

Sintesis dan karakterisasi hidrogel kitosan metil selulosa dengan metode semi interpenetrating polymer network semi ipn = Synthesis and characterization of chitosan methyl cellulose hydrogel with semi interpenetrating polymer network semi ipn method

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Abstrak

Metode semi-Interpenetrating Polymer Network (Semi-IPN) merupakan salah satu metode untuk mensintesis hidrogel. Pada metode semi-IPN, kitosan mengalami ikat silang dengan agen pengikat silang asetaldehida/ formaldehida/ glutaraldehida membentuk jaringan polimer kitosan terikat silang yang kemudian berinteraksi dengan polimer metil selulosa yang berbentuk linier. Umumnya derajat ikat silang dan rasio swelling hidrogel semi-IPN akan dipengaruhi oleh waktu reaksi, rasio komposisi kitosan-metil selulosa, dan jenis agen pengikat silang yaitu asetaldehida, formaldehida, dan glutaraldehida. Kemampuan swelling dan derajat ikat silang hidrogel kitosan-metil selulosa semi-IPN yang optimum didapat pada rasio kitosan/metil selulosa 60:40 (b/b), agen pengikat silang formaldehida 2% (b/b), dan waktu reaksi 3 jam yaitu persen rasio swelling 785,6 % dan derajat ikat silang 50,8 %. Hidrogel kitosan-metil selulosa dengan metode semi-IPN memiliki rasio swelling dan derajat ikat silang lebih besar dibandingkan dengan hidrogel kitosan nonkovalen. Karakterisasi hidrogel kitosan-metil selulosa semi-IPN dilakukan dengan instrumen Fourier Transform Infra Red (FTIR), Differential Scanning Calorimetry (DSC), dan Scanning Electron Microscope (SEM).

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Semi-Interpenetrating Polymer Network (semi-IPN) method is one of many methods which used to synthesize hydrogels. In semi-IPN method, chitosan was crosslinked with crosslinking agent acetaldehyde/ formaldehyde/ glutaraldehyde to form crosslinked chitosan polymer network that will interracts with methyl cellulose polymer which have linear form. In general, degree of crosslinking and swelling ratio of semi-IPN hydrogels were influenced by reaction time, composition ratio of chitosan-methyl cellulose, and crosslinking agent acetaldehyde, formaldehyde, and glutaraldehyde. Swelling ability and degree of crosslinking of chitosan-methyl cellulose hydrogel with semi-IPN method optimally reach at chitosan/methyl cellulose ratio 60:40 (b/b) with formaldehyde crosslinking agent in 3 hours reaction time is 785,6 % swelling ratio and 50,8 % degree of crosslinking. Chitosan-methyl cellulose hydrogel with semi-IPN method has higher swelling ratio and degree of crosslinking compared to noncovalent chitosan hydrogel. Characterization of chitosan-methyl cellulose semi-IPN hydrogel using Fourier Transform Infra Red (FTIR), Differential Scanning Calorimetry (DSC), dan Scanning Electron Microscope (SEM) instrument.