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Editorial

Biomineralization of Uranium – A Nano-Microbial Approach

Rakesh Chatterjee* and Saumen Datta

CSIR- Indian Institute of Chemical Biology, Kolkata, India

***Corresponding Author**: Rakesh Chatterjee, CSIR- Indian Institute of Chemical Biology, Kolkata, India.

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Alkaline condition at the cell surface of microbes results in precipitation of metals as sulfide, phosphate, carbonates or hydroxides. This phenomenon is known as biomineralization. This is an editorial of uranium biomineralization conducted by various microorganisms that can be exploited commercially for its extraction. So far two species *Serratia* spp [1,2] and *Pseudomonas* spp [3]. In *Serratia* spp, exogenous glycerol phosphate induces intracellular phosphatase to cleave organic phosphate to release the inorganic phosphate which precipitates with U (VI) extracellularly as uranyl phosphate. Such results have been observed in environmental isolates also [3]. In *Pseudomonas* spp biomineralization is initiated by addition of tributylphosphate [4] Addition of phosphates in ground water is a proposed approach but the major disadvantage is that it lacks controlled way of accumulation that occurs in these microbial systems. Such chemical precipitation of uranium is characterized by clogging and aggregation. Use of microbial systems is advantageous in this respect. Surface accumulations of uranium often results in inhibition or metabolic constrains of the used microbial system. Uranyl-binding profiles of all *Serratia* isolates indicated these organisms are highly efficient in removal of U (VI) (90 - 92%) at low pH (3 - 3.5) [5]. Recent advances have led to the identification of hydroxyl appetites in *Serratia* spp as means of biosorption. BHAP (Biogenic HydroxyAPetite), a bacterially produced calcium nano-biomineral is been successfully used for adsorption thereby facilitating uranium and other radio-nucleotides uptake [6,7] and can be used in environmental cleanup in places affected by radio-toxicity. Synthetic approaches modifying these BHAPs with and increased adsorption in the presence of higher organic content will prove essential for biomineralization of *Serratia* spp to be more efficiently for cleanups of radiotoxic contaminated region.

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