# Efek Crosslinking pada Biodegradabilitas Busa Superabsorbent = Effect of Crosslinking on Superabsorbent Foam Biodegradability

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Abstrak

uperabsorbent polymers (SAP) dapat dihimbau mendapatkan minat yang meningkat dari berbagai industry yang berbeda dalam beberapa tahun terakhir. Namun, mayoritas dari SAP diproduksi menggunakan petroleum sebagai bahan baku yang merupakan sebuah ancaman bagi lingkungan dikarenakan masa degradasi yang panjang. Polimer yang diproduksi dari selulosa merupakan sebuah alternatif yang menjanjikan dikarenakan properti biodegradasi. Efek dari crosslinking untuk biodegradasi SAP diuji terhadap beberapa properti yang berbeda. Literatur yang telah tercetak menunjukkan bahwa dengan crosslinking yang lebih kuat, maka daya tahan biodegradasi akan menjadi lebih tinggi. Namun, eksperimen pendahuluan yang telah dilakukan menunjukkan hasil yang berbeda. Selulase dari Trichoderma reesei di-analisa menggunakan beberapa teknik yang berbeda. Hasil analisis menunjukkan sebuah kecenderungan dimana biodegradasi terjadi lebih cepat di sampel yang telah di-crosslink. Alasan untuk hal tersebut, namun, tidak dapat ditentukan dikarenakan diluar cakupan riset.

.....Superabsorbent polymers (SAPs) have seen an increase in interest from various different industries within the past few years. However, a majority of SAPs are produced using petroleum-based polymer which poses as a major environmental threat due to its long degradation period. SAPs produced from cellulose is a promising alternative due to its sustainable characteristics as well as its ease of biodegradation. The effect of crosslinking on the biodegradation of SAPs was tested. Current literature has shown that crosslinking increases stability and resistance to biodegradation. Nanocellulose foams, synthesized through a TEMPO-mediated oxidation process, were crosslinked using Hexamethylenediamine (HMDA) and tested through different analysis methods. UV-Vis spectrophotometry was used to analyse enzymatic activity, gas chromatography was used to test microbial activity, and high-performance liquid chromatography (HPLC) was used to analyse biodegradation testing. Cellulose from Trichoderma reesei was used as the enzyme for an enzymatic biodegradation process. The experimental results showed a trend which sees a higher rate of biodegradation in chemically crosslinked samples. This result may prove to be significant as it contradicts established literature. Experimental results, however, was unable to prove a possible reason relating to enzymatic activity due to unreproducible results. Other possible reasons were explored which includes HMDA crosslinking affecting the crystallinity and hydrophobicity of nanocellulose foam. These reasons have yet to be tested as it is outside the scope of research, however further research might prove beneficial as it may bring significant insight regarding crosslinking.