changes might occur in the structure and function of biomolecules upon interaction with nanoparticles. Therefore, conducting a series of fundamental investigations before designing any nano based system would be of high significance. Herein, structure of lysozyme has been studied upon interaction with a specific type of gold nanorods (gold nanorice). Gold nanorices were synthesized by modification of conventional seed-mediated growth protocol, by reduction of surfactant concentration up to 5 mM. The nanorices were characterized by UV- Vis Spectroscopy, Transmission Electron Microscopy (TEM) and Atomic Absorption Spectroscopy (AAS). Lysozyme solution (300 µg. mL^{-1}) was then interacted with nanoparticles of 25 nM concentration. Conformation of lysozyme treated gold nanorice was studied by circular dichroism spectroscopy under different pH conditions, and quenching of the intrinsic fluorescence was traced in varying concentrations of gold nanorices (0-200 nM). Circular dichroism revealed mild conformational change in the secondary structure of lysozyme, with a slight increase of compactness upon binding to gold nanorices. Intrinsic fluorescence spectra showed a steady reduction in the fluorescence intensity of protein, indicating the proximity of gold nanorices' interacting surface to the location of tryptophan residues in lysozyme, and possibility of complex formation. Maintaining high fraction of native structure and internal quenching, the enzyme could perform its catalytic activity in the presence of gold nanorices. Findings of this investigation might encourage utilization of gold nanorices as a new generation of nanocarrier within the domain of drug delivery applications.

Keywords: Nanocarrier, Plasmonic Nanoparticles, Circular Dichroism, Internal Quenching.

Abstract No.26

β-Casein Nanoparticles As An Efficient Drug Carrier System For Curcumin And Its Derivatives

Fahimeh Mehranfar [1], Abdolkhalegh Bordbar [1], Mehrnaz Keyhanfar [2]*

1. Department of Chemistry, University of Isfahan, Isfahan, IR
2. Department of Biotechnology,Faculty of Advance Sciences andTechnologies,University of Isfahan, Isfahan, IR
(E-mail: f.mehranfar@chem.ui.ac.ir)

In milk β-casein micelles exists a natural nanostructure, which can be used as a Nancarrier of hydrophobic drugs. Curcumin, diacethylcurcumin and bis-demethoxy curcumin, are the active curcuminoids of turmeric (Curcuma longa L.) with many physiological, biochemical, and pharmacological properties. Here, we investigated the complex formation of curcuminoids and some of its derivatives with β-casein micelles and its use as a vehicle for drug delivery to cancer cells. Steady-state fluorescence spectroscopy of the β-Casein micelle-curcuminoids complex formation revealed that at pH 7, curcuminoids molecule binds to β-Casein micelle and formed complexes through hydrophobic interactions. The binding parameters including number of substantive binding sites and the binding constants have been evaluated by fluorescence quenching method. Results showed that curcuminoids molecules quench the intrinsic fluorescence of β-Casein upon binding. The distance (r) between donor (β-Casein) and acceptor (CUR, DAC and BDMC) was obtained according to Förster theory of non-radiative energy transfer. The utility of β-Casein micelle as carriers of curcuminoids was evaluated in vitro, using cultured MCF7 cells. Cytotoxicity studies revealed that, the β-Casein micelle-curcuminoids complex exhibited similar cytotoxic effects on MCF7 cells compared to an equal dose of free curcuminoids. Because β-Casein is an edible protein, the β-Casein micelle-curcuminoids complex has a potential to be administered orally

Keywords: Curcumin, Diacetylcurcumin ,Bis-demethoxy curcumin, β-Casein micelle, Fluorescence, Förster's theory.

Abstract No.27

DNA Binding of Cyclopentadienyliron Substituted Polyoxotungstate CoW11O39(CpFe)]7-

*Somayeh Dianat, Shahram Tangestaninejad, Bahram Yadollahi, Abdol-khalegh Bordbar**

Department of Chemistry, University of Isfahan, Isfahan, IR
(E-mail: s.dianat@sci.ui.ac.ir)

The ctDNA (calf thymus DNA) binding properties of water soluble keggin type polyoxometalate(POM): [CoW11O39CpFe]7-, (CoWCpFe) were carried out with electronic absorption, fluorescence spectrophotometry and cyclic voltammetry. Absorption spectrum trace revealed 12.08%, hypochromism, indicative of moderate interaction to ctDNA. The binding constant has been estimated 3.10×103 M^{-1}, by analysis of UV- Vis titration experiments. In addition, number of substantive binding sites and the binding constants parameters were obtained from fluorescence spectroscopy. The estimated parameters from two spectroscopic methods are consistent. Also, voltammetric method was used to probe the interaction binding mode through shift in potential and change in limiting current of POM due to addition of ctDNA. The results of voltametric study represent the binding of POM to ctDNA is via of phosphate groups of nucleic acid. It is noticeable,