

**GLISEROL DAN POLI(PROPILEN ITAKONAT)  
SEBAGAI PLASTICIZER PADA FILM  
Ca-ALGINAT/CARBOXYMETHYL CELLULOSE**

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**INTISARI**

Telah dilakukan pembuatan film Ca-alginat/CMC dengan penambahan gliserol dan poli(propilen itakonat) sebagai *plasticizer*. Penelitian ini bertujuan untuk mempelajari pengaruh penambahan CMC terhadap karakter fisik dan mekanik film biodegradabel Ca-alginat, pengaruh penambahan *plasticizer* terhadap film Ca-alginat/CMC, dan mempelajari biodegradasi film Ca-alginat/CMC.

Pembuatan film Ca-alginat/CMC dilakukan menggunakan metode *casting* dengan cara mencampurkan Na-alginat dengan CaCl<sub>2</sub> 1% dan CMC dengan konsentrasi alginat:CMC 9:1, 8:2, 7:3, 6:4 dan 5:5, dengan penambahan *plasticizer* gliserol dan poli(propilen itakonat) dengan konsentrasi 0, 3, 6, 9, 12 dan 15% (b/b). Larutan dicetak dan dipanaskan pada suhu 60 °C hingga terbentuk film dan selanjutnya dilakukan uji karakter film yang meliputi kuat tarik, persen perpanjangan, laju transmisi uap air (WVTR), FT-IR dan uji biodegradasi.

Hasil penelitian menunjukkan bahwa CMC dapat meningkatkan kuat tarik dan biodegradabilitas film Ca-alginat. Penambahan CMC mencapai kondisi optimum pada konsentrasi alginat:CMC 5:5 dengan *plasticizer* gliserol dan 7:3 dengan *plasticizer* poli(propilen itakonat). Penambahan *plasticizer* gliserol optimum pada konsentrasi 15% dengan nilai kuat tarik 16,70 Mpa, persen perpanjangan 7,67%, dan WVTR 1,22 g.mm/m<sup>2</sup>.jam.atm. Penambahan *plasticizer* poli(propilen itakonat) optimum pada konsentrasi 12% dengan nilai kuat tarik 16,69 MPa, persen perpanjangan 6,55%, dan WVTR 0,70 g.mm/m<sup>2</sup>.jam.atm. Hasil uji biodegradasi menunjukkan penggunaan bahan alami alginat, CMC, gliserol, dan poli(propilen itakonat) dapat mempercepat waktu degradasi. Persen kehilangan massa film Ca-alginat/CMC berkisar antara 12 – 56% dalam waktu 7 hari.

Kata kunci: Ca-alginat, CMC, gliserol, poli(propilen itakonat), film

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AS PLASTICIZERS OF Ca-ALGINATE/CARBOXYMETHYL  
CELLULOSE FILM**

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**ABSTRACT**

Synthesis of biodegradable film from Ca-alginate/Carboxymethyl cellulose using glycerol and poly(propylene itaconate) as plasticizer has been studied. The purpose of this research is to study the effect of CMC on physical and mechanical characteristic of Ca-alginate film. The effect of glycerol and poly(propylene itaconate) as plasticizer to Ca-alginate/CMC film's characteristic and biodegradation of the film is also studied.

Ca-alginate film was prepared by casting method, i.e. the mixing of Na-alginate with  $\text{CaCl}_2$  1%. The ratio of alginate:CMC are 9:1, 8:2, 7:3, 6:4 and 5:5 with variation of glycerol and poly(propylene itaconate) 0, 3, 6, 9, 12 and 15% (w/w). The solution was molded and heated to 60 °C to form the film. The film was characterized for tensile strength, elongation to break, water vapour transmission rate (WVTR), FT-IR and biodegradation test.

The result showed that CMC could increase the tensile strength and biodegradability of the film. The increase of CMC reached its optimum condition at concentration of alginate:CMC 5:5 by glycerol as plasticizer and 7:3 by poly(propylene itaconate) as plasticizer. The use of glycerol as plasticizer reached its optimum condition when its concentration is 15% (w/w) with tensile strength 16.70 Mpa, elongation to break 7.67%, and WVTR 1.22 mm.g/m<sup>2</sup>.hour.atm. The use of poly(propylene itaconate) as plasticizer reached its optimum condition when its concentration is 12% (w/w) with tensile strength 16.69 Mpa, elongation to break 6.55% and WVTR 0.70 g.mm/m<sup>2</sup>.hour.atm. The result of biodegradation test showed that alginate, CMC, glycerol and poly(propylene itaconate) could reduce biodegradation time with the percentage of mass loss is 12 – 56% in 7 days.

Keyword: Ca-alginate, CMC, glycerol, poly(propylene itaconate), film