

## INVESTIGATION OF BIOFOULING RESISTANT POLY(VINYL ALCOHOL)/CELLULOSE ACETATE ULTRAFILTRATION MEMBRANES

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Biofouling is detrimental to water filtration processes and decreases the durability of membranes. Therefore, membranes, that are resistant to the accumulation of microorganisms, are a necessity for water filtration. In this study, Cellulose Acetate (CA) and Poly(vinyl alcohol) blend membranes were prepared by the phase inversion method. To increase the rejection of foulants through the membrane, silver ( $\text{Ag}^+$ ) was added then reduced ( $\text{Ag}^0$ ) to decrease metal leaching. The casting solution consisted of 15% (w/v) polymer and 85% (w/v) N-Methyl 2-Pyrrolidone. Of the 15% (w/v) polymer concentration, different PVA concentrations were compared: 2% (w/v) 5% (w/v) and 10% (w/v). The membranes were analyzed for metal attachment, protein rejection, and water/foulant flux. Membranes were characterized with FTIR, XPS, SEM and Serial Dilution. FTIR confirmed the presence of the PVA's hydroxyl group and a decrease in the intensity of the CA's carbonyl group when blended. Additionally, membranes blended with PVA efficiently reduce adsorption of protein onto the membrane surface. Reduced silver membranes efficiently eradicate the growth of *E.coli* over a 5-hour time span pending *E.coli* colony concentration. SEM micrographs indicated differences in pore morphology with PVA while EDS confirms the presence of silver on membrane surface and sublayer. The water flux data displayed a great disparity when comparing CA membranes to PVA/CA membranes with a dramatic increase when blended with a surface modifier. Furthermore, a 28% increase in rejection was observed with the blended polymer.