World Academy of Science, Engineering and Technology
International Journal of Chemical and Materials Engineering
Vol:8, No:09, 2014

Fluorescence Spectroscopy of Lysozyme-Silver Nanoparticles Complex

Authors : Shahnaz Ashrafpour, Tahereh Tohidi Moghadam, Bijan Ranjbar

Abstract : Identifying the nature of protein-nanoparticle interactions and favored binding sites is an important issue in functional characterization of biomolecules and their physiological responses. Herein, interaction of silver nanoparticles with lysozyme as a model protein has been monitored via fluorescence spectroscopy. Formation of complex between the biomolecule and silver nanoparticles (AgNPs) induced a steady state reduction in the fluorescence intensity of protein at different concentrations of nanoparticles. Tryptophan fluorescence quenching spectra suggested that silver nanoparticles act as a foreign quencher, approaching the protein via this residue. Analysis of the Stern-Volmer plot showed quenching constant of 3.73 μM−1. Moreover, a single binding site in lysozyme is suggested to play role during interaction with AgNPs, having low affinity of binding compared to gold nanoparticles. Unfolding studies of lysozyme showed that complex of lysozyme-AgNPs has not undergone structural perturbations compared to the bare protein. Results of this effort will pave the way for utilization of sensitive spectroscopic techniques for rational design of nanobiomaterials in biomedical applications.

Keywords : nanocarrier, nanoparticles, surface plasmon resonance, quenching fluorescence
Conference Title : ICNN 2014 : International Conference on Nanochemistry and Nanoengineering
Conference Location : Los Angeles, United States
Conference Dates : September 29-30, 2014