Hyperglycaemia leads to an accumulation of harmful substances in the body due to a process known as glycation. In this process carbonyl group of sugars interact with the amino groups of other biomolecules ultimately resulting in the formation of advanced glycation end products. These products have been implicated in various pathophysiological conditions like Diabetes, Parkinson's, Alzheimer's, cataract etc. Although the exact mechanism by which AGEs bring about changes in the structure of biomolecules is not known, it is assumed that cross linking, aggregation, oxidation and precipitation of the proteins are some probable processes that are responsible for structural and functional changes in the biomolecules. In our study we have used glucose and BSA as the in vitro model system to study the structural alteration and reversal of these alterations by natural products. A range of spectroscopic and electrophoretic tools were used to assess the alteration in BSA structure. The amount of glycation products were also quantified by colorimeteic and spectroflourometric methods. The results indicate that glucose induced severe changes in the conformation of BSA and the presence of thymoquinone suppressed these alterations. Similarly there was generation of significant amount of glycation products in the in vitro system which was inhibited by the natural product. It can be concluded that glucose brings about conformational change in the proteins and causes accumulation of glycation products during sustained hyperglycaemia.