In vitro delivery and controlled release of doxorubicin for targeting osteosarcoma bone cancer

ABSTRACT

Drug delivery systems are designed to achieve drug therapeutic index and enhance the efficacy of controlled drug release targeting with specificity and selectivity by successful delivery of therapeutic agents at the desired sites without affecting the non-diseased neighbouring cells or tissues. In this research, we developed and demonstrated a bio-based calcium carbonate nanocrystals carrier that can be loaded with anticancer drug and selectively deliver it to cancer cells with high specificity by achieving the effective osteosarcoma cancer cell death without inducing specific toxicity. The results showed pH sensitivity of the controlled release characteristics of the drug at normal physiological pH 7.4 with approximately 80% released within 1,200 min but when exposed pH 4.8 the corresponding 80% was released in 50 min. This study showed that the DOX-loaded CaCO3 nanocrystals have promising applications in delivery of anticancer drugs.

Keyword: Drug delivery; Calcium carbonate; Nanocrystals; Doxorubicin; Osteosarcoma