



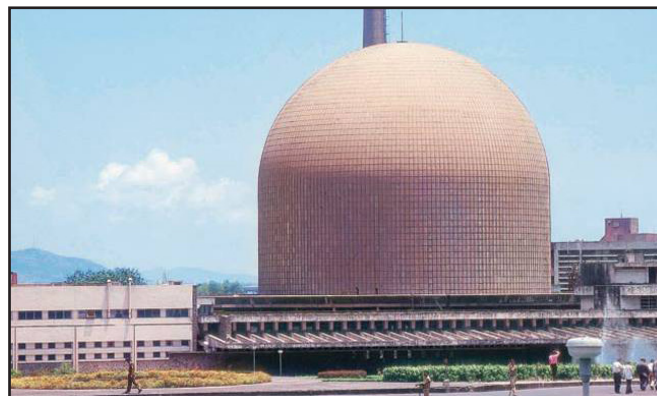
Nano-silica based biohybrids and its various applications

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Abstract:

Biohybrids (a combination of biological material and inorganic nanoparticles) offer several advantages over conventional materials. Thus, in order to improve the practical applicability of the biomolecule, silica nanoparticles were associated with different bio-components. In one of the studies, silica NP was assembled on the fibers of *Ocimum basilicum* seeds. Association of silica NP with seeds led to the synthesis of a fibrillar pellicular biohybrid support (Silica@PEI-seed) which showed fourfold higher loading of invertase enzyme and improved physico-chemical properties. Another biological component, microbial cells (*Sphingomonas* sp.) were used as template for assembly of silica NP, synthesized biohybrid was immobilized and applied as biosensor for detect of methyl parathion pesticide. Results showed an increase in the sensitivity and storage stability of the biosensor. However, for large scale application of biohybrid in industrial processing or for commercialization purpose, there is need to develop method/techniques. To achieve this, spray drying as another mode for preparing biohybrids was devised. Biohybrid of *Streptococcus lactis* cells and silica NP were synthesized and used as sorbent for uranium. It was observed that uranium sorption capacity of biohybrid was a sum total of uranium removal capacity by silica NP and *S. lactis* cells per se which is unique. Further, spray drying was explored for production of biohybrid drug carrier of silica NP and sodium alginate. Developed biohybrid showed slow release of doxorubicin and more killing of cancer cells. Overall, association between silica NP and bio-components leads to the synthesis of a stable and functional biohybrid which improves the practical applicability of biomolecule.



Biography:

Dr. Archana Mishra is currently Scientific Officer E in Bioscience Group, Bhabha Atomic Research Centre, Mumbai, India. She obtained her M. Sc. Biotechnology Degree from Banaras Hindu University, India in 2009 and received her Ph.D. from Homi Bhabha National Institute, Mumbai India in Life Sciences. Her research is focused in the area of development of novel silica based biohybrid materials, nanomaterials, hybrid materials and their further applications in biosensor, environmental biotechnology, bioprocess development and drug delivery.

Recent Publications:

- Archana Mishra ,Oncotarget.2020
- Archana Mishra , Psychopharmacology.2020
- Archana Mishra ,Tropical Plant Research.2020
- Archana Mishra , Inflammopharmacology. 2020
- Archana Mishra ,Cancer Research.2018

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