International Journal of Applied and Natural Sciences (IJANS)
ISSN(P): 2319-4014; ISSN(E): 2319-4022
Vol. 5, Issue 6, Oct – Nov 2016; 1-20

International Academy of Science, Engineering and Technology
Connecting Researchers; Nurturing Innovations

A COMPREHENSIVE INVESTIGATION OF THE INTERRELATIONSHIP BETWEEN FLUORESCENCE AND UV-DIFFERENCE SPECTROSCOPY OF DENATURATION OF OVALBUMIN BY UREA AND β-BME

J. P. SINGH HARIDWARI & B. N. WARIS

Department of Chemistry, Aligarh Muslim University, Aligarh, India

ABSTRACT

The structural thermodynamic and functional aspects of ovalbumin of chicken egg, unfolding induced by urea and βME(β-mercaptoethanol) has been studied at pH 7.0. Ovalbumin belongs to the **Serpin** class of protein. We have shown that the transition from native to denatured induced by urea and βME passes through essential unfolding of the protein. The phenomenon of denaturation of ovalbumin has been studied in terms in λ_{max}, fluorescence intensity, change in Gibbs free energy at zero denaturant concentration, ΔG_D (H_2O) using the LEM (Linear Extrapolation Method). The fluorescence intensity (specially tryptophan fluorescence intensity) should be a minimum (10%) decrease on addition of 1M urea and maximum (97.7%) decrease on addition of 1N βME and 9M urea mixture in ovalbumin. Intensity quenching due to environmental change (or substantial conformational change) The chemical deaturation leading to exposure of tyrosine residues was studied with UV-difference spectroscopy as function of concentration of urea and βME. The study showed that ovalbumin was highly denatured in presence of urea and βME. The UV-difference spectra were evaluated to calculate Gibbs free energy change, $\Delta G_D(H_2O)$, using the linear extrapolation method, which reflects the stability difference between native and denatured species The study should that ovalbumin was highly denatured in presence of urea and βME due to disruption of hydrogen bonds as well as intra- and interchain disulfide bonds indicating the flexibility of ovalbumin increase on addition of βME, so it becomes susceptible to digestion.

KEYWORDS: Interrelationship, Fluorescence, UV-Difference Spectroscopy, Denaturation, Ovalbumin, Urea and β-BME