

MULTICOMPONENT CRYSTALLIZATION OF KETOPROFEN-NICOTINAMIDE FOR IMPROVING THE SOLUBILITY AND DISSOLUTION RATE

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Abstract. The purpose of this research was to improve the solubility and dissolution rate of ketoprofen by using the multicomponent crystallization approach with nicotinamide as cofomer. Multicomponent crystallization of ketoprofen-nicotinamide with a 2:1 molar ratio was performed by solvent evaporation technique using 2-propanol as solvent. The characterization of the multicomponent crystal was performed using powder X-ray diffraction (PXRD), differential scanning calorimetry (DSC), Fourier transform infrared spectroscopy (FTIR) and scanning electron microscopy (SEM). The solubility and dissolution behaviour of the multicomponent crystal in distilled water were determined by the shake-flask and standard paddle method, respectively. The results of characterization by PXRD, DSC, FTIR and SEM have confirmed the formation of a new crystalline phase of ketoprofen-nicotinamide as the multicomponent crystal. The solubility of ketoprofen-nicotinamide multicomponent crystal was registered 1.3 times higher compared to pure ketoprofen. The multicomponent crystal dissolved about 64% within 60 minutes in comparison to the pure ketoprofen that showed a dissolution of only about 56% during the same period. The results of solubility and dissolution tests showed that the ketoprofen-nicotinamide multicomponent crystal is characterized by a solubility and dissolution rate significantly higher than those for the pure ketoprofen.

Keywords: ketoprofen, multicomponent crystallization, solvent evaporation, solubility, dissolution rate.

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