INTISARI

Glibenklamid merupakan salah satu obat yang digunakan dalam terapi diabetes melitus tipe II. Berdasarkan *Biopharmaceutical Classification System* (BCS), glibenklamid tergolong dalam BCS Kelas II, yang mana diketahui memilki kelarutan rendah (4 mg/L) sehingga perlu dilakukan upaya peningkatan laju disolusi, salah satunya dengan metode kokristalisasi dengan manitol mesopori. Dalam penelitian ini, dilakukan optimasi pembuatan manitol mesopori menggunakan metode *spray drying* dengan tambahan *templating agent* asam sitrat. Manitol mesopori yang optimum dipilih untuk selanjutnya digunakan sebagai matriks untuk memuat obat glibenklamid dalam proses kokristalisasi. Serbuk glibenklamid yang sudah termuat dalam manitol mesopori dikarakterisasi menggunakan *Surface area analyzer* (SAA), *Fourier transform infrared* (FTIR), *Scanning electron microscopy* (SEM), *differential scanning calorimetry* (DSC), *Powder X-ray diffraction* (PXRD), penentuan muatan obat, dan uji disolusi *in vitro.*

Komposisi campuran D-Manitol 15% b/v dan *templating agent* asam sitrat 2% b/v dengan suhu *inlet* 170 °C dan *outlet* 100 °C memberikan karakteristik manitol mesopori paling baik, yakni menghasilkan peningkatan hasil SAA terbesar dari 0,002197 menjadi 0,008233 cc/g. Perbandingan asam sitrat dan D-Manitol yang paling besar serta suhu *inlet-outlet* yang paling tinggi menghasilkan mesopori dengan karakteristik paling baik. Manitol mesopori tersebut kemudian digunakan untuk memuat obat glibenklamid 0,005 M. Hasil karakterisasi menunjukkan adanya perubahan titik leleh dari 173,38 ke 168,77 °C; perubahan struktur kristal α dan β polimorf; ikatan antara glibenklamid-manitol, serta meningkatnya profil disolusi glibenklamid sebanyak 5,6 kali.

Kata Kunci: Glibenklamid, D-manitol, asam sitrat, mesopori, diabetes melitus tipe II

ABSTRACT

Glibenclamide is one of the drugs used in type II diabetes mellitus therapy. Based on the Biopharmaceutical Classification System (BCS), glibenclamide is classified as BCS Class II, which is known to have low solubility (4 mg/L) so that efforts need to be made to increase the dissolution rate, one of which is the cocrystallization method with mesoporous mannitol. In this study, mesoporous mannitol was optimized using the spray drying method with the addition of citric acid templating agent. The optimum mesoporous mannitol was selected and then used as a matrix to load glibenclamide drug in the cocrystallization process. Glibenclamide powder loaded in mesoporous mannitol was characterized using Surface area analyzer (SAA), Fourier transform infrared (FTIR), Scanning electron microscopy (SEM), differential scanning calorimetry (DSC), Powder X-ray diffraction (PXRD), drug loading determination, and in vitro dissolution test.

The mixture of D-Manitol 15% b/v and citric acid templating agent 2% b/v with inlet temperature of 170 °C and outlet temperature of 100 °C gave the best mesoporous mannitol characteristics, which resulted in the largest increase in SAA yield from 0.002197 to 0.008233 cc/g. The largest ratio of citric acid and D-Manitol and the highest inlet-outlet temperature produced mesopores with the best characteristics. The mesoporous mannitol was then used to load 0.005 M glibenclamide drug. Characterization results showed a change in melting point from 173.38 to 168.77 °C; changes in the crystal structure of α and β polymorphs; bonding between glibenclamide-mannitol; and an increase in the dissolution profile of glibenclamide by 5.6 times.

Keywords: Glibenclamide, D-mannitol, citric acid, mesoporous, type II diabetes mellitus