

Aqueous extract of *Catharanthus roseus* L. loaded alginate nanoparticles: Characterization and assessment of α -glucosidase and α -amylase inhibitory potential

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Low solubility and degradation under unfavorable conditions limit the bioactivities of herbal extracts. This study aimed to characterize the aqueous extract of *Catharanthus roseus* L. (Family: Apocynaceae) encapsulated alginate nanoformulation (CEA) and assess α -amylase and α -glucosidase inhibitory potential. Aqueous extract of *C. roseus* was prepared using ultrasonication followed by refluxing. Nanoformulation was done using the ionic gelation method. Extract concentration was optimized via encapsulation efficiency (EE), loading capacity (LC), particle size analysis and zeta potential analysis. The α -glucosidase and α -amylase inhibitory potential of free extract and CEA were evaluated. The optimum concentration for encapsulation was selected as 1 mg/ml with the highest EE of $62.0 \pm 1.5\%$ and LC of 1.1%. Microscopic examination showed the lowest particle size of 158.2 nm and acceptable zeta potential of (-) 22.00 mV at 1 mg/ml. The α -amylase inhibition assay showed that the free extract (10.3 ± 2.1 mg/ml) and CEA (6.0 ± 0.7 mg/ml) exhibited 50% α -amylase inhibition activity at the mentioned concentrations. The α -glucosidase IC₅₀ values for the free extract and CEA were found to be 23.0 ± 0.7 mg/ml and 9.3 ± 1.6 mg/ml respectively. IC₅₀ values of α -amylase and α -glucosidase for acarbose were 0.004 ± 0.000 mg/ml and 1.8 ± 0.6 mg/ml respectively. The free extract and CEA have shown a significant difference comparable to that of reference compound acarbose. The results concluded that CEA had a higher inhibition on α -glucosidase and α -amylase enzymes. Further studies are warranted to determine the stability of nanoformulation.

Keywords: Alginate, Antidiabetic activity, *Catharanthus roseus* L.

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