Thesis Title Improvement of Dissolution Characteristic of Indomethacin Capsules

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ABSTRACT

This study dealt with the investigation of the dissolution characteristics of indomethacin (IMC) capsules prepared by various methods and with various additives. The aqueous solubility of IMC with some additives were also determined. Three methods of preparation including physical mixing, grinding, and kneading were employed. The additives were dibasic sodium phosphate, calcium carbonate, sodium lauryl sulfate, β-cyclodextrin (β-CD), polyethylene glycol 4000 (PEG 4000) and lactose. The capsules were stored at ambient condition and at 40 °C, 75% RH. It was found that kneading method improved the dissolution of the subsequently dried powder whereas the physical mixing and grinding method did not. The order of the percentage of drug dissolved at 20 min of the freshly prepared capsules was IMC-PEG 4000 (1:4) kneaded mixture (I); IMC kneaded powder (II) > IMC-β-CD (1:2 M)

kneaded mixture (III) > IMC:$CaCO_3$ (1:0.5) physical mixture (IV) > control (V). The dissolution of the products stored at ambient condition for 3 months were in the order of II; III > V; IV; I and of the products stored at 40 °C, 75% RH for 2 months were in the order of III; I > II > V; IV. The differential scanning calorimetry study was employed on two systems, IMC-β-CD and IMC-PEG 4000. The results showed that IMC did not form any inclusion complex with β-CD whereas IMC might form eutectic mixture with PEG 4000. It was concluded that the addition of β-CD or PEG 4000 was able to stabilize IMC capsules. However, kneading the drug with water could improve the dissolution of IMC capsules and seemed to be convenient and cost-saving method for the drug preparation.