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In vitro Release of Polyphenols from Different Extracts of *Coccinia grandis* L. Encapsulated Alginate Nanoparticles

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Abstract

Growing shreds of evidence established the worth of polyphenol-rich herbal extracts for drug discovery against various human diseases. Controlled release of bioactive phytoconstituents such as polyphenols is important in the development of novel antidiabetic drug leads from encapsulated herbal extracts. *Coccinia grandis* (L) (Family: Cucurbitaceae) is an edible plant with a high potency of antidiabetic activity. The objective of the present study was to evaluate the successful encapsulation of aqueous, ethanol, 50% ethanol, and 50% acetone extracts of *C. grandis* (AEAC) into an alginate matrix and *in vitro* release of polyphenols from the encapsulated alginate nanoparticles. Aqueous, ethanol, 50% ethanol, and 50% acetone extracts (1-5 mg/mL) of *C. grandis* encapsulated alginate nanoparticles were synthesized by a controlled ionic gelation method. They were characterized using Fourier transform infrared spectroscopy (FTIR) and scanning electron microscopy (SEM). *In vitro* release profiles of polyphenols were studied at pH 1.2 and pH 6.8 for AEAC-encapsulated alginate nanoparticles. Cumulative release percentages were calculated with respect to the released polyphenol content. The SEM images demonstrated that the AEAC in the alginate was a spherical shape. The positional changes of peaks were present in the FTIR spectrum of AEAC-encapsulated alginate nanoparticles. The cumulative release of polyphenols from AEAC was controlled by encapsulation, accounting for approximately 39-68% (aqueous), 79-98% (ethanol), 53-80% (50% ethanol), 78-100% (50% acetone) of polyphenols from the total amount encapsulated at both pH 1.2 and 6.8. Successful encapsulation of AEAC in the alginate matrix was evidenced by FTIR and SEM analysis. The results of the *in vitro* release of polyphenols revealed that the aqueous extract of *C. grandis* encapsulated alginate nanoparticles gained prolonged controlled release and could be beneficial in the development of antidiabetic drug leads.

Keywords*: Alginate Nanoparticles, Coccinia. Grandis (L).*

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