

Interactions of *Paenibacillus* sp. JG-TB8 and *Sulfolobus acidocaldarius* with U(VI): spectroscopic and microscopic studies.

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In this work a combination of wet chemistry, spectroscopic, microscopic, and molecular techniques was used to investigate and compare interactions of uranium(VI) with two microbial strains as representatives of the two domains of life - *Bacteria* and *Archaea*. The bacterial strain *Paenibacillus* sp. JG-TB8 was isolated from a microbial consortium cultured from a uranium mining waste pile near the town of Johannegeorgenstadt, Germany. This consortium consisted not only of bacteria from the division *Firmicutes* but also of yet to be cultured mesophilic 1.1b-*Crenarchaeota* populations. One of the closest cultured relatives to these populations, available in the public microbial culture collections, is the thermophilic Crenarchaeon species *Sulfolobus acidocaldarius*. Because representatives of the latter are often found in uranium mining and other acidic soils we involved a strain of this species in our analyses.

Our study was focused on biosorption of uranium at different pH values, relevant to the natural milieu of the studied strains.

By using ICP-MS, X-ray absorption spectroscopy, time resolved laser induced fluorescence spectroscopy, and transmission electron microscopy we were able to demonstrate that the uranium sorption as well as the nature of the formed complexes and their localization differed noticeable between the two studied microbial strains most possibly due to the significant differences in their cell wall structure.