UPAYA MENINGKATKAN *SOFTNESS* SERAT RAMI MENGGUNAKAN CAIRAN IONIK EUTEKTIK BERBASIS KOLINIUM KLORIDA

SKRIPSI

diajukan untuk memenuhi salah satu syarat memperoleh
gelar Sarjana Sains pada Program Studi Kimia

oleh

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PROGRAM STUDI KIMIA

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UNIVERSITAS PENDIDIKAN INDONESIA

2023

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PERNYATAAN

Dengan ini saya menyatakan bahwa skripsi dengan judul "**Upaya Meningkatkan *Softness* Serat Rami Menggunakan Cairan Ionik Eutektik Berbasis Kolinium Klorida**" ini beserta seluruh isinya adalah benar-benar karya sendiri. Saya tidak melakukan penjiplakan atau pengutipan dengan cara-cara tidak sesuai dengan etika ilmu yang berlaku dalam masyarakat keilmuan. Atas pernyataan ini, saya siap menerima risiko/ sanksi apabila dikemudian hari ditemukan adanya pelanggaran etika keilmuan atau ada klaim dari pihak lain terhadap keaslian karya saya ini.

Bandung, Agustus 2023

Yang Membuat Pernyataan

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ABSTRAK

Serat rami merupakan salah satu serat alami yang berasal dari bagian batang tanaman dan memiliki sifat yang unggul untuk aplikasi tekstil. Namun karena bersifat kaku, serat ini memerlukan perlakuan tertentu untuk mengurangi sifat kakunya. Berbagai metode kimia telah dikembangkan untuk menurunkan sifat kaku serat rami, namun masih menghasilkan cemaran lingkungan yang berbahaya. Dalam penelitian ini, terhadap serat rami dilakukan proses *degumming* menggunakan dua jenis cairan ionik eutektik (*eutectic ionic liquid* − EILs) yaitu kolinium klorida−asam oksalat 1:1 (CO) dan kolinium klorida−$ZnCl_2$ 1:2 (CZ). Karakterisasi EILs menggunakan FTIR dilakukan untuk menganalisis pembentukan kedua EILs yang berhasil dipreparasi; EILs yang berhasil dipreparasi kemudian dicampur dengan air dengan konsentrasi 50%. *Degumming* serat dilakukan selama 1 jam pada suhu 80 ℃ dengan perbandingan S:L = 1:20 untuk masing-masing EILs. Serat sebelum dan sesudah di*degumming* dikarakterisasi menggunakan SEM (diameter dan morfologi serat), uji tarik, dan XRD (indeks kristalinitas). Keberhasilan *degumming* ditinjau dari pengukuran *softness* serat yang dikonfirmasi dan diamati hubungannya dengan data hasil uji tarik dan indeks kristalinitas serat. Spektrum IR menunjukkan kedua EILs berhasil di preparasi. Selanjutnya *softness* serat yang di*degumming* menggunakan CZ (1260 Nm) lebih tinggi dibandingkan menggunakan CO (1070 Nm). Dalam penelitian ini, upaya untuk meningkatkan *softness* serat rami menggunakan kedua EILs berhasil; namun pengembangan tambahan diperlukan untuk mendekati data *softness* dan sifat mekanik yang ada dalam standar serat yang digunakan dalam industri tekstil.

Kata kunci: *degumming* serat rami, *eutectic ionic liquid*, karakteristik EILs, dan *softness* serat

ABSTRACT

Ramie fiber is a natural fiber that is taken from the stem of its plant and has superior properties for textile applications. Due to its rigidity, this fiber requires certain treatment to decrease its rigidity. Various chemical methods have been developed to reduce the rigidity of ramie fiber, but still produce harmful environmental pollutants. In this study, ramie fiber was degummed using two types of eutectic ionic liquids (EILs), i.e. choline chloride-oxalic acid 1:1 (CO) and choline chloride-$ZnCl_2$ 1:2 (CZ). Characterization of EILs using FTIR was carried out to analyze the formation of the two EILs that were successfully prepared; both EILs that were successfully prepared then were mixed with water at a concentration of 50%. Degumming fiber was carried out for 1 hour at 80 ℃ with a ratio of S:L = 1:20 for each EILs. Fibers before and after degumming were characterized using SEM (diameter and fiber morphology), tensile test, and XRD (crystallinity index). The achievement of degumming is reviewed from the measurement of fiber softness which is confirmed and observed in relation to tensile test results data and fiber crystallinity index. The IR spectrum shows both EILs successfully prepared. Furthermore, the softness of the fiber degumming using CZ (1260 Nm) is higher than using CO (1070 Nm). In this study, attempt to enhance softness of ramie fiber using both EILs were successful; however additional development is required to approach the softness of the data and mechanical properties present in fiber standards used in the textile industry.

Keywords: *degumming of ramie fiber, EILs characteristics, eutectic ionic liquid, and softness' fiber*

DAFTAR ISI

DAFTAR GAMBAR

DAFTAR TABEL

DAFTAR LAMPIRAN

DAFTAR SINGKATAN

[BMIM]OAc	:	1-Butil-3-metilimidazolium asetat
CO	:	EIL kolinium klorida−asam oksalat (ChCl-*oxalic acid*)
CZ	:	EIL kolinium klorida−$ZnCl_2$ (ChCl-$ZnCl_2$)
DBA	:	Dibenzilideneaseton
EG	:	Etilen glikol
[EMIM]OAc	:	1-Etil-3-metilimidazolium asetat
gly	:	Gliserol
HFIF	:	Heksafluoro-2-propanol
imH	:	Imidazol
LA	:	*Lactic acid*
Nm	:	No metrik
OA	:	*Oxalic acid*
PTSA	:	*p-Toluenesulfonic acid*
RF	:	Serat rami mentah atau sebelum di*degumming*
RFCO	:	Serat rami yang di*degumming* menggunakan CO
RFCZ	:	Serat rami yang di*degumming* menggunakan CZ
SB	:	Sorbitol
TOPO	:	*Trioctylphosphine oxide*

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