**Biogenic Cadmium telluride nanoparticles from *Penicillium citrinum* and anaerobic sludge biomass for photocatalytic dye degradation application**

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**Abstract**

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Semiconductor chalcogenide nanoparticle are of recent interest due to their size tunable optoelectronic properties. The currently followed chemical synthesis methods involves high-cost and harsh conditions, and therefore, biogenic nanoparticles are highly preferred. In this study, cadmium telluride (CdTe) nanoparticles were synthesized using two different biomass viz. *Penicillium citrinum* and anaerobic sludge. Characterization of the biogenic nanoparticle was carried out for its shape morphology and crystallinity using field emission scanning electron microscopy (FESEM) and X-ray diffraction (XRD). The micrographs revealed spherical-shaped nanoparticles on the surface of *P. citrinum* with an average diameter of 18 ± 7 nm. The crystallite size from the XRD for the rutile phase of tellurium was obtained to be 16.9 ± 2.1 nm. Furthermore, Energy Dispersive X-Ray Analysis (EDX) confirmed the presence of tellurium. These CdTe nanoparticles possess adsorptive properties and are currently being examined for the dye degradation application which has not been reported thus far. Furthermore, characterization of the CdTe nanoparticles by X-ray photoelectron spectroscopy (XPS), dynamic light scattering (DLS) for composition, surface chemistry and size distribution are being studied for.

**Keywords:** Chalcogenide cadmium tellurium nanoparticle, *Penicillium citrinum*, anaerobic sludge biomass, dye degradation