Isolation of dissimilatory antimonate reducing bacteria from sediments contaminated with antimony

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To date, there is very little information available on the oxidation and reduction of antimony by bacteria. Recently, a pure culture of respiratory antimonate reducing bacterium was isolated and characterized, which belongs to the order Bacillales [1]. An antimonate-respiring bacterium was isolated from sediment samples collected in the vicinity of an antimony oxide-producing factory in Korea. Temporarily named strain JUK-1, it was found to be a rod-shape bacterium and occurred individually or in pairs. Antimonate was reduced to antimonite in the presence of JUK-1 in an anoxic minimal medium containing 5 mM antimonate and 10 mM acetate. The organism grew optimally at an initial pH of 7.7 and a temperature of 30 ºC. A part of the antimonite which was produced in medium precipitated as a bio-mineral containing approximately 50.0 % antimony, 33.5 % oxygen, 12.7 % carbon, 2.0 % sodium and 1.9 % magnesium by weight. A bio-mineral that appeared during growth may be a precipitate of a trivalent antimony compound, $Sb(OH)_3$, that was formed under reducing conditions in the medium. Based on the phylogenetics of 16S rRNA gene sequence and DNA G+C content, JUK-1 appears to be a new strain of the *Sinorhizobium* genus. Classification of JUK-1 was proposed as follows: Bacteria, Proteobacteria, a-Proteobacteria, Rhizobiales, Rhizobiaceae, *Sinorhizobium* sp. JUK-1. The results suggest that bacteria may play a significant role in changing the redox state of antimony in the environment.

[1] Abin & Hollibaugh (2014) *Environ. Sci. Technol.* **48**, 681–688.