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Spectrofluorimetric Investigation of Copper (II), Cobalt (II), Calcium (II), and Ferric (III) Influence on the Ciprofloxacin Binding to Bovine Serum Albumin

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Abstract : The interaction between ciprofloxacin and bovine serum albumin (BSA) was investigated by UV-Visible absorption and fluorescence spectroscopy. The influence of Cu^{2+} Ca^{2+}, Co^{2+}, and Fe^{3+} on the Cip-BSA interaction was investigated. The quenching of the BSA fluorescence emission in presence of ciprofloxacin as well as the influence of metal ions on the interaction was analyzed using the Stern-Volmer equation. The Stern-Volmer quenching constant, K_{sv} was calculated in presence and absence of the metal ions at the physiological pH of 7.4 using phosphate buffer. The experimental results showed that interaction mainly static in nature and quenching rate constant is decreased in presence of the studied metal ions with exception of Cu^{2+} ions. The decrease observed in the K_{sv} values in presence of Co^{2+}, Ca^{2+}, and Fe^{3+} can be understood on basis of competition between these metal and Cip when both of them existed in the BSA solution. Cu^{2+} induces interaction between Cip and BSA at faster quenching rates as inferred from the observed increase in the K_{sv} value. This allowed us to propose that copper (II) ions are directly involved in the process of Cip binding to BSA. The binding constant for Cip on BSA was determined and the metal ions effect on it was examined as well and their values were in line with the K_{sv} values.

Keywords : bovine serum albumin, ciprofloxacin, fluorescence, metal ions effect
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