

Jan Evangelista Purkyně University in Ústí nad Labem

Faculty of Environment

Study material

ANALYSIS OF SOIL MICROBIAL COMMUNITIES

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Objectives

Students will gain practical experience with a number of methods suitable for the analysis of soil microorganisms, their quantity, diversity, activity and physiological state. The student can choose at least 4 methods compatible with the focus of the dissertation.

Study topics

1. Isolation and cultivation of soil microorganisms
2. Metagenomics – soil DNA extraction, qPCR, sequencing, bioinformatics analysis
3. Metatranscriptomics – mRNA extraction from soil, bioinformatics analysis
4. Determination of metabolic profiles using Ecolog® plates
5. Chemical markers of microorganisms 1 - determination of phospholipid fatty acids
6. Chemical markers of microorganisms 2 - determination of mycolic acids and soil sterols
7. Determination of soil respiration and dehydrogenase activity
8. Determination of soil enzyme activities – phosphatase, cellulase, oxidase, peroxidase, arylsulfatase, peptidase
9. Soil respiration
10. Observation and quantification of arbuscular mycorrhizae and ectomycorrhizae. Extraction of spores of arbuscular mycorrhizal fungi from soil.

Study literature

ALEF, Kassem a Paolo NANNIPIERI, ed. *Methods in applied soil microbiology and biochemistry*. London: Academic Press, c1995. ISBN 0-12-513840-7.

ELSAS, Jan Dirk van, Janet JANSSON a Jack T. TREVORS, ed. *Modern soil microbiology*. 2nd ed. Boca Raton: CRC Press, c2007. *Books in soils, plants, and the environment*. ISBN 978-0-8247-2749-9.