

Abstract No: MO-17

Synthesis and characterization of cinnamon enriched BSA particles with antidiabetic properties

H. M. W. K. Sathsarani, H. G. N. Dewangani and B. M. Jayawardena*

Department of Chemistry, University of Kelaniya, Sri Lanka
bimali@klh.ac.lk*

Diabetes mellitus is the most common endocrine illness of the current world. Since synthetic drugs exert adverse side effects, scientists have focused more on natural hypoglycemic agents. “Sri Vijaya” cinnamon variety (CCSV) is an accession of *Cinnamomum zeylanicum* that contains considerable amount of hypoglycemic agents. Pressured water extract of the dried quills of CCSV can be used as a liquid form antidiabetic nutraceutical. Due to the higher stability and the easiness of storage and transportation, powder form nutraceuticals are preferred over liquids. But the most powdering techniques decrease the activity of the aqueous extracts. Plant extracts can be encapsulated in nanoparticles to convert them into more stable powder form products with higher biological activity. The objective of the present study was to develop cinnamon encapsulated Bovine Serum Albumin (BSA) particles as a powder form nutraceutical with higher hypoglycemic activity. In this study four different products were synthesized from aqueous cinnamon extract. Two of them were synthesized using BSA (8.8 % (w/v), pH 5) in the presence of citric acid and ascorbic acid as cross-linking agents separately. The other two products were synthesized using BSA (20 mg/mL, pH 9) in the presence of same cross-linking agents. Products were tested for antidiabetic activity by carrying out alpha-amylase inhibition assay and alpha glucosidase inhibition assay and the results were compared with the results obtained for the crude cinnamon extract and the positive control acarbose. IC₅₀ values on both enzymes were calculated using GraphPad prism 8 software. The synthesized BSA particles were characterized for parameters such as water solubility, loading percentage and cinnamon entrapment efficiency. All the obtained data were statistically analysed using Minitab software package. Since the product synthesised using BSA (20 mg/mL, pH 9) and citric acid showed the lowest IC₅₀ value on α -amylase enzyme [117.60(±1.73) μ g/mL], and the highest water solubility [53.00(±1.00) %], loading percentage [3.69(±0.01) %] and cinnamon entrapment efficiency [77.97(±0.03) %] those conditions were concluded as the optimum conditions that are required to synthesize highly active antidiabetic powder form of nutraceutical from CCSV. The product synthesized using BSA (20 mg/mL, pH 9) and ascorbic acid showed the highest yield [75.36 %] and the lowest IC₅₀ value on α -glucosidase enzyme [112.40(±0.57) μ g/mL].

Keywords: Cinnamon, Cross-linking agents, Diabetes, Nutraceuticals

Acknowledgment

This work was supported by the Accelerating Higher Education Expansion and Development (AHEAD) Operation of the Ministry of Higher Education funded by the World Bank.