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Spectroscopic Study of 4-methoxychalcone and Human Serum Albumin: binding interaction

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TITLE: Spectroscopic Study of 4-methoxychalcone and Human Serum Albumin: binding interaction

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Introduction: Research has shown that chalcones have numerous biological applications, including antibacterial, antifungal, anti-inflammatory, anti-tumor. One specific study looked at the chalcones present in the Japanese herb, *Angelica keiskei*. These chalcones were found to have strong insulin-like activities that helped slow the progression of diabetes in genetically diabetic mice. The focus of this study is to investigate the binding interaction of 4-methoxychalcone with Human Serum Albumin (HSA) using UV-vis and fluorescence spectroscopy.

Methods: Known chalcone, 4-methoxychalcone was synthesized from substituted acetophenone and substituted benzaldehyde using a 1:1 crossed aldol condensation reaction. Precipitated chalcones were filtered and recrystallized with 95% pure ethanol. Human Serum Albumin was obtained commercially and was not further purified. All chalcone and HSA solutions were then prepared in a 0.80M sodium phosphate buffer ($\text{NaH}_2\text{PO}_4 \cdot \text{H}_2\text{O}$), pH 7.4, containing 1.0M sodium chloride (NaCl).

Results: UV-vis spectroscopy analysis determined the molar extinction coefficient of 4-methoxychalcone to be $23,681 \text{ M}^{-1} \text{ cm}^{-1}$. This value was in agreement with the published data. . Experiments indicate that the fluorescence spectrum of HSA around 348 nm is substantially decreased in the presence of substituted chalcones under optimum conditions. Experimental melting points of prepared chalcone derivatives ($177\text{-}179^\circ \text{C}$) are also in agreement with published values.

Conclusion: The purpose of this study was to investigate the interaction between 4-methoxychalcone and HSA. An apparent quenching of the fluorescence intensity of HSA was observed, which suggests an interaction between the chalcone and HSA. In future work, more analyses of other known substituted chalcones and their interaction with HSA to further determine specific changes in the protein.