Nanoparticulate systems have been proposed as vectors for loading, transport and drug release, making the therapeutic activity of the drug more effective, due to the stability and half-life of the drug increases. They also allow the administration of the drug by non-invasive administration routes such as the mucosal, nasal, pulmonary, oral and vaginal, which allow the release of drug in the target tissue. The main purpose of the present work is to study the association of insulin and albumin to modified chitosan nanoparticles with the addition of thiol groups, their physicochemical characterization (DLS, AFM, FT-IR, STEM), the in vitro release profile of the protein at different pH values and to evaluate their efficiency in vivo model. The nanoparticles were prepared by ionotropic gelation method. The size and surface charge of the biopolymer-protein nanoplataforms were determined with the Zetasizer nano Zs equipment. The size distribution of the nanoplataforms was 190-200 nm with a zeta potential of 24 mV. The images of atomic force microscopy show nanoparticles of sizes around 180 nm with an ovoid morphology. The average insulin encapsulation in the nanoparticles was ~75%. The in vitro release profile shows that approximately 20% of the protein is released at pH 2.0 during the first 24 h, while at a physiological pH of 7.4, about 85% is released during the first 24 h. The sublingual administration of thiolated chitosan-insulin NPs were effective in lowering the blood glucose level of diabetic mice. This drug delivery system has proved to be a potential alternative for non invasive administration routes in the treatment for diabetes mellitus.

**Keywords:** chitosan nanoplataforms, thiol groups, insulin release

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