

ABSTRACT

Chronic kidney disease (CKD) impairs the kidney's ability to filter metabolic waste products, necessitating the development of effective dialysis membranes. This study aimed to synthesize chitosan membranes combined with starch and cross-linked using polyethylene glycol (PEG), and to investigate their effects on physicochemical characteristics and dialysis efficiency of creatinine and urea. Membranes were fabricated using the phase inversion method with a chitosan-starch ratio of 1.5 g : 0.75 g and varying PEG concentrations of 0.0224 g (CsStP1), 0.044 g (CsStP2), and 0.224 g (CsStP3). The results showed that the addition of starch and PEG significantly improved the swelling degree, porosity, water uptake, hydrophilicity, and tensile strength of the membranes. SEM analysis revealed a more open and uniform pore structure, while permeation tests demonstrated enhanced transport capacity for creatinine and urea. The optimal membrane was obtained at the CsStP3 variation, achieving creatinine transport of 35.19% and urea transport of 39.99%. It was concluded that the modification of chitosan membranes with starch and PEG successfully enhanced dialysis performance, making them a promising alternative as effective and environmentally friendly biopolymer-based membranes.

Keywords: *chitosan, starch, polyethylene glycol, membrane, creatinine dialysis, chronic kidney disease*