

Preparation and Characterization of Drug-Solution-Dropping Tablet

Orawan Chitvanich¹, Busaban Sirithunyalug², Siriporn Okonogi²,
Sirivipa Piyamongkol² and Jakkapan Sirithunyalug^{2*}

¹Department of Pharmaceutical Sciences, Faculty of Pharmaceutical Science, Huachiew Chalermprakiet University, Samutprakarn 10540, Thailand

²Department of Pharmaceutical Sciences, Faculty of Pharmacy, Chiang Mai University, Chiang Mai 50200, Thailand

*Corresponding author. E-mail: jakkapan@pharmacy.cmu.ac.th

ABSTRACT

This study is an attempt to improve dissolution rate of a poorly water-soluble drug from tablet by drug-solution-dropping technique. Diazepam was used as a model drug. Absolute alcohol and dichloromethane were used to prepare diazepam solution. The 50 μ l solution (5 mg diazepam) was dropped on blank tablet by using microsyringe. Two kinds of blank tablets were prepared by direct compression (DC) and wet granulation (WG) methods, using dicalcium phosphate dihydrate and lactose as diluents, respectively, with 1000, 1400 or 1800 kg compression force. The surfaces of diazepam-solution-dropping tablets were characterized by Scanning electron microscope (SEM). Their morphologies revealed the smoother surface than that of blank tablet, particularly from wet granulation method of higher compression force but not being clear to point out diazepam particles on the surface. X-ray diffraction by monochromator (single crystal) mode was also used to point out the crystalline or amorphous form of the drug. X-ray monochromator analysis could not be used to confirm the crystallinity of diazepam on the surface of prepared tablet. Differential scanning calorimetry thermatogram showed the peak of diazepam only in the tablet prepared from wet granulation blank tablet. Dissolution profiles of the prepared tablet from the two kinds of blank tablets were compared to diazepam tablet prepared by the conventional direct compression and wet granulation technique. The result profiles revealed that this drug-solution-dropping technique could be applied especially to poorly-water-soluble drug such as diazepam by using blank tablet at 1000 kg compression force. The dissolution rate of drug-solution-dropping tablet (DSDT) from blank tablet prepared by WG method was faster than that of DSDT from blank tablet prepared by DC method. Certainly, more uniformity of active ingredient is also an advantage of the drug-solution-dropping tablet prepared.

Key words: Diazepam, Drug-solution-dropping tablet