

Studi Migrasi Total pada Bioplastik Termoplastik Pati (TPS) - Selulosa Bakteri (BC) – Poli Asam Laktat (PLA) sebagai Kemasan Pangan = Study of Total Migration on Bioplastic Thermoplastic Starch (TPS) - Bacterial Cellulose (BC) - Poly Lactic Acid (PLA) as Food Packaging

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Abstrak

Pada penelitian ini dipelajari migrasi total bioplastik termoplastik pati (TPS) - selulosa bakteri (BC) – poli asam laktat (PLA) sebagai kemasan pangan. Bioplastik TPS – PLA (50:50) disintesis dengan penguat BC dalam konsentrasi 0%, 1%, 5%, dan 10%. Proses dilakukan dengan ekstrusi dua tahap dan compression moulding. Penambahan BC sebesar 1% memberikan sifat termal dan derajat kristalinitas yang optimal. Peningkatan konsentrasi BC menurunkan densitas, dimana bioplastik ringan akan menjadi poin yang baik untuk kemasan. Analisis water vapor transmission rate (WVTR) menunjukkan bahwa bioplastik dengan penambahan BC 10% dapat menahan uap air hingga 36% dibandingkan dengan bioplastik tanpa BC. Uji migrasi total dilakukan dengan waktu pengujian 24 jam, suhu pengujian yaitu 20 °C, 40 °C dan 60 °C, dan simulan pangan etanol 10%, 20%, 50%, 95%, dan asam asetat 3%. Migrasi total bioplastik TPS-BC-PLA berkisar antara 4,23 – 152,77 mg/dm². Secara umum, nilai migrasi total semakin besar dengan penambahan konsentrasi BC, peningkatan suhu kontak, dan kepolaran simulan. Sesuai dengan ketentuan BPOM bahwa batas migrasi pada kemasan pangan maksimal 10 mg/dm², maka bioplastik TPA-BC-PLA yang memenuhi adalah H1LA, H2LA, H3LA pada suhu 20 °C dengan simulan etanol 50% dan 95%, H2LA pada suhu 40 °C dengan simulan etanol 50%, H1LA dan H2LA pada suhu 40 °C dengan simulan etanol 95%. Etanol 50% dan 95% adalah simulan untuk pangan berlemak, seperti mentega, keju, dan daging

.....In this study, the total migration of thermoplastic bioplastic starch (TPS) - bacterial cellulose (BC) - poly lactic acid (PLA) as food packaging was studied. TPS – PLA (50:50) bioplastic was synthesized with BC reinforcement in concentrations of 0%, 1%, 5%, and 10%. The process was carried out by two-stage extrusion and compression molding. The addition of 1% BC provided optimal thermal properties and degree of crystallinity. Increasing the concentration of BC decreases the density, where lightweight bioplastics would be good points for packaging. Water vapor transmission rate (WVTR) analysis showed that bioplastics with 10% BC addition could hold up to 36% water vapor compared to bioplastics without BC. The total migration test was carried out with a testing time of 24 hours, the test temperatures were 20 °C, 40 °C and 60 °C, and food simulants were ethanol 10%, 20%, 50%, 95%, and 3% acetic acid. The total migration of TPS-BC-PLA bioplastics ranged from 4.23 – 152.77 mg/dm². In general, the total migration value increases with the addition of BC concentration, increasing contact temperature, and simulant polarity. In accordance with the provisions of BPOM that the maximum migration limit on food packaging is 10 mg/dm², the TPA-BC-PLA bioplastics that meet are H1LA, H2LA, H3LA at 20 °C with 50% and 95% ethanol simulants, H2LA at 40 °C with 50% ethanol simulant, H1LA and H2LA at 40 °C with 95% ethanol simulant. Ethanol 50% and 95% are simulants for fatty foods, such as butter, cheese, and meat