

LP-SBA-15/Ketorolac Nanocomposite: Development, Characterization, and Mathematical Modeling of Controlled Keto Release

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Abstract: Drug-controlled release systems can keep the level of drugs in precise doses in the body above the optimal level and with low toxicity. We propose the nanomaterial LP-SBA-15 as an attractive new host for drug delivery systems due to its high biocompatibility, in vivo biodegradability, and low toxicity. LP-SBA-15/Ketorolac was prepared and characterized by XRD, FTIR, UV-Vis DRS, TEM, and texture analysis, determining the adsorption capacity and its release and achieving the required therapeutic efficacy. The host shows the ordered mesoporous nanochannels with a diameter of 11-12 nm, maintaining the structure with the incorporation of Keto. The mechanism of drug release from the LP-SBA-15 host was evaluated. Different mathematical models were used to adjust the experimental data, the Ritger-Peppas model followed by the Weibull model the best ones. The promising results we obtained for the release of the drug thoroughly using the new material, reaching a rapid initial release rate, and maintaining a constant rate afterward, allow us to maintain the concentration of the drug in the therapeutic efficacy range, applying it largely to the treatment of diseases that require a rapid response.

Keywords: LP-SBA-15; ketorolac tromethamine; nanostructured host; drug-delivering device; nanoscale medicine.

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