ABSTRAK

NABELA DWI KUSUMA AYU, 2021, PENGARUH KONSENTRASI *GELLING AGENT* HPMC K4M DAN KARBOPOL 941 TERHADAP KARAKTERISASI SIFAT FISIK SEDIAAN NANOGEL ALLANTOIN, SKRIPSI, FAKULTAS FARMASI, UNIVERSITAS SETIA BUDI, SURAKARTA. Dibimbing oleh Dr. apt. Ilham Kuncahyo, S.Si., M.Sc. dan apt. Anita Nilawati, S.Farm., M.Farm.

Tanaman Comfrey (*Symphytum officinale* L.) mengandung senyawa allantoin yang memiliki aktivitas mempercepat proses penyembuhan luka. Allantoin mudah terdegradasi apabila digunakan secara oral, modifikasi senyawa allantoin kedalam nanogel dapat diperoleh sediaan yang stabil dan meningkatkan pelepasan zat aktif allantoin. Penelitian ini bertujuan mengetahui sifat fisik nanogel allantoin terhadap penambahan *gelling agent* HPMC-K4M dan Karbopol 94.

Nanogel allantoin dibuat dengan metode gelasi ionik. Konsentrasi HPMC K4M : Karbopol 941 dibuat dalam tiga variasi yaitu F1 (2%:2%) ; F2 (3%:1%), dan F3 (3,5%:0,5%). Karakterisasi nanogel meliputi uji ukuran nanopartikel dan potensial zeta serta karakterisasi gel meliputi uji viskositas, daya lekat, daya sebar, dan uji stabilitas. Data uji mutu fisik dan uji stabilitas dianalisis secara statistik dengan uji *one-way* ANOVA dilanjutkan dengan uji T-test.

Nanopartikel allantoin berukuran 167±4,64 nm dengan nilai zeta potensial 34±1,27 mV. Hasil uji mutu fisik nanogel menunjukkan penambahan konsentrasi HPMC K4M dan Karbopol 941 meningkatkan nilai viskositas dan daya lekat serta menurunkan nilai daya sebar. Formula terbaik diperoleh perbandingan 2% HPMC K4M : 2% Karbopol 941 dengan nilai viskositas 300±21,79 dPa's, daya lekat 18,84±0,12 detik dan daya sebar 4,15±0,16 cm. Uji stabilitas *freeze thaw* menunjukkan hasil bahwa sediaan tetap stabil selama proses penyimpanan.

Kata kunci : Allantoin, *gelasi ionik*, Kitosan, TPP, HPMC K4M, Karbopol 941

NABELA DWI KUSUMA AYU, 2021, THE EFFECT OF GELLING AGENT HPMC K4M AND CARBOPOL 941 CONCENTRATION ON THE CHARACTERIZATION OF THE PHYSICAL PROPERTIES OF NANOGEL ALLANTOIN, THESIS, FACULTY OF PHARMACY, UNIVERSITY SETIA BUDI, SURAKARTA. Supervised by Dr. apt. Ilham Kuncahyo, S.Si., M.Sc. and apt. Anita Nilawati, S.Farm., M.Farm.

Comfrey plant (Symphytum officinale L.) contains namely allantoin which has activity of accelerating wound healing process. However, Allantoins are unstable and degraded with orally administration. Therefore, enhancement of allantoin can be inteded to incorporate into nanogel formulation to increase the value of allantoin release. The aim of this study was to incorporate allantoin into nanogel HPMC K4M and Carbopol 941 which can affect the physical properties.

Allantoin nanogel was prepared using an ionic gelation method. Consentration of HPMC K4M : Carbopol 941, namely F1 (2%:2%); F2 (3%:1%) and F3 (3,5%:0,5%). The characterization of nanogel includes nanoparticle size and zeta potential then gel includes viscosity, adhesion, spreadability, and stability. Data were analyzed statistically using *one-way* ANOVA followed by the T-test.

The resulted display that average of allantoin nanoparticles 167±4,64 nm and the zeta potential value 34±1,27 mV. The addition of HPMC K4M and Carbopol 941 concentrations affected increase if the viscosity and adhesion and reduce the value of the spreadability. Optimized formula comprising 2% HPMC K4M : 2% Carbopol 941 had the viscosity value of 300±21,79 dPa's, adhesion of 18,84±0,12 seconds and spreadability of 4,15±0,16 cm. The freeze thaw stability test showed that the preparation remained stable during the storage process.

Keywords: Allantoin, *ionic gelation,* Chitosan, TPP, HPMC K4M, Karbopol 941