Sintesis dan karaktersisasi hidrogel kitosan poli (N-VINIL-2 pirolidon) (PNVP) dengan metode full-interpenetrating polymer network (Full-IPN) = Synthesis and characterization of hydrogel chitosan poly (N-VINIL-2- pyrrolidone) (PNVP) by full interpenetrating polymer network full ipn method

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Abstrak

Sintesis hidrogel kitosan-poli(N-vinil-2-pirolidon) (PNVP) dengan metode full-Interpenetrating Polymer Network (full-IPN) dilakukan secara bertahap (sequential). Tahap pertama yaitu melakukan sintesis jaringan polimer kitosan terikat silang asetaldehida melalui homogenisasi. Tahap kedua yaitu melakukan sintesis jaringan PNVP terikat silang N, N?-metilenbisakrilamida (MBA) melalui reaksi polimerisasi radikal bebas dari monomer NVP dengan agen pengikat silang MBA dan inisiator amonium persulfat (APS). Hidrogel kitosan-PNVP full-IPN yang dihasilkan, memiliki kekuatan ikat silang lebih baik yang teramati dari nilai derajat ikat silang serta dapat mempertahankan kemampuan swelling dengan baik yang teramati dari nilai rasio swelling dibandingkan dengan hidrogel kitosan.
Hasil optimum dari rasio swelling dan derajat ikat silang pada hidrogel kitosan-PNVP full-IPN sebesar 149,8% dan 85,4% dengan komposisi kitosan:monomer NVP yaitu 70:30 (b/b %), waktu reaksi polimerisasi 0,5 jam, konsentrasi MBA 1% (b/b), serta konsentrasi APS 1% (b/b). Karakterisasi dilakukan dengan Spektrofotometer Fourier Transform Infrared (FTIR), Differential Scanning Calorimetry (DSC), dan Scanning Electron Microscope (SEM).
<hr>Synthesis of hydrogel chitosan-poly(N-vinyl-2-pyrrolidone) (PNVP) by full-Interpenetrating Polymer Network was performed in stages (sequential method). The first stage was the synthesis of chitosan polymer network by crosslinked with acetaldehyde under homogenization process. The second stage was the synthesis which was PNVP of crosslinked with N,N?-methylenebisacrylamide (MBA) through free radical polymerization reaction of NVP monomer, was used as the crosslink agent MBA and ammonium persulfate (APS) as the initiator. The synthesized hydrogel chitosan-PNVP full-IPN has a good strength due to the observed crosslinking structure observed the value of crosslinking degree and the good swelling capability by the value of swelling ratio compared with hydrogel chitosan.
The optimum result of swelling ratio and the degree of crosslinking from hydrogel chitosan-PNVP full-IPN were 149,8% and 85,4% which were obtained with the composition chitosan:NVP monomer of 70:30 (w/w %), the polymerization reaction time of 0,5 hours, the concentration MBA 1% (w/w), and the concentration APS 1% (w/w). Products characterizations were done by Fourier Transform Infrared Spectrophotometer (FTIR), Differential Scanning Calorimetry (DSC), dan Scanning Electron Microscope (SEM).