



Lithotrophic metabolism in the relation with microbiologically induced corrosion

Czech contribution to IGD-TP 2014

Lithotrophic



Environment



Sampling



Microbiology



Experiments



Usage



Partnership



**Microbiological
studies for
nuclear waste
disposal
(bioremediation
experience)**

Lithotrophic

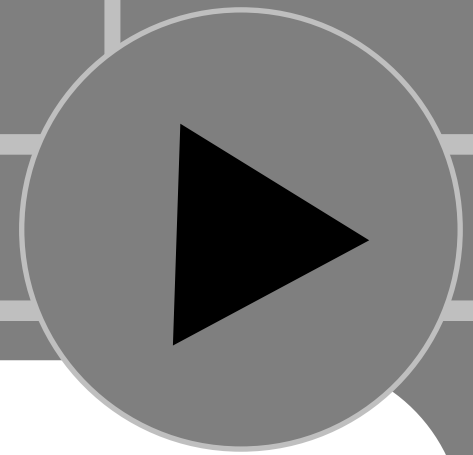


Source of reducing equivalent (electrons) is an inorganic compound. Obligated (strict) or facultative?

#sporogenesis

#facultative_lithotrophy

Lithotrophic



Syntrophic relationships (cross-feeding)

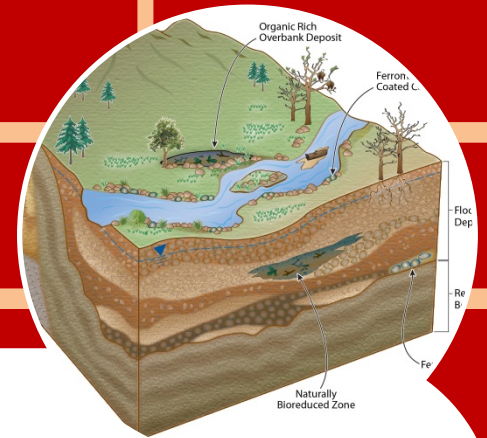
Adaptation mechanisms

Supplementarity and complementarity in sources.

#sporogenesis

#facultative_lithotrophy

Environment



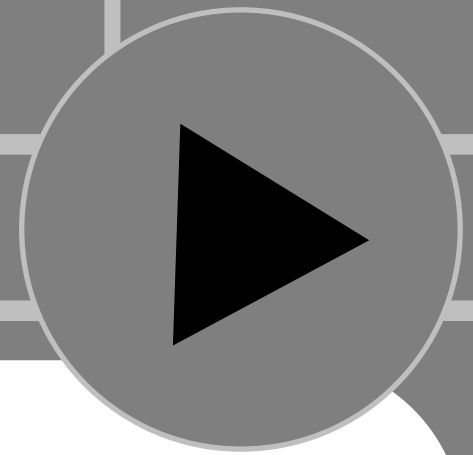
Microbial, chemical, and geological diversity.

Biocorrosive aggressive.

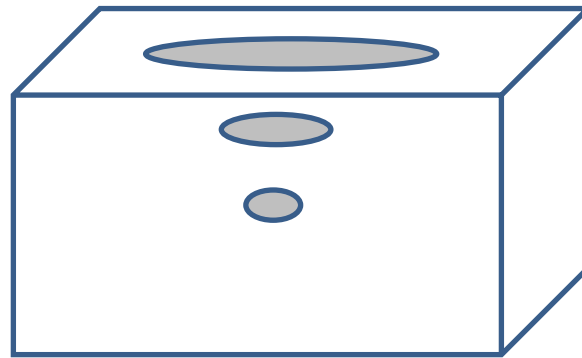
Internal relationships between microbial groups.

