Aim/Objectives. Glycation is a nonenzymatic process that happens when reducing carbohydrates like glucose, fructose, and glucose 6-phosphate reacts with biomolecules like proteins, lipids, and nucleic acids. Protein glycation has an important role in diabetic complications such as nephropathy, retinopathy, cataract, atherosclerosis, neurodegenerative disease, and etc.; therefore lowering the rate of protein glycation could help diabetic patients.

Methods. We investigated hemoglobin (Hb) glycation by glucose (Glc), glucose-6-phosphate (G6P) and fructose (Fru) in the presence of glycine (Gly). Hb was incubated in phosphate buffer saline for four months at 37 ºC with or without Glc, G6P or Fru in the presence or absence of Gly. Samples were gathered every two weeks and maintained at -80 ºC. After 4 months samples were investigated by fluorometry, circular dichroism (CD) and electrophoresis. The fluorescence intensity of advanced glycation end products (AGEs) using fluorometry, secondary structure of protein using a CD and electrophoretic mobility of samples using electrophoresis was followed. Results showed that Hb structure changed due to the glycation. AGE formation was increased and the electrophoretic mobility of the Glycated Hb was more than the native protein. All the named changes were reversed in the presence of Gly; however the effect of the three named sugar was different in the glycation of Hb and the effect of Gly on prevention of glaciation by each of them was also different. Conclusion. In the present research comparison between the effect of each sugar on Hb glycation and the antiglycating effect of Gly is presented.