

“Synthesis of Intercalated Fenopropfen into Layered Double Hydroxides for the Formulation of Controlled Release Anti-Inflammatory Drug”

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A new controlled release anti-inflammatory drug, namely Zinc-Aluminium-fenopropfen (ZAF) was successfully synthesized via intercalation of the fenopropfen into Zinc-Aluminium-layered double hydroxide (ZAL). The new formulation of drug was synthesized at 0.3M fenopropfen with molar ratio of Zn:Al = 2. The pH of the synthesis of ZAF was kept constant at pH7.5. Upon the successful intercalation of the drug, release profiles and the factors govern its release from their matrices into various aqueous media were determined. The relatively phase-pure with well-ordered layered nanohybrid materials were successfully synthesized by self-assembly method at optimum condition. Expansion of basal spacing was observed from 9.8 Å in the ZAL to 20.1 Å in the ZAF by using Powder X-Ray Diffraction (PXRD). The results were supported by the data obtained from the whole analysis by using Fourier Transform-Infrared Spectroscopy (FT-IR), Elemental Analysis (CHNS), Brunauer-Emmett-Teller (BET) surface area analysis and Ultraviolet-Visible (UV-VIS) Spectroscopy. Controlled release study of the drug into the aqueous solutions of sodium carbonate solution, sodium chloride solution and saline solution were performed. Release of drug into the aqueous media is in the order of; sodium carbonate > sodium chloride > saline solution with the percentage release of 50%, 30% and 20%, respectively. The release profiles are best described by pseudo-second order kinetic model as shown by the regression values of about 1.0. The fenopropfen anion was successfully intercalated into ZAL with the percentage loading of guest anion which is 63.40%, respectively. This study shows that the ZAL can be used as a matrix for controlled release formulation of fenopropfen drug. The release of fenopropfen from the matrix was found to be controlled by the anion in the release aqueous solution as well as the type of the release media.

Keywords: Layered double hydroxide, fenopropfen, controlled release, anti-inflammatory drug, drug delivery

Area of research: Chemistry

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