

Characterization of the inclusion complex of zerumbone with hydroxypropyl--cyclodextrin

ABSTRACT

In this paper we investigated the inclusion complexation between zerumbone (ZER) and hydroxypropyl- -cyclodextrin (HPCD) at four different temperatures: 293–318 °K. The thermodynamic parameters (H, S and G) for the formation of the complex were obtained from the van't Hoff equation. The complex with HPCD was characterized by differential scanning calorimetry (DSC), X-ray diffractometry (XRD), Fourier transform infrared spectroscopy (FT-IR), and molecular modeling using PM6. The solubility of ZER was enhanced >30 fold after complexation. Calculations show that ZER penetrates completely into the cavity of HPCD. The complex retained its cytotoxic activity as shown by in vitro cell survival assay on human cervical cancer (Hela), breast cancer (MCF7 and MDA-MB 231) and human leukemic (CEMss) cell lines. HPCD is, therefore, a suitable encapsular capable of forming thermodynamically stable complex with ZER for save delivery of the compound as an anticancer drug in the future.

Keyword: Zerumbone, Hydroxypropyl--cycoldextrin, Cytotoxicity Molecular modeling, PM6,