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Study of Interaction between Ascorbic Acid and Bovine Hemoglobin by Multispectroscopic Methods

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Abstract : Ascorbic acid is an essential component in the diet of humans, and also is a typical long used pharmaceutical agent. In the present contribution, we have carried out a detailed study on the binding interaction of ascorbic acid (AA) with bovine hemoglobin (BHb) using steady state emission, time resolved fluorescence, UV-Vis absorption, circular dichroism (CD), Fourier transform infra-red (FT-IR) and three dimensional emission (3D) spectral studies. The results from the emission spectral studies unveiled that the quenching of BHb emission by AA is attributed to the formation of a complex in the ground state (static in nature) after correcting for inner filter effect. The binding parameters calculated from corrected emission quenching data revealed that BHb exhibited a significant binding affinity towards AA. Moreover, AA induced tertiary and secondary conformational changes of BHb were monitored by UV-Vis absorption, CD, FT-IR and 3D emission spectral studies. The results presented here will help to further understand the credible mechanism of BHb-AA system which is expected to provide insights into conformational and microenvironmental changes of BHb.

Keywords : ascorbic acid, bovine hemoglobin, circular dichroism, three dimensional emission spectral studies
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