#microbial_biogeography

Environment >



**Mapping (3D) of microbial
distribution in the environment with
functional impact.**



#microbial_biogeography

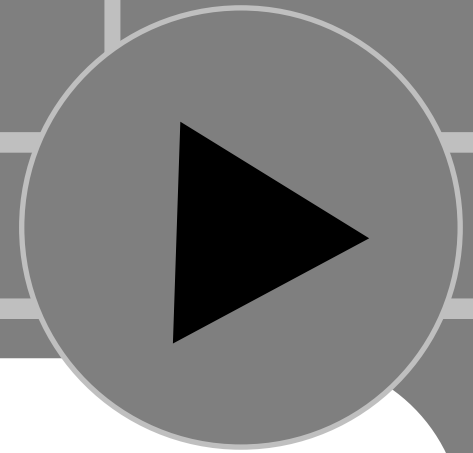
Sampling >



**The need of intact approach.
Sterile glovebox manipulation.
Sample preparation for advanced
microbial analysis.**

#conservation_in_place

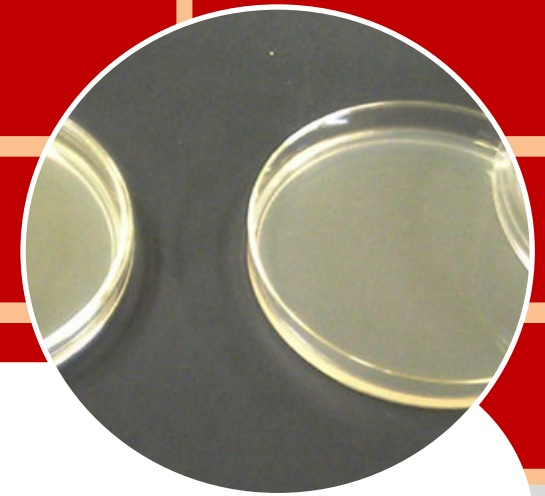
Sampling



**Sampling for 3D mapping of microbial
groups distribution**

#conservation_in_place

Microbiology



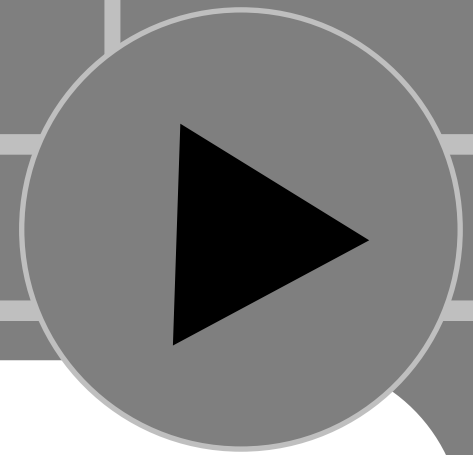
Three questions: How? What? How many?

**Functional, taxonomic, and quantitative description.
Microbial ability to survive.**

#MALDI-TOF

#culture_media

Microbiology



Molecular microbiology
Culture media based on non-
biodegradable carriers (agars)
simulating natural environment

#MALDI-TOF

#culture_media

Experiments >



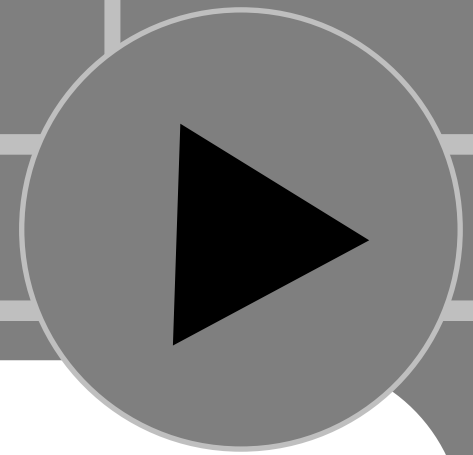
Comprehensive description of the environment from microbiological point of view.

Tests of material vulnerability (corrosion).

Inhibition of biocorrosion agents.

#complex_view

Experiments



**Describe.
Measure.
Predict.
Solve.**

#complex_view

Usage

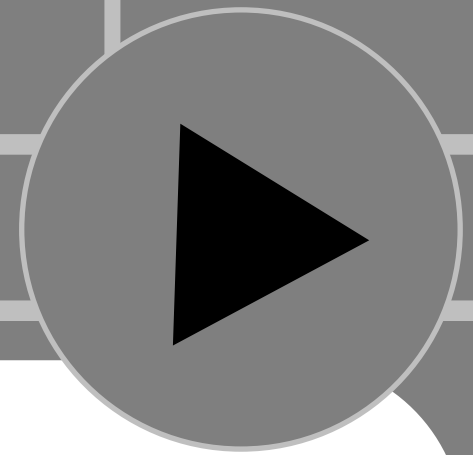


**Geomicrobiological prospection of
the environment.
Biocorrosion tests.
Biodeterioration of construction
materials.**

#managed_simulations

#inhibition

Usage



**Validated methodical approach
(comparable, experience exchange)
Usage of natural principles to
minimize or inhibit potential
detrimental effects**

#managed_simulations

#inhibition

Partnership



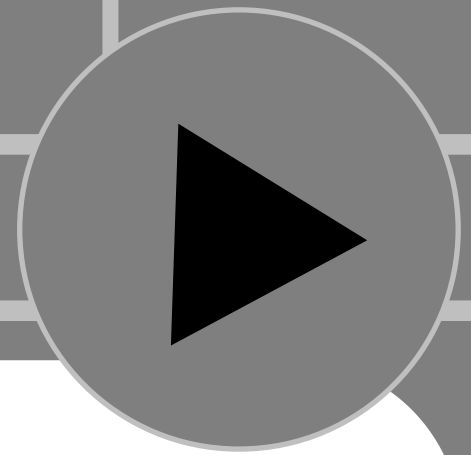
Underground research center Josef
ceg.fsv.cvut.cz

Nuclear research center: ÚJV a.s.
www.ujv.cz

SÚRAO
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CHEMCOMEX Praha a.s.
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Thank you for your attention!
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