Films loaded with insulin-coated nanoparticles (ICNP) as potential platforms for peptide buccal delivery

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The goal of this investigation was to develop films containing insulin-coated nanoparticles and evaluate their performance in vitro as potential peptide delivery systems. To incorporate insulin into the films, a new antisolvent co-precipitation fabrication process was adapted to obtain insulin-coated nanoparticles (ICNPs). The ICNPs were embedded in polymeric films containing a cationic polymethacrylate derivative (ERL) or a combination of ERL with hydroxypropyl methylcellulose (HPMC). ICNP-loaded films were characterized for morphology, mucoadhesion, and insulin release. Furthermore, in vitro insulin permeation was evaluated using a cultured tridimensional human buccal mucosa model. The antisolvent co-precipitation method was successfully adapted to obtain ICNPs with 40% (w/w) insulin load, achieving 323 ± 8. nm particles with a high zeta potential of 32.4 ± 0.8. mV, indicating good stability. High yields were obtained after manufacture and the insulin content did not decrease after o