
Interactions of Phenolic Compounds with Ovalbumin

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Ovalbumin (OVA) is the major protein in egg white and can cause allergy mainly in infants and young children [1]. Egg allergy is an IgE mediated reaction and is one the most common food allergies. So far, the avoidance of the egg has been the unique way to prevent this allergy [2].

It is well known that phenolic compounds can bind to proteins promoting structural and functional changes. In this work, the interactions between OVA and the phenolic compounds were studied through spectroscopic techniques (fluorescence, circular dichroism (CD), Fourier transform infrared spectroscopy (FTIR)) and docking. OVA solutions were incubated at different temperatures and times, with different phenolic compounds prepared with the same buffer solution (Gallic, Caffeic, Ferulic, Chlorogenic and Tannic Acids, Resveratrol and Quercetin). Results indicate that OVA's structure was affected by the binding of phenolic compounds. CD and FTIR experiments showed changes in the secondary structure of OVA, originated by the conversion of α -helix into β -sheets [1]. Fluorescence spectra demonstrated that phenolics are quenchers of fluorescent aminoacids (Tyrosine, Phenylalanine and Tryptophan) meaning that interactions occur directly or near these aminoacids. Fluorescence results also suggest that these interactions are electrostatic and thermodynamically favorable ($\Delta G < 0$). Docking studies showed that the tested phenolic compounds can interact directly with OVA epitopes, or with its neighbors, thus avoiding the IgE binding. Therefore, the phenolic compounds can be used as a strategy for reducing egg allergy in foods.

Keywords: Egg allergy, Interactions, Ovalbumin, Phenolic compounds,

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