Interaction of chalcones with CT-DNA by spectrophotometric analysis and theoretical simulations

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Chalcones are open chain molecules precursors of flavonoids and isoflavonoids, found spread in edible plants. Because they are easily accessible trough Claisen Shmidt condensation, a great variety of derivatives are available. They have also shown potential in pharmacological and biological applications. It is known that chalcone derivatives display a role in the treatment of complex diseases such as cancer, among others, where the DNA is considered as the target for the action of these kinds of compounds. This action is commonly explained as the inhibition of the DNA replications and transcriptions through interactions. However, not conclusive associations between these DNA-Drug interactions and toxicity have been found. This research focuses on the capacity of a chalcone's family to interact with DNA. Therefore, the binding constants for each compounds with Calf Thymus DNA [CT-DNA] were determined by spectrophotometric titration at room temperature. In addition, the effect of increasing the chalcone's concentration over the relative viscosity of CT-DNA at room temperature was assessed. On the other hand, with the aim to find the optimal DNA-chalcone configurations, as well as consistently predict their binding, a computational work was undertaken. To accomplish these goals within a reasonable time framework, an empirical scoring function (AScore) and a docking engine (ShapeDock) were performed using the ArgusLab package. The results of viscosity and docking measurement provided structural insights which suggest that chalcones bind with DNA via interaction as well as intercalation. The presence of

interactions is also evidenced by the spectrophotometric study which showed luminescence quenching of the chalcones upon interaction with CT-DNA.

Antitumoral

Chalcones

DNA

Docking

Spectrophotometric analysis