Contribution ID: **148** Type: **Oral**

Spectroscopic Investigation of BSA Protein and Thiochrome Dye Interaction

Friday, 17 November 2023 13:00 (15 minutes)

In this study, we investigated the relationship of BSA (Bovine Serum Albumin) protein with thiochrome dye through several spectroscopic techniques, including absorption, IR, and Raman spectroscopy.
Since BSA is a multifunctional plasma protein that carries a huge number of compounds, in this study we have chosen a dye that has good spectral properties and can detect conformational changes in proteins in diseases, or when adding some kind of medicine, for example.
As a result of our studies, we analyzed the absorption films and obtained a shift of the composite film (BSA and thiochrome) of the second peak at 220 nm to the right, which may indicate potential conformational changes. When the IR absorption spectra and the difference IR spectra of the BSA film and the composite film were studied, there were almost no changes in amides I and II, but a significant change in the amide A peak at 3402 cm-1 was observed. The observed decrease in intensity indicates N-H bond stretching.
The Raman spectra showed us small shifts of the amide I and amide II bands upon addition of the dye, as well as a change in the characteristic absorption peaks of the tryptophan residue in the protein at 1657 cm-1 (W3), a signal at 1340 and 1360 cm-1 (W7), and 757 cm-1 (W18), which shifted to the right. These changes in the tryptophan peaks are indicative of resonance in the vibration, a change in tryptophan conformation, and symmetrical vibrations of the benzene and pyrrole rings.

Topics

Session D. Biomedical optics and sensors technology

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Session Classification: Emergent biosensing technologies