SISTEM DISPERSI PADAT TICAGRELOR DENGAN MENGGUNAKAN POLIMER *HYDROXYPROPYL METHILCELLULOSE(*HPMC)2910 DENGAN METODE *FREEZE DRYING*

ABSTRAK

Ticagrelor merupakan obat anti platelet. Ticagrelor merupakan obat kategori *Biopharmaceutcal Classification System* (BCS) Kelas IV dengan kelarutan yang sukar larut dalam air dan memiliki permeabilitas yang rendah. Tujuan dari penelitian ini untuk meningkatkan karakteristik fisikokimia, kelarutan, dan laju disolusi dari obat yang sukar larut dalam air yaitu Ticagrelor.Penelitian dilakukan dengan membuat dispersi padat Ticagrelor dengan HPMC2910 dibuat dengan teknik Freeze Drying dalam tiga perbandingan antara Ticagrelor dan HPMC 2910 yaitu (2:1, 1:1, 1:2). Serbuk Dispersi padat yang terbentuk dikarakterisasi meliputi analisa termal (DSC), analisa difraksi sinar-X (XRD), analisa gugus fungsi (FTIR), analisa morfologi permukaan (SEM), perolehan kembali, uji kelarutan dan uji disolusi. Hasil analisa termal menunjukkan terjadi pergeseran puncak endotermik Ticagrelor.Hasil analisa difraksi sinar-X menunjukkan penurunan derajat kristalinitas Ticagrelor. Hasil analisa gugus fungsi menunjukkan bahwa tidak ada interaksi antara Ticagrelor dan HPMC 2910 pada serbuk dispersi padat. Pembuatan sistem dispersi padat Ticagrelor-HPMC 2910 dapat memperbaiki karakteristik fisikokimia, kelarutan dan laju disolusi Ticagrelor. Dari hasil analisa karakteristik diatas, formula 3 dispersi padat yang terbaik dari formula lainnya. Hasil Uji Kelarutan pada serbuk dispersi padat Ticagrelor-HPMC 2910 terjadi penigkatan pada formula 1=1,84 kali, formula 2= 2,07 kali, formula 3= 2,54 kali sedangkan Hasil disolusi pada serbuk dispersi padat menit ke-60 yaitu formula 1=12,435%, formula 2 = 12,864%, formula 3 = 13,766%. Uji statistik dengan menggunakan ANOVA satu arah dengan nilai signifikansi = 0,000 (<0,05) yang menunjukkan bahwa terdapat perbedaan nyata rata rata % disolusi antara Ticagrelor, dengan masing masing formula dispersi padat Ticagrelor-HPMC 2910.Dapat disimpulkan bahwa pada permbuatan dispersi padat Ticagrelor dengan menggunakan polimer dapat meningkatkan kelarutan dan laju disolusi Ticagrelor.

Kata kunci: dispersi padat, Ticagrelor, HPMC2910, Freeze-drying, Kelarutan, disolusi.

TICAGRELOR SOLID DISPERSION SYSTEM USING*HYDROXYPROPYL METHYLCELLULOSE* (HPMC)2910 POLYMER BY *FREEZE DRYING METHOD*

ABSTRACT

Ticagrelor is an anti-platelet drug. Ticagrelor is a Biopharmaceutcal Classification System (BCS) Class IV category drug with poor water solubility and low permeability. The aim of this study was to improve the physicochemical characteristics, solubility, and dissolution rate of the poorly water-soluble drug Ticagrelor. The study was conducted by making a solid dispersion of Ticagrelor with HPMC2910 made by Freeze Drying technique in three ratios between Ticagrelor and HPMC 2910 namely (2:1, 1:1, 1:2). The solid dispersion powder formed was characterized including thermal analysis (DSC), X-ray diffraction analysis (XRD), functional group analysis (FTIR), surface morphology analysis (SEM), recovery, solubility test and dissolution test. The results of thermal analysis showed a shift in the endothermic peak of Ticagrelor. The results of X-ray diffraction analysis showed a decrease in the degree of crystallinity of Ticagrelor. The results of functional group analysis showed that there was no interaction between Ticagrelor and HPMC 2910 in the solid dispersion powder. The preparation of Ticagrelor-HPMC 2910 solid dispersion system can improve the physicochemical characteristics, solubility and dissolution rate of Ticagrelor. From the results of the analysis of the above characteristics, formula 3 solid dispersion is the best of the other formulas. The results of the solubility test on Ticagrelor-HPMC 2910 solid dispersion powder increased in formula 1 = 1.84 times, formula 2 = 2.07 times, formula 3 = 2.54 times while the dissolution results in the 60th minute solid dispersion powder were formula 1 = 12.435%, formula 2 = 12.864%, formula 3 = 13.766%. Statistical tests using one-way ANOVA with a significance value = 0.000 (<0.05) showed that there was a significant difference in the average % dissolution between Ticagrelor, with each Ticagrelor-HPMC 2910 solid dispersion formula. It can be concluded that the preparation of Ticagrelor solid dispersion using polymers can increase the solubility and dissolution rate of Ticagrelor.

Keywords: solid dispersion, Ticagrelor, HPMC2910, Freeze-drying, Solubility, dissolution.