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# Surface Dynamics Associated with Zinc Oxide Nanoparticles and Biomolecules in Presence of Surfactants

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## Abstract

This work reports the physicochemical parameters and the nature of association between Zinc oxide nanoparticles (ZnO NPs) and biomolecules viz., Bovine serum albumin (BSA) and Deoxyribonucleic acid (DNA) in presence of cationic, anionic and non-ionic surfactants. Zinc oxide nanoparticles are first synthesized using wet chemical method and subsequently characterized by FTIR, XRD, SEM, TEM and EDAX studies. The nanoparticle-protein interactions were studied using UV-vis spectroscopy, fluorescence spectroscopy, Dynamic light scattering studies, circular dichroism techniques and SDS-PAGE technique. The spectroscopic investigation sheds light into various aspects of binding during the molecular association of BSA with the ZnO NPs in absence and presence of cationic, anionic and non-ionic surfactants. The nanoparticles-DNA interactions were studied in presence and absence of surfactants by gel electrophoresis. Anionic and non-ionic surfactants were found to impart long-term stability to ZnO NPs. This study provides valuable mechanistic insights into the interactions taking place at the interface of the nanoparticles which further helps in designing stable colloidal ZnO NPs systems.

**Keywords:** ZnO nanoparticles; Surfactants; BSA; DNA

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