

A mechanistic approach for the optimization of loperamide loaded nanocarriers characterization: Diafiltration and mathematical modeling advantages

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© 2018 Elsevier B.V. Oral bioavailability of loperamide is restricted by its limited absorption in the gastrointestinal tract due to its poor aqueous solubility and its P-glycoprotein (Pgp) substrate characteristic. In addition, ammonium methacrylate copolymers have shown to have mucoadhesive properties, whereas poloxamer 188, has been suggested as a Pgp inhibitor. Thus, in this work, we evaluate conditions that affect physicochemical parameters of ammonium methacrylate/poloxamer 188-based nanocarriers loaded with loperamide hydrochloride. Nanocarriers were synthesized by nanoprecipitation, enhancing loperamide encapsulation efficiency by modifying the aqueous phase to basic pH. The isolation of the non-encapsulated drug fraction from the nanocarriers-incorporated fraction was conducted by centrifugation, ultrafiltration, vacuum filtration and diafiltration. The last method was effective in providing a deeper understanding of drug-nanocarrier loading and interactions by means of modeli