

ABSTRAK

Sintesis membran kitosan tertaut silang asam dikarboksilat dan aplikasinya sebagai membran *slow-release fertilizer (SRF)* telah dilakukan untuk mengurangi penggunaan pupuk secara berlebihan dan meningkatkan efisiensi penyerapan nutrisi oleh tanaman. Pengaruh penambahan jumlah rantai karbon pada asam dikarboksilat terhadap karakteristik kitosan dipelajari pada penelitian ini. Penelitian ini melibatkan pembuatan membran kitosan modifikasi asam dikarboksilat (asam suksinat, asam glutarat, asam adipat) dengan metode *blending*, pembuatan membran terisolasi urea dicetak dengan metode *coating/sandwich*, dan karakterisasi fisikokimia membran yang dihasilkan meliputi uji: gugus fungsi menggunakan FTIR (*Fourier-Transform Infrared*), morfologi permukaan membran dengan AFM (*Atomic Force Microscopy*), uji berat dan ketebalan, porositas (*porosity*), derajat pengembangan (*swelling degree*), serap air (*water uptake*), sudut kontak, ketahanan pH, dan biodegradasi, serta aplikasi membran *SRF* di dalam air. Berdasarkan penelitian yang telah dilakukan menunjukkan bahwa modifikasi membran kitosan dengan asam dikarboksilat menghasilkan peningkatan porositas, derajat pengembangan, daya serap air, hidrofilitas, ketahanan pH, dan biodegradasi membran. Membran *SRF* yang dihasilkan menunjukkan efektivitas pelepasan urea selama 14 hari dengan persentase pelepasan antara 18,50-38,38%.

Kata kunci: Membran, kitosan, asam dikarboksilat, *slow-release fertilizer (SRF)*

ABSTRACT

The synthesis of chitosan membrane cross-linked dicarboxylic acid and its application as a slow-release fertilizer membrane (SRF) has been done to reduce excessive use of fertilizers and improve the efficiency of nutrient absorption by plants. The increase in the carbon chain length of dicarboxylic acid on the characteristics of chitosan was studied. The research involved the manufacture of modified chitosan membranes of dicarboxylic acid (succinate acid, glutaric acid, adipic acid) by blending methods, the production of isolated membrane of printed urea by coating/sandwich method, and the physiochemical characterization of the resulting membrane included tests: function groups using FTIR (Fourier-Transform Infrared), membrane surface morphology with AFM (Atomic Force Microscopy), tests of gravity and thickness, porosity, swelling degree, water uptake, contact angle, pH resistance, and biodegradation, as well as SRF membrane applications in water. Studies have shown that the modification of the chitosan membrane with dicarboxylic acid results in increased porosity, swelling degree, water uptake, hydrophilicity, pH resistance, and membrane biodegradation. The resulting SRF membrane showed urea release effectiveness for 14 days with a release percentage between 18.50-38.38%.

Keywords: Membrane, chitosan, dicarboxylic acid, slow-release fertilizer (SRF)