ABSTRAK

PENGOLAHAN SERAT PELEPAH NIPAH (*NYPA FRUTICANS*) YANG DIPROSES SECARA FISIKA-KIMIA SEBAGAI BAHAN BAKU TEKSTIL

(Selvia, 2025, 45 Halaman, 11 tabel, 18 Gambar, 4 Lampiran)

Industri tekstil di Indonesia memiliki peran penting dalam perekonomian nasional, namun masih bergantung pada bahan baku sintetis berbasis impor yang berdampak negatif terhadap lingkungan. Untuk mengatasi permasalahan tersebut, diperlukan alternatif bahan baku yang ramah lingkungan dan tersedia secara lokal. Pelepah nipah (*Nypa fruticans*), yang merupakan limbah pertanian di daerah pesisir Indonesia, mengandung senyawa lignoselulosa seperti selulosa, hemiselulosa, dan lignin, sehingga berpotensi diolah menjadi serat tekstil alami. Proses ekstraksi serat dilakukan menggunakan alat dekortikator, dilanjutkan dengan perendaman dalam larutan NaOH konsentrasi 4%, 5%, dan 6% selama 60 hingga 300 menit, serta tahap *bleaching* menggunakan NaClO. Analisis komponen kimia meliputi kadar selulosa, hemiselulosa, dan lignin menggunakan metode *Chesson-Datta*. Hasil terbaik diperoleh pada perlakuan dengan larutan NaOH 6% dengan waktu perendaman 300 menit, yang menghasilkan kandungan selulosa sebesar 49,73%, hemiselulosa 17,84%, dan lignin 8,71%. Nilai kekuatan tarik mencapai 171,03 Mpa. Penurunan signifikan kadar lignin dan hemiselulosa menunjukkan keberhasilan proses delignifikasi, sementara peningkatan kadar selulosa berkontribusi terhadap kekuatan tarik serat. Hasil ini menunjukkan bahwa serat pelepah nipah berpotensi digunakan sebagai bahan baku tekstil ramah lingkungan.

Kata Kunci: Serat Alam, Pelepah Nipah, Dekortikator, Alkalisasi, Delignifikasi, Tekstil.

ABSTRACT

PROCESSING OF NIPAH (NYPA FRUTICANS) THROUGH PHYSICO-CHEMICAL TREATMENT AS RAW MATERIAL FOR TEXTILE APPLICATIONS

(Selvia, 2025, 45 Pages, 11 tables, 18 Figures, 4 Attachments)

The textile industry in Indonesia plays a vital role in the national economy but remains heavily dependent on imported synthetic raw materials, which have adverse environmental impacts. To address this issue, it is necessary to explore alternative raw materials that are both environmentally friendly and locally available. Nypa fruticans, commonly known as nipa palm, is an agricultural waste abundantly found in coastal regions of Indonesia and contains lignocellulosic compounds such as cellulose, hemicellulose, and lignin, making it a promising source of natural textile fibers. Fiber extraction was carried out using a decorticator, followed by immersion in NaOH solutions with concentrations of 4%, 5%, and 6% for durations ranging from 60 to 300 minutes. A bleaching step using NaClO was also conducted. Chemical composition analysis, including cellulose, hemicellulose, and lignin content, was performed using the Chesson-Datta method. The optimal result was obtained with 6% NaOH treatment for 300 minutes, yielding the highest cellulose content of 49,73%, hemicellulose content of 17,84% and lignin content of 8,71%. The tensile strength reached 171,03 Mpa. A significant reduction in lignin and hemicellulose indicates successful delignification, while the increase in cellulose content contributed to improved fiber tensile strength. These results demonstrate the potential of Nypa fruticans petiole fiber as an environmentally friendly raw material for textile applications.

Keywords: Natural Fiber, Nypa Petiole, Decorticator, Alkali Treatment, Delignification, Textile.