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# Characterization of BSA nanoparticles loaded with bioactive compounds present in the quills of *C. zeylanicum* as an antidiabetic nutraceutical

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Diabetes mellitus is the most common non-communicable disease and the ninth leading cause of death in the world. Oral antidiabetic drugs have serious side effects and therefore, about 60% of the world's population currently uses traditional medicine in the treatment of diabetes as the side effects are less. The antidiabetic properties of cinnamon including the inhibition of pancreatic enzymes, stimulation of cellular glucose uptake by GLUT-4 and stimulation of insulin release, make it suitable for use in the development of an antidiabetic nutraceutical. *Cinnamomum zeylanicum* "Sri Vijaya" (CCSV) accession contains high amounts of antidiabetic compounds and an aqueous extract of its quills can be prepared using the pressurized water extraction method, which has proven to show higher activity than other extraction methods. Nanoparticles synthesized using Bovine Serum Albumin (BSA) are less toxic, non-antigenic, biodegradable, biocompatible and easy to produce. The objective of the present study was to characterize cinnamon loaded nanoparticles using parameters such as particle size, surface charge, morphology, and particle structure using FTIR and cinnamon entrapment using UV-visible spectrophotometry. Nanoparticles were synthesized using BSA solution (20 mg/mL, 4 mL, pH 9), aqueous extract of quills of CCSV (4 mL), ethanol as the desolvation agent and citric acid as the cross-linking agent. Cinnamon encapsulated BSA nanoparticles were obtained 1281 ± 4.5 nm in size, with a polydispersity index of 0.460 ± 0.018 and zeta potential value of -1.09 ± 0.03 mV at the optimum point of the desolvation process. The obtained SEM images showed that the synthesized nanoparticles have a spherical morphology. The FTIR results showed that the cross-linking agent, citric acid has caused confirmational changes in the protein structure of BSA during nanoparticle formation, while the UV-visible spectrum indicated that the active compounds of the aqueous cinnamon extract have been successfully loaded into the BSA nanoparticles.

**Keywords:** Diabetes mellitus, Cinnamon, BSA nanoparticles, Desolvation, Citric acid

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