# Shifts in the bacterial diversity of aerobic and anaerobic bentonite microcosms treated with U and G2P

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Microorganisms can potentially disturb the migration of radionuclides through processes such as biosorption, biomineralization, bioaccumulation and biotransformation. These processes would occur in deep geological repository (DGR), if radionuclides were accidentally leaked from nuclear wastes into the environment. To simulate this situation, aerobic and anaerobic microcosms of Spanish bentonite amended with uranium and glycerol-2-phosphate (G2P) were studied.

Changes in the microbial communities after six months of incubation were shown using Next Generation Sequencing (NGS) based on Illumina technology. Under aerobic conditions, uranium enhanced the growth of specific microorganisms with the potential to interact with such radionuclide like *Desulfomicrobium*, *Burkholderia* and *Bacillus*. In addition, in G2P-uranyl-treated microcosms *Amycolatopsis* was enriched suggesting a U biomineralization process and STEM-EDS analyses showed U-phosphates. In anaerobic microcosms, dominant genera such as *Desulfatiglans* (a sulfate-reducing bacterium), and sulfur-oxidizing bacteria (*Sulfurimonas* and *Thiobacillus*) were identified in U microcosms, while *Pseudomonas* and *Desulfovibrio*, were abundant in the U-G2P microcosms. Both are described for their ability to immobilize U as U phosphates through biomineralization and by enzymatic reduction of U(VI) to U(IV) (*Desulfovibrio*). The outputs of this study would help to predict the impact of microbial processes on the DGR long-term performance.

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