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Combination of PLGA nanoparticles with mucoadhesive guar-gum films for buccal delivery of antihypertensive peptide

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Abstract

Oral administration of proteins and peptides still is a challenging task to overcome due to low permeability through absorptive epithelia, degradation and metabolism that lead to poor bioavailability. Attempting to overcome such limitations, an antihypertensive peptide derived from whey protein, with KGYGGVSLPEW sequence, was incorporated for the first time into polymeric nanoparticles. An experimental design was followed in order to optimize drug-loading, association efficiency, mean particle size, zeta-potential and polydispersity index of a formulation of poly(lactic-co-glycolic acid) (PLGA) nanoparticles as carriers for bioactive peptides. In sequence, peptide-loaded PLGA nanoparticles were incorporated in a guar-gum film matrix, resulting in a combined delivery system aiming to promote slow release and permeation across buccal epithelium. Neither PLGA nanoparticles, guar-gum films nor the conjugation of PLGA nanoparticles and guar-gum films (GfNp) significantly compromised *in vitro* TR146 human buccal carcinoma cell line viability after 12 h contact, as assessed by 3-(4,5-Dimethylthiazol-2-yl)-2,5-Diphenyltetrazolium Bromide reduction assay (MTT). *In vitro*

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