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“Nanostructured polyelectrolyte multilayer drug delivery systems for buccal administration”

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Polyelectrolyte multilayers (PEMs) are well-defined nanoarchitectures with many potential applications, usually as biomaterial coatings. They possess excellent characteristics, such as fine-tuning of thickness, stiffness, stability, morphology and topography. Hence, they may exhibit special biological properties, such as mucoadhesion and local drug delivery. We present our recent investigations on layer-by-layer assembled polyelectrolyte multilayers from chitosan and casein on preliminary corona charged substrates from poly-lactic acid. Polyelectrolyte multilayers were at different environmental conditions – pH and ionic strength. The presence of PEMs on the substrates was proved by ATR FT-IR spectroscopy. The surface morphology and topography of the samples were done by scanning electron microscopy (SEM) and atomic force microscopy (AFM). All the experimental data confirmed differences in the structure and surface properties of the PEMs assembled at different conditions. The ability to control the inner structure of the PEMs enables to manipulate the physical properties or chemical activity of the functionalized thin films. In this way, tunable mucoadhesion and drug release properties could be achieved.

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