CHAPTER I
INTRODUCTION

Coating of multiparticulates plays an important role in pharmaceutical industry (Collett and Moreton, 2001). By applying different coating materials onto multiparticulates, various desirable functional properties such as physical and chemical protection, aesthetic purposes, taste masking, modified release and targeted release may be obtained (Chan et al., 2006; Heng et al., 2006). Bottom spray fluidized bed coating have been extensively used in pharmaceutical industry for coating multiparticulates, especially pellets, due to its high throughput and formation of good quality coats. It is carried out by using the air suspension method in which air passed through a perforated (air distribution) plate, suspending the substrate particles above the nozzle (Deasy, 1984). They offer excellent heat and mass transfer within the product bed and are able to form uniform coats.

However, such coater has some disadvantages that some coating agents will rapidly be vaporized or be entrained out of the vessel before coming into contact with core particles due to the concurrent flow between coating agent droplets and core particles. In addition, the occurrence of electrostatic charges is almost unavoidable in gas-solid fluidization. Electrostatic charges are generated due to repeated particle contacts and separation, supplement by the friction of particles rubbing against each other and the column wall (Mehrani, 2005). To overcome these limitations, an alternative coating technology based on electrostatic, an attractive force between the different charged substances broadly applied in many industries, has been introduced. For example, electrostatic spray-painting utilizes charged droplets for coating onto the surface of an object. Other industrial electrostatic applications include textile flocking, sand paper manufacture and xerography. Use of charged spray droplets has been shown to improve the deposition efficiency in agricultural pesticide applications. Phoonphetmongkon (2004) found that the electrostatic enhanced fluidized bed increased coating efficiency of glass beads. However, types of core particles, types of coating agent and difference in charge of applied electrical potential were not addressed.

To our knowledge, the aqueous electrostatic fluidized bed coating technique in pharmaceutical sciences application has never been investigated. Therefore, this study used propranolol hydrochloride and diclofenac sodium pellets as a model drug core. Hydroxypropylmethylcellulose solution and ethylcellulose aqueous dispersion were used as coating agents. Moreover, the difference of applied electrical potentials was compared.

It was hypothesized that applied electrical potential onto droplets of coating agent in a bottom spray fluidized bed would provide improved coating efficiency by the attractive force to the oppositely charged pellets.

Objectives of the study

1. To develop electrostatic fluidized bed coating technique for pharmaceutical pellets.
2. To study the effect of process variables on physicochemical properties of coated pellets produced by electrostatic fluidized bed coating technique.
3. To compare the coating efficiency between non-applied and applied electrostatic coating technique.