of education and research:

Research in the field of:

- bio-degradation processes: aerobic and anaerobic degradation of bio-wastes;
- bioleaching of raw materials and wastes, with a special regard on e-wastes;
- the bio-synthesis processes: production of materials by fermentation or other enzyme-catalytic reactions;
- the biological techniques for the removal of contaminants from air, water or soil: bio sorption, bio-filtration and bioremediation,
- bio-processes which can be applied for the preparation of mineral raw materials and fossil fuels.

Academic mission of the Laboratory: the demonstration and measuring laboratory practical classes in the above-mentioned themes, as well as support of the TDK student research work, diploma theses in B.Sc. and M.Sc. level, as well as PhD dissertations.



V. Laboratory experiments, services (on-site experiment is possible):

Experimental investigation of aerobic and anaerobic treatment of organic wastes, hydrocarbon contaminated soils; bioleaching and biosorption of inorganic compounds by autotrophic microorganisms, design, measurement and further development.

VI. Available equipment for education, research and innovation

- Euromex iScope trinocular phase contrast microscope
- Hamilton on-line cell monitoring system
- Bürker Chamber
- Bioreactor (1L, adjustable stirring, temperature and gas inlet)
- Bioreactor: Biostat, B. Braun Melsungen AG (aerobic and anaerobic mode, temperature and pH control, V= 4.5 and 9 L)
- Anaerobic clean-bench cabinet (Bactron I, SHELLAB)
- Anaerobic horizontal bioreactor: High Solid Anaerobic Digestion HSAD, Alpha-Gamma Technologies, Inc. (USA), V=100 L.
- Statical installation for measuring biogas yield
- Thermostat cabinet
- Container house
- Fix-bed reactor for testing of air decontamination
- Gas analyzer (Dräger X-am 7000, IR)
- WiceCube shaker with temperature control
- Autoclave (WiseClave WAC)
- Additional devices (pl. Hach pH, ORP meter, Adwa 310 conductance meter).

VII. Laboratory development plan, requirements:

1. In the laboratory, we plan to purchase a reactor for the bioleaching of electronic wastes, to which the sensors of the Hamilton instrument can be connected, so that we can study the effect of the waste on the viability of microorganisms under sufficiently stirred and thermostatic conditions.
2. There are plans to purchase dynamic installation for measuring biogas yield

VIII. Main professional partners / references:

TU Berlin, TU Kosice, Messer Hungária, Bay Zoltán Foundation, Profikomp Kft, Verikál Zrt, ÉMK Kft. and others.

IX. Compiler of the information material:

Ljudmilla Bokányi and Valéria Mádainé Üveges



Biolab 1 with autoclave and microscope



Biolabor 2 Hamilton device and a bioreactor



Biolabor 3 Anaerobic clean-bench cabinet, shaker



HSAD anaerobic bioreactor

Miskolc, 19 June 2024