ABSTRACT

Effect of Methanol Concentration on Physicochemical Characteristics of *p*-Methoxycinnamic Acid-Succinic Acid Cocrystal Prepared by Microwave Radiation Method

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P-methoxycinnamic acid (PMCA) is a compound obtained from the hydrolysis of ethyl p-methoxycinnamate, the main compound in *Kaempferia galangal*. PMCA has anti-inflammatory activity but its solubility in water is very low (0,712 mg/ml). There is one method to increase the solubility of PMCA by forming cocrystal. The aims of this study were to determine the characteristics of the PMCA-succinic acid cocrystal at 1:1 molar ratio made by the microwave radiation method and also to determine the effect of methanol as medium at concentrations of 0% w/w, 5% w/w, and 10% w/w on the cocrystal's characteristics. Physicochemical characterization were carried out by testing Differential Scanning Calorimetry (DSC), Powder X-ray Diffraction (PXRD), Fourier Transform Infrared (FTIR), and Scanning Electron Microscope (SEM). The DSC thermogram showed a decrease in the melting point of cocrystals compared to PMCA (173.55°C) and succinic acid (187.78°C). Cocrystals which had been prepared with 5 and 10% w/w methanol showed a single - sharp endothermic peaks at 158.67°C and 158.41°C, respectively. The difractogram of cocrystals showed the presence of new diffraction peaks which were different from their constituent components and their physical mixtures. New diffraction peaks of cocrystal prepared with methanol showed a higher intensity. FTIR spectrum of cocrystal showed some peaks were disappear and shifted, especially the absorption peaks of carboxylic group from PMCA and succinic acid. SEM photomicrographs showed that PMCA-succinic acid cocrystals had different surface morphology compared to its constituent components. It also exhibited the cocrystals which had been prepared with 10% methanol had uniform shape with smaller size than PMCA and succinic acid.

Keywords: *p*-methoxycinnamic acid (PMCA), Succinic acid, Cocrystal, Microwave radiation, physicochemical characterization