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Formation of solid dispersions famotidine with HPMC E5LV and mannitol with co-grinding technique

Erizal Zaini, Lili Fitriani, Robby Kurniawan and **Sherly Ramadhani**
Andalas University, Indonesia

Solid dispersion have attracted considerable interest as an efficient means of improving the solubility and the dissolution rate of poorly water-soluble drug. The aim of this study was to prepare solid dispersions of famotidine with HPMC E5LV and mannitol as carrier to improve its sollubility and its dissolution rate. Co-grinding techniques by using ball milling was used. 18 formulas with 3 different ratio to HPMC and mannitol (1:1, 1:2, 2:1) and 3 different grinding time (30', 60', 90') were prepared. Characterization of solid dispersion was analyzed with Scanning Electron Microcopy analysis (SEM), X-ray diffraction, Fourier Transform Infrared (FTIR), Optilab Microscope Camera, solubility test and dissolution test. The solid state interaction of co-ground and physical mixture were evaluated by X-ray powder diffraction and SEM. The dissolution studies were conducted in USP type II apparatus. The result of X-ray powder diffraction analysis showed that the co-ground of famotidine with HPMC E5LV and mannitol decreased the drug crystallinity. X-ray powder diffraction showed the transformation of crystalline state of famotidine to amorphous by co-grinding with HPMC E5LV and mannitol. SEM results showed the co-ground mixture with HPMC E5LV had smaller size and co-ground mixture with mannitol showed agglomerate form. The highest in solubility and dissolution rate was observed for famotidine-HPMC E5LV showed in 1:1 ratio with 90' grinding time and famotidine-mannitol showed in 1:2 ratio with 30' grinding time compared to the intact famotidine and its physical mixture.

robbyk142@gmail.com