Characterization, drug release profile and cytotoxicity of dentatin-hydroxypropyl-β-cyclodextrin complex

ABSTRACT

This current work has been conducted mainly to increase solubility and drug release properties for high hydrophobic Dentatin (DEN) by incorporation it into Hydroxypropyl-β-Cyclodextrin (HPβCD) cavity. To confirm that inclusion be succeeded, the produced complex were installed onto different machines. The latter includes: Fourier transform infrared spectroscopy (FT-IR), X-ray diffractometry (XRD), differential scanning calorimetry (DSC), and field emission-scanning electron microscopy (FE-SEM). The hydrodynamic diameter and zeta potential of DEN-HPβCD complex were 2.025 ± 0.39 nm and -33.6 mV, respectively. Ultra-violet spectroscopy was employed to further confirmation of complexation process as well as to determine drug release profile. The result showed an initial burst release (19.9% within first two minutes) and then a continuous release for an extended period of 41 h (100%). The solubility of DEN was enhanced by >300 fold following complexation when a compared to DEN alone. Moreover, MTT finding showed that this complexation did not reduce cytotoxicity of DEN after applying on prostate cancer (LNCaP), human adenocarcinoma breast cancer (MDA-MB-231) and human gastric adenocarcinoma cell line (HDT). However, further investigations are required to validate efficacy of our produced inclusion using molecular analysis and in vivo studies.

Keyword: Dentatin; Hydroxypropyl-β-cyclodextrin; Physical properties; Solubility; Drug release