

ABSTRAK

RAHMA ASMARANI, 2021, FORMULASI NANOGEL ALLANTOIN MENGGUNAKAN NANO ALLANTOIN YANG DIBUAT DENGAN METODE GELASI IONIK ANTARA KITOSAN DAN TRIPOLIFOSFAT, SKRIPSI, PROGRAM STUDI S1 FARMASI, FAKULTAS FARMASI, UNIVERSITAS SETIA BUDI, SURAKARTA. Dibimbing oleh Dr. apt. Ilham Kuncahyo, M.Sc. dan Hery Muhamad Ansory, S. Pd., M. Sc.

Allantoin merupakan senyawa kimia yang berperan sebagai antiiritasi dan penyembuh luka. Allantoin memiliki sifat aman, tidak toksik tetapi mudah terdegradasi apabila digunakan secara oral, modifikasi allantoin dalam bentuk nanogel dapat meningkatkan stabilitas dan memberikan efek terapi maksimal. Penelitian ini bertujuan untuk mengetahui pengaruh perbedaan konsentrasi tripolifosfat sebagai agen penyambung silang terhadap karakteristik nano allantoin, mengetahui karakteristik sifat fisik, dan stabilitas nanogel allantoin formula terpilih.

Nanopartikel allantoin dibuat menggunakan metode gelasi ionik antara polimer kitosan dan penyambung silang tripolifosfat. Konsentrasi allantoin yang digunakan sebesar 0,5%, kitosan 0,2% dalam 1% asam asetat glasial, dan tripolifosfat yang dibuat 3 variasi yaitu 0,3%; 0,2%; 0,1%. Karakteristik nanopartikel meliputi ukuran partikel, potensial zeta, dan efisiensi penjerapan. Hidroksipropil metilselulosa (HPMC) digunakan sebagai bahan pembentuk gel. Karakteristik nanogel meliputi organoleptik, homogenitas, daya sebar, daya lekat, dan viskositas.

Hasil uji karakteristik nano allantoin menunjukkan semakin rendah konsentrasi tripolifosfat semakin kecil ukuran partikel, potensial zeta stabil, dan efisiensi penjerapan semakin tinggi. Nano allantoin formula 3 dipilih sebagai formula untuk pembuatan nanogel, memiliki ukuran partikel terkecil ($160,73 \pm 2,4$ nm), potensial zeta stabil ($31,27 \pm 2,76$ mV), dan efisiensi penjerapan tertinggi ($60,01 \pm 0,5$ %). Formula 3 terbukti dapat diformulasikan dalam bentuk nanogel dan memenuhi standar sifat fisik gel yang baik. Uji stabilitas *cycling test* menunjukkan sediaan tetap stabil selama penyimpanan.

Kata kunci: allantoin, kitosan, tripolifosfat, gelasi ionik, nanogel, HPMC, cycling test.

ABSTRACT

RAHMA ASMARANI, 2021, THE FORMULATION OF ALLANTOIN NANOGEL USING NANO ALLANTOIN MADE BY IONIC GELATION METHOD BETWEEN KITOSAN AND TRIPOLIFOSFAT, THESIS, BACHELOR OF PHARMACY, FACULTY OF PHARMACY, SETIABUDI UNIVERSITY, SURAKARTA. Supervised by Dr. apt. Ilham Kuncahyo, M.Sc. and Hery Muhamad Ansory, S. Pd., M. Sc.

Allantoin is a kind of chemical compound as an anti-irritant and wound healer. Allantoin has a safe component characteristic, have not toxic but is easily degraded when used orally. On the other hand, modified allantoin through nanogels can increase stability and provide a maximum therapeutic effect. This study aims to determine the effects of the tripolyphosphate different concentrations as a crosslinking way on the characteristics of nano allantoin, determine the physical characteristics, and stability of the selected formula allantoin nanogel.

Allantoin nanoparticles were prepared using the ionic gelation method between chitosan polymer and tripolyphosphate crosslinker. The concentration of allantoin used was 0.5%, chitosan was 0.2% in 1% glacial acetic acid, and tripolyphosphate made in 3 variations, consisted of 0.3%; 0.2%; and 0.1%. The characteristics of nanoparticles include particle size, zeta potential, and sorption efficiency. Hydroxypropyl methylcellulose (HPMC) was used as a gelling material. The characteristics of nanogels include organoleptic, homogeneity, spreadability, adhesion, and viscosity.

The results of the nano allantoin characteristic test showed the lower the tripolyphosphate concentration, the smaller the particle size, the stable zeta potential, and the higher the adsorption efficiency. Nano allantoin formula number 3 was chosen as the formula for the manufacture of nanogels, which had the smallest particle size (160.73 ± 2.4 nm), stable zeta potential (31.27 ± 2.76 mV), and the highest adsorption efficiency ($60.01 \pm 0,5\%$). Formula 3 was proven to be able to be formulated in the form of nanogels and had good gel physical properties standards. The cycling test stability test showed that the preparation was stable during storage.

Keywords: allantoin, chitosan, tripoliphosphate, ionic gelation, nanogel, HPMC, cycling test.