

PENGARUH PENAMBAHAN PEMLASTIS POLI(PROPILEN ITAKONAT) DAN GLISEROL TERHADAP KARAKTER FISIK DAN MEKANIK PLASTIK BIODEGRADABEL Ca-ALGINAT/ASAM STEARAT

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INTISARI

Telah dipelajari pengaruh pemlastis poli(propilen itakonat) dan gliserol terhadap plastik biodegradabel Ca-alginat/asam stearat. Tujuan penelitian ini untuk mengetahui pengaruh asam stearat dan pemlastis terhadap karakter fisik dan mekanik film Ca-alginat/asam stearat dan membandingkan poli(propilen itakonat) dengan gliserol sebagai pemlastis dalam plastik biodegradabel.

Penelitian ini diawali dengan membuat plastik biodegradabel Ca-alginat/asam stearat dengan variasi asam stearat 0, 5, 10, 15% (b/b) serta variasi pemlastis 3, 6, 9, 12, 15, 18% (b/b). Plastik biodegradabel yang dihasilkan diuji sifat fisik dan mekaniknya yaitu kuat tarik, persen elongasi, dan permeabilitas uap air. Plastik biodegradabel pada konsentrasi asam stearat dan pemlastis optimum dikarakterisasi dengan FTIR dan diuji biodegradasi menggunakan EM4.

Hasil penelitian menunjukkan bahwa plastik biodegradabel Ca-alginat/asam stearat dengan pemlastis poli(propilen itakonat) mencapai kondisi optimum pada konsentrasi asam stearat 5% (b/b) dan poli(propilen itakonat) 15% (b/b) dengan nilai kuat tarik 17,73 MPa, nilai persen elongasi 4,54%, dan nilai permeabilitas uap air $1,00 \text{ g mm m}^{-2} \text{ jam}^{-1} \text{ atm}^{-1}$, sedangkan dengan pemlastis gliserol mencapai kondisi optimum pada konsentrasi asam stearat 10% (b/b) dan gliserol 15% (b/b) dengan nilai kuat tarik 8,73 MPa, nilai persen elongasi 9,76%, dan nilai permeabilitas uap air $0,87 \text{ g mm m}^{-2} \text{ jam}^{-1} \text{ atm}^{-1}$. Plastik biodegradabel Ca-alginat/asam stearat dengan pemlastis gliserol lebih baik dibandingkan dengan pemlastis poli(propilen itakonat) karena memiliki nilai persen elongasi yang tinggi dan nilai permeabilitas uap air yang rendah.

Kata kunci: plastik biodegradabel, asam stearat, pemlastis, poli(propilen itakonat), gliserol.

THE EFFECT OF ADDING POLY(PROPYLENE ITACONATE) AND GLYCEROL PLASTICIZER TO THE PHYSICAL AND MECHANICAL CHARACTER OF Ca-ALGINATE/STEARIC ACID BIODEGRADABLE PLASTIC

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ABSTRACT

Have studied the effect of poly(propylene itaconate) and glycerol plasticizer to the Ca-alginate/stearic acid biodegradable plastic. The purpose of this study was to determine the effect of stearic acid and plasticizer to the physical and mechanical properties of the film Ca-alginate/stearic acid and comparing poly(propylene itaconate) with glycerol as a plasticizer in the biodegradable plastic.

This study started with the making biodegradable plastic with stearic acid variation of 0, 5, 10, 15% (w/w) and plasticizer variation of 3, 6, 9, 12, 15, 18% (w/w). Biodegradable plastics tested physical and mechanical properties, such as tensile strength, elongation to break, and water vapor permeability. Biodegradable plastics with stearic acid and plasticizer optimum concentration characterized by FTIR and biodegradation tested with EM4.

The results showed that the biodegradable plastic Ca-alginate/stearic acid with poly(propylene itaconate) had optimum conditions in stearic acid concentration 5% (w/w) and poly(propylene itaconate) 15% (w/w) which tensile strength 17.73 MPa, elongation percentage 4.54%, and water vapor permeability $1.00 \text{ g mm m}^{-2} \text{ h}^{-1} \text{ atm}^{-1}$, while using glycerol plasticizer had optimum conditions in stearic acid concentration 10% (w/w) and glycerol 15 % (w/w) which tensile strength 8.73 MPa, elongation percentage 9.76%, and water vapor permeability $0.87 \text{ g mm m}^{-2} \text{ h}^{-1} \text{ atm}^{-1}$. Biodegradable plastic Ca-alginate/stearic acid with glycerol plasticizer was better than poly(propylene itaconate) plasticizer because it had higher elongation percentage and lower water vapor permeability.

Keyword: biodegradable plastic, stearic acid, plasticizer, poly(propylene itaconate), glycerol.