

## SISTEM DISPERSI PADAT TICAGRELOR DENGAN POLIMER

### *HYDROXYPROPYL METHYLCELLULOSE (HPMC) 2910*

### MENGGUNAKAN METODE *SOLVENT EVAPORATION*

#### ABSTRAK

Ticagrelor merupakan obat antiplatelet. Ticagrelor termasuk dalam obat BCS kelas IV dengan kelarutan 10µg/mL dalam air. Penelitian ini bertujuan untuk meningkatkan kelarutan dan disolusi dari Ticagrelor melalui pembuatan dispersi padat dengan *Hydroxypropyl Methylcellulose* (HPMC) 2910. Dispersi padat Ticagrelor – HPMC 2910 dibuat menjadi 3 formula, yaitu F1, F2, dan F3 menggunakan metode *solvent evaporation*. Ticagrelor dan dispersi padat yang terbentuk kemudian dikarakterisasi secara fisikokimia dan dilakukan uji kelarutan dan disolusi. Hasil DSC menunjukkan tidak adanya terbentuk puncak titik lebur yang berarti telah terbentuknya amorf (*totally amorf*). Hasil XRD menunjukkan terbentuknya padatan amorf (*totally amorf*) ditandai dengan tidak terbentuknya puncak ticagrelor, serta data % derajat kristalinitasnya dibawah 20%. Hasil FTIR menunjukkan tidak terbentuknya gugus fungsi yang baru. Hasil SEM menunjukkan ticagrelor yang masuk kedalam rongga polimer HPMC 2910. Uji kelarutan menggunakan aquadest bebas CO<sub>2</sub> menunjukkan peningkatan kelarutan ticagrelor dalam dispersi padat dengan F1, F2, dan F3 masing – masing meningkat 1,5; 1,6; 1,7 dibandingkan dengan ticagrelor murni. Uji disolusi menggunakan alat disolusi tipe 2 dengan medium dapar fosfat pH 6,8 menunjukkan bahwa dispersi padat ticagrelor HPMC 2910 meningkatkan laju disolusi dibandingkan dengan ticagrelor murni. Pada menit ke-60, persentase zat terdisolusi untuk F1, F2, dan F3 adalah 11,723%; 12,906%; 15,713% dibandingkan dengan ticagrelor murni, yaitu 1,839%. Dari hasil penelitian disimpulkan bahwa terjadi pembentukan amorf pada dispersi padat ticagrelor – HPMC 2910 dengan metode *solvent evaporation* berdasarkan hasil analisis karakterisasi dan terjadi peningkatan kelarutan dan disolusi dibandingkan dengan ticagrelor murni.

Kata kunci : Ticagrelor, HPMC 2910, dispersi padat, kelarutan, disolusi, *solvent evaporation*.

**TICAGRELOR SOLID DISPERSION SYSTEM WITH  
HYDROXYPROPYL METHYLCELLULOSE (HPMC)  
2910 POLYMER USING SOLVENT EVAPORATION METHOD**

**ABSTRACT**

Ticagrelor is an antiplatelet drug. Ticagrelor is included in BCS class IV drugs with a solubility of 10µg/mL in water. This research aims to increase the solubility and dissolution of Ticagrelor by making a solid dispersion with Hydroxypropyl Methylcellulose (HPMC) 2910. The solid dispersion of Ticagrelor - HPMC 2910 is made into 3 formulas, namely F1, F2, and F3 using the solvent evaporation method. Ticagrelor and the solid dispersion formed were then characterized physicochemically and solubility and dissolution tests were carried out. The DSC results show that there is no melting point peak, which means that amorphous (totally amorphous) formation has occurred. The XRD results showed the formation of an amorphous solid (totally amorphous) characterized by the absence of a ticagrelor peak, and data on the % crystalline degree below 20%. FTIR results showed that no new functional groups were formed. SEM results show that ticagrelor enters the cavity of the HPMC 2910 polymer. The solubility test using CO<sub>2</sub>-free distilled water shows an increase in the solubility of ticagrelor in solid dispersions with F1, F2, and F3 each increasing by 1.5; 1.6; 1.7 compared with pure ticagrelor. Dissolution tests using a type 2 dissolution apparatus with phosphate buffer medium pH 6.8 showed that the solid dispersion of ticagrelor HPMC 2910 increased the dissolution rate compared to pure ticagrelor. At 60 minutes, the percentage of dissolved substances for F1, F2, and F3 was 11.723%; 12.906%; 15.713% compared to pure ticagrelor, namely 1.839%. From the research results, it was concluded that amorphous formation occurred in the solid dispersion of ticagrelor - HPMC 2910 using the solvent evaporation method based on the results of the characterization analysis and there was an increase in solubility and dissolution compared to pure ticagrelor.

Key word : Ticagrelor, HPMC 2910, solid dispersion, solubility, dissolution, *solvent evaporation*