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International Journal of Biological Macromolecules
Volume 118, Part B, 15 October 2018, Pages 1479-1487

Inhibition of advanced glycation end products by isoferulic acid and its free radical scavenging capacity: An in vitro and molecular docking study

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Abstract

Non-enzymatic glycation and Oxidation of some essential biological macromolecules are paramount in the pathogenesis of various diseases including diabetes and atherosclerosis. Hyperglycemia plays a key role in the pathological process of diabetic complications by progressive accumulation of advanced glycation end products (AGEs) in body tissues. Formation of AGEs as a result of protein glycation is followed by an increased free radical activity that additionally contributes towards the bio-macromolecular damage. The present study aimed to evaluate the free radical scavenging and antiglycation capacity of isoferulic acid (IFA). The free radical scavenging activity of IFA was measured using DPPH, FRAP, and metal chelating

assays. IFA showed effective reducing power, free radical scavenging activity and metal chelation activity in concentration dependent manner. The antiglycation activity of IFA was studied using various spectroscopic techniques. The obtained results were validated with free amino, sulfhydryl group, carbonyl content and AGEs formation. Secondary structural alterations were monitored using circular dichroism, morphology of aggregates was analyzed using transmission electron microscopy. Molecular docking reveals the possible binding location of IFA with in the sub-domain IIA of human serum albumin (HSA).