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Application of nanotechnology to meet the challenges of arsenic and fluoride contamination of ground water in West Bengal, India

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Geogenic arsenic and fluoride contamination of groundwater emerged as a major global crisis affecting over 50 countries. Nearly 200 million people in Asia and Africa drink groundwater that contains toxic levels of arsenic and fluoride. The diverse nanoparticles have the unique capacity for scavenging toxic species such as arsenic, fluoride, lead and other contaminants that can result in affordable, user-friendly water purifiers which can function without electricity. The paper discusses the experience of the author, as the Chairman of Arsenic Task Force, Govt. of West Bengal, India, in collaborating with IIT, Madras, India and Lehigh University, USA, for application of nano-materials in addressing the critical problem of contamination of groundwater sources with arsenic and

fluoride. The Lehigh University has developed a process to disperse zirconium oxides which have the unique sorption capacity to bind a variety of trace contaminants including arsenic, fluoride, phosphate and lead. The IIT technology, on the other hand, is marked by the constant release of silver ion in water combining, with the capacity of diverse of nanoparticles for the development of the most cost-effective water purification plant. The author is involved in the process of planning and management of a comprehensive arsenic mitigation programme in West Bengal, India, which includes large no. of plants for arsenic and fluoride removals by using nanomaterials. A comparative evaluation of the technology with various other competing technologies is also undertaken in the paper.

Biography

Kumar Jyoti Nath is widely recognized as the foremost expert in community water supply in India. He has long experience in planning, designing and management of water purification processes. He is a Civil Engineering graduate from Bengal Engineering College in 1964. He obtained his post graduate degree from Calcutta University and also from International Institute of Hydraulic and Sanitary Engineering, Delft, The Netherlands. He has played a pioneering role in the studies for technology development and health impact assessment of arsenic contamination of ground water in India. He has worked with WHO, UNICEF, UNDP, World Bank and many other organizations and travelled all over the world.

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