

Abstract

This study analyzes the effect of emulsifiers on the mechanical properties of electrospun membranes based on Polyvinyl Alcohol (PVA) incorporated with Piper betle L. essential oil. The emulsifiers used were Tween 80 and Sodium Lauryl Sulfate (SLS). The membranes were fabricated using the electrospinning technique at a voltage of 25 kV and a 13 cm tip-to-collector distance. Characterization was performed through mechanical testing, fiber morphology analysis using Scanning Electron Microscopy (SEM), and functional group analysis using Fourier Transform Infrared Spectroscopy (FTIR). The results show that the addition of emulsifiers improves the mechanical properties and fiber uniformity of the electrospun membranes. Tween 80 provided the best performance, producing more homogeneous fibers with minimal bead formation, as well as higher tensile strength and elongation at break compared to SLS. FTIR analysis indicates the presence of hydrogen bonding interactions between PVA, the essential oil, and the emulsifiers, which contribute to enhanced structural and mechanical membrane quality. Therefore, Tween 80 is more effective than SLS in improving membrane performance and holds potential for biomedical applications, particularly as a wound dressing material.

Keywords : Electrospinning, Polyvinyl Alcohol (PVA), Piper betle L. Atsiri, Tween 80, Sodium Lauryl Sulfate (SLS), Mechanical Properties.