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Green Chemistry Principle Mediated Synthesis of Biocompatible ZnS Quantum Dots: Potential Antibacterial Agent and Photo Catalyst

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Quantum Dots (QDs) are elite class of semiconductor nanoparticles which have potential applications in optoelectronics, photocatalytic activity and biomedical sector as they possess high fluorescent nature as well as high surface-to-volume ratio due to their atom like behaviour [1-3]. Despite having such promising ability, synthesis of these QDs adopting eco-friendly pathway is still a challenging one [3]. Moreover, efforts are also made to utilize these metamaterials in biomedical domain too which is again a challenging task do to their inherent toxicity comes with their tiny size. Keeping in view, the present work demonstrates the Green Chemistry Principle mediated synthesis of Zinc Sulfide (ZnS) QDs, an important semiconductor from Group IIB-VIA. The primary characterization with Powder X-ray Diffraction Transmission, Electron Microscope (TEM) and UV-Visible spectra reveals the generation of quantum confined ZnS nanoparticles and FT-IR spectra admit the encapsulation of ZnS QDs with D-Fructose successively. The biological activity analysis demonstrates the cytofriendlyness of these ZnS QDs with high antibacterial efficiency. Moreover, both these dots are found to be highly eligible photocatalytic agents towards methylene blue (MB). Concisely, the present work demonstrate the multitasking nature of ZnS QDs which shows promising ability towards both biomedical domain as well as photocatalysis.

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