Linking genomic structure of *Stenotrophomonas* sp. BII-R7 and its potential for bioremediation purposes

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Members of the bacterial genus *Stenotrophomonas* are considered promising candidates for biotechnological applications due to their broad metabolic properties, biofilms formation capacity, and intrinsic resistance to numerous heavy metals and antibiotics. Apart from their utility as plant growth promoters, this microbial group has been proposed for bioremediation of polluted soils.

Stenotrophomonas sp. BII-R7, an environmental strain isolated in our laboratory from bentonite samples [1], showed high tolerance to increasing concentrations of U(VI) and selenite, SeO_3^{2-}. A comprehensive study of the interaction mechanisms occurring between these common contaminants and BII-R7 isolate was performed through a multidisciplinary approach combining Scanning Transmission Electron Microscopy-High Angle Annular Dark-Field (STEM-HAADF), X-ray Absorption Spectroscopy (XAS), Time-Resolved Laser-Induced Fluorescence Spectroscopy (TRLFS) and next-generation sequencing (NGS) technologies.

Results showed the accumulation of U(VI) phosphates in the cells wall and the reduction of SeO_3^{2-} to Se^0. These interaction mechanisms, likely affecting the behavior of these elements in nature, are driven by genes coding for certain enzymes such as acid/alkaline phosphatases in the case of U, and glutathione-related enzymes, NADH-dependent enzymes, or thioredoxin reductase for Se reduction. All these enzymes were detected among the *Stenotrophomonas* sp. BII-R7 genome contigs that we assembled. Further analyses might lead to a preliminary BII-R7 draft genome which will provide useful information of its genetic structure and composition.

Further studies in order to effectively understand the enzymatic reactions responsible of the resistance mechanisms described in *Stenotrophomas* spp. are central to advancing these environmental remediation-related applications.

[1] Microbial communities in bentonite formations and their interactions with uranium, López-Fernández M. et al. (2014), *Applied Geochemistry* **49**, 77-86.