INTISARI

Fabrikasi dan Karakterisasi Membran Nanofiber *Expanded Polystyrene* (EPS) dengan Pelarut Terpena

Oleh

Nabila Aulia Laely Putri
19/439124/PA/18947

Telah dilakukan fabrikasi dan karakterisasi membran nanofiber EPS dengan pelarut terpena. Penelitian ini dilakukan sebagai upaya pengolahan limbah styrofoam wadah makanan. Selain itu, penelitian ini dilakukan untuk menentukan konsentrasi EPS pada pelarut DMF : *R-Limonene* yang optimal dan menentukan pengaruh variasi jenis pelarut terpena terhadap morfologi, gugus fungsi, nilai sudut kontak, dan sifat mekanik membran nanofiber EPS. Penelitian ini dapat dijadikan acuan dalam kajian membran nanofiber EPS dengan pelarut terpena. Pada penelitian ini dilakukan variasi konsentrasi EPS sebesar 10, 13, 15, 18, 20 wt% menggunakan pelarut DMF : *R-Limonene* terlebih dahulu untuk menemukan konsentrasi optimum berdasarkan morfologi membran. Setelah menemukan konsentrasi optimum yakni pada konsentrasi 15 wt% dilakukan variasi pelarut terpena lain dicampur dengan DMF yakni, DMF : γ-*Terpinene* dan *α-Pinene*. Pada variasi pelarut ini dilakukan karakterisasi SEM dan FTIR. Setelah dilakukan karakterisasi, membran nanofiber EPS dilakukan uji sudut kontak dan uji sifat mekanik. Uji sifat mekanik dilakukan dengan uji tekan dan uji tarik. Hasil penelitian ini menunjukkan membran nanofiber EPS 15 wt% variasi jenis pelarut terpena memiliki : fiber yang bebas beads dengan arah fiber paling seragam pada jenis pelarut DMF : *γ-Terpinene,* gugus fungsi yang sama dengan gugus fungsi polimernya yakni EPS, tingkat kebasahan ultrahidrofobik dengan nilai sudut kontak paling kecil diraih oleh pelarut DMF : *γ-Terpinene*, nilai kuat tekan yang paling besar diraih oleh DMF : *γ-Terpinene*, dan modulus elastisitas hasil uji kuat tarik menunjukkan pelarut DMF : *α-Pinene* memiliki karakteristik mekanik paling elastis sedangkan membran EPS menggunakan pelarut DMF : *R-Limonene* memiliki karakteristik paling tidak elastis.

Kata kunci : *expanded polystyrene*, elektrospinning, nanofiber, terpena, *dimetylformalamide*

ABSTRACT

FABRICATION AND CHARACTERIZATION OF EXPANDED POLYSTYRENE (EPS) NANOFIBER MEMBRANE IN TERPENE SOLVENT

by

Nabila Aulia Laely Putri
19/439124/PA/18947

Fabrication and characterization of EPS nanofiber membrane with terpene solvent have been conducted. This research was conducted as an effort to recycle food packaging styrofoam waste. In addition, this research was conducted to determine the concentration of EPS in DMF solvent: R-Limonene solvent and determine the effect of variations in the type of terpene solvent on the morphology, functional groups, contact angle values, and mechanical properties of EPS nanofiber membranes. This research can be used as a reference in the study of EPS nanofiber membranes with terpene solvent. In this study, the variations in EPS concentration of 10, 13, 15, 18, and 20 wt% were first conducted using DMF solvent: R-Limonene solvent to find the optimum concentration based on membrane morphology. After find the optimum concentration, namely at a concentration of 15 wt%, variations of other terpene solvents mixed with DMF were carried out, namely, DMF: γ-Terpinene and α-Pinene. In this solvent variation, SEM and FTIR characterization was carried out. After characterization, the EPS nanofiber membrane was tested for contact angle and mechanical properties. Mechanical properties test was conducted with compressive test and tensile test. The results of this study show that the 15 wt% EPS nanofiber membrane varies in the type of terpene solvent have fiber free beads with the most uniform fiber direction in the type of DMF solvent: γ-Terpinene solvent, the same functional group as the polymer functional group, namely EPS, ultra hydrophobic wetness level with the smallest contact angle value achieved by DMF solvent: γ-Terpinene, the highest compressive strength value was achieved by DMF: γ-Terpinene, and the elastic modulus of tensile strength test results showed DMF solvent: α-Pinene has the most elastic mechanical characteristics while the EPS membrane using DMF solvent: R-Limonene has the least elastic characteristics.

Keywords : expanded polystyrene, electrospinning, nanofiber, terpene, dimetylformalamide