ENKAPSULASI PIRIDOKSIN (VITAMIN B_6) DALAM NANOPARTIKEL KITOSAN-ALGINAT TERTAUT SILANG NATRIUM TRIPOLIFOSFAT DAN STUDI PELEPASANNYA SECARA IN VITRO

Aulia Rahman
20/466442/PPA/06008

INTISARI

Telah dilakukan penelitian mengenai enkapsulasi vitamin B_6 dalam nanopartikel kitosan-alginat tertaut silang natrium tripolifosfat dan studi pelepasannya secara *in vitro* untuk menentukan efektivitas nanopartikel dalam melepaskan vitamin B_6 di media pelepasan. Komponen nanopartikel yang mempengaruhi pelepasan vitamin B_6 yang telah dipelajari adalah kitosan, alginat dan natrium tripolifosfat.

Nanopartikel dibuat dengan menggunakan metode gelasi ionik dengan cara mencampurkan kitosan di dalam larutan asam asetat 1% dengan alginat, kemudian ditambahkan natrium tripolifosfat sebagai agen taut silang ke dalam campuran larutan tersebut. Nanopartikel yang dihasilkan dikarakterisasi dengan metode spektrofotometri *Fourier Transform Infrared* (FTIR), penentuan ukuran partikel dilakukan menggunakan *Transmission Electron Microscope* (TEM), sedangkan karakterisasi morfologi diuji dengan *Scanning Electron Microscope* (SEM). Studi pelepasan vitamin B_6 ditentukan dengan Spektrofotometer UV-Vis. Kinetika pelepasan vitamin B_6 dikaji dengan model kinetika orde nol, orde satu, model Higuchi dan model Korsmeyer-Peppas.

Hasil penelitian menunjukkan bahwa interaksi elektrostatik antara gugus amina dengan gugus karboksil dapat menyebabkan pergeseran serapan nanopartikel kitosan-alginat-NaTPP pada bilangan gelombang 1635 cm^{-1}. Nanopartikel memiliki ukuran 22,55 nm. Komposisi nanopartikel kitosan-alginat-NaTPP optimal diperoleh pada rasio 1,0:1,5:2,0. Model pelepasan vitamin B_6 mengikuti kinetika Korsmeyer-Peppas dengan mekanisme difusi Fickian. Pelepasan vitamin B_6 sebanyak 82,04% dan memiliki konstanta laju sebesar 0,039 terjadi pada waktu 6 jam.

Kata kunci: alginat, kitosan, nanopartikel, natrium tripolifosfat, vitamin B_6.

ENCAPSULATION OF PYRIDOXINE (VITAMIN B_6) INTO SODIUM TRIPHOSPHATE CROSS-LINKED CHITOSAN-ALGINATE NANOPARTICLES AND ITS IN VITRO DRUG RELEASE STUDY

Aulia Rahman
20/466442/PPA/06008

ABSTRACT

Research of vitamin B_6 encapsulation into sodium tripolyphosphate cross-linked chitosan-alginate nanoparticles and its in-vitro drug release study had been conducted to determine the effectiveness of the nanoparticles to release vitamin B_6 in the releasing media. The composition of the components that influenced the vitamin B_6 release including chitosan, alginate and sodium tripolyphosphate was studied.

Nanoparticles were prepared using the ionic gelation method by mixing chitosan in 1% acetic acid solution with alginate, then sodium tripolyphosphate as a cross-linking agent was added to the mixed solution. The resulting nanoparticles were characterized by the Fourier Transform Infrared (FTIR) spectrophotometric method, the particle size determination was carried out using Transmission Electron Microscope (TEM), while the morphological characterization was tested by Scanning Electron Microscope (SEM). Study of vitamin B_6 release was determined by UV-Vis Spectrophotometer. The kinetics of vitamin B_6 release was analyzed by several models: zero order, first order, Higuchi and Korsmeyer-Peppas model.

The results showed that the electrostatic interaction between the amine group with a carboxyl group can cause a shift in the absorption of chitosan-alginate-NaTPP nanoparticles at wave number 1635 cm^{-1}. Nanoparticles have a size of 22.55 nm. The optimal composition of chitosan-alginate-sodium tripolyphosphate nanoparticles was obtained at a ratio of 1.0:1.5:2.0. Model equation of vitamin B_6 release followed Korsmeyer-Peppas kinetics model with the Fickian diffusion mechanism. The release of vitamin B_6 was 82.04% and had a rate of constant of 0.039 occurred within 6 hours.

Keywords: alginate, chitosan, nanoparticles, sodium tripolyphosphate, vitamin B_6.