

عنوان مقاله:

Application of near-infrared responsive nano-carrier for controlled drug delivery: synthesis, isotherm and kinetic studies

محل انتشار:

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خلاصه مقاله:

Due to the importance of selecting an appropriate strategy in drug delivery systems, numerous studies have been performed to support this process. However, there are still major obstacles associated with the targeted drug delivery to cancer tissues. Hence, the main focus of this study is to develop the current cancer therapies by using drug delivery systems. To achieve this goal, we have synthesized a near-infrared light responsive drug carrier based on WS₂ nano-sheets, which can be a good candidate for applications such as drug delivery vehicle and chemo-photothermal treatments. In this study, a rapid and economy synthesis method was employed to modify the nano-sheets of WS₂ for targeted drug delivery of bicalutamide as a prostate anti-cancer drug. The investigation of adsorption isotherm was fitted well by Langmuir model ($q_{max} = 15.87 \text{ mg g}^{-1}$). The evaluation of adsorption kinetic was better expressed by pseudo-second-order kinetic model ($R^2 = 0.9998$). In-vitro drug release study was performed more rapid and complete in simulated blood fluid ($\text{pH} = 7.4$) at 50°C than 37°C . Besides, the activity of the produced nano-carrier was examined under near-infrared light irradiation (at 808 nm). The drug release data were investigated through Zero-order, First-order, Higuchi, Hixson-Crowell and Korsmeyer–Peppas mathematical models.

کلمات کلیدی:

Thermo-sensitive polymer, Drug delivery, Bicalutamide, In-vitro drug release, WS₂ nano-sheets, Near-infrared light irradiation

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