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Uranium bio-precipitation and recovery from high radiation environments: New approaches

Removal of traces of uranium from nuclear waste poses a big challenge for its disposal. Our laboratory has genetically engineered the extremely radio-resistant bacterium *Deinococcus radiodurans* to over-express either an acid phosphatase PhoN, or an alkaline phosphatase *PhoK*, to achieve impressive uranium bio-precipitation (up to 7-10g U/g dry biomass) over a wide pH (5-9) and uranium concentration (0.2-10 mM) range. Successful preservation of bioprecipitation-active dry biomass for up to 2 years at ambient temperature has been achieved. Conditions have been optimized to accomplish easy and complete recovery of precipitated uranium. Further augmentation of uranium bioremediation has been accomplished by: pyramiding *phoN* and *phoK* genes in a single strain, employing radiation-responsive *Deinococcus* gene promoters, and by surface display of bioremediation-active enzymes.

Biography

Shree Kumar Apte is the Former Director, Bio-Science Group, BARC and currently serves as a Professor at the Homi Bhabha National Institute. He is a JC Bose National and Raja Ramanna Fellow at BARC, Mumbai, India. His laboratory has unraveled stress and adaptive responses of several bacteria and developed many biotechnologies for metal bioremediation from high radiation environments. He is a fellow of all National Science Academies and Agriculture Academy in India.

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