

Pengaruh variasi konsentrasi pengikat silang pada hidrogel IPN PH sensitif poliakrilamida dan poli(N-metilol akrilamida) terhadap perilaku swelling = The effect of crosslinker concentration on swelling behaviour of pH responsive IPN hydrogel polyacrylamide and poly(N-methylol acrylamide)

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Abstrak

Hidrogel homopolimer poliakrilamida dan poli(N-metilol akrilamida) serta hidrogel IPN poliakrilamida-poli(N-metilol akrilamida) disintesis dengan menggunakan metode polimerisasi radikal bebas. Pada proses sintesis dilakukan variasi konsentrasi pengikat silang N,N'-metilen bis akrilamida (MBA) pada jaringan polimernya untuk mengetahui pengaruhnya terhadap *swelling*. Variasi konsentrasi pengikat silang menyebabkan perubahan matriks hidrogel sehingga rasio *swelling* akan berbeda. Proses polimerisasi berhasil, ditandai dengan hilangnya puncak C=C dan C-H  $sp^2$  alkena pada FTIR. Uji *swelling* dilakukan pada suhu ruang dan variasi pH 3, 5, 7, 9, dan 12 selama 24 jam perendaman. Hasil *swelling* hidrogel IPN ditemukan lebih tinggi dibandingkan hidrogel homopolimer dikarenakan keberadaan jaringan kedua. *Swelling* variasi pH pada hidrogel PNMA dan IPN mempunyai *swelling* tertinggi pada pH 5. Hidrogel dengan konsentrasi pengikat silang 1% untuk PAAm dan IPN PAAm serta konsentrasi pengikat silang 2% untuk PNMA dan IPN PNMA memiliki *swelling* tertinggi.

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Homopolymer hydrogel polyacrylamide and poly(N-methylol acrylamide) also IPN hydrogel polyacrylamide-poly(N-methylol acrylamide) were synthesized using the free radical polymerization method. In the synthesis process, variations of concentration N, N'-methylene bis acrylamide (MBA) crosslinkers were used on the polymer network to determine their effect on swelling behaviour. Variations of crosslinker concentration caused changes in the hydrogel structure and thus the swelling ratio will be different. The polymerization process conducted successfully, which was marked by the loss of the C = C and C-H  $sp^2$  alkene peaks at FTIR. Swelling test were carried out at room temperature and pH 3, 5, 7, 9, and 12. The IPN hydrogel swelling ratio was found to be higher than homopolymer hydrogel due to the presence of the second network. The highest swelling behaviour in different pH for PNMA and IPN hydrogels was found at pH 5. Hydrogels with a crosslinking concentration of 1% for PAAm, IPN PAAm and 2% for PNMA, IPN PNMA had the highest swelling.