

Highly Hydrophilic Electrospun Polyacrylonitrile Polyvinylpyrrolidone Nanofibers Incorporated with Gentamicin as Filter Mediums for Drinking and Wastewater Treatments

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Polyacrylonitrile (PAN) was dissolved in dimethylformamide with different weight percentages of poly(vinylpyrrolidone) (PVP), and then gentamicin sulfate powder was added to the solution prior to the electrospinning process. Gentamicin was added mainly to remove bacteria and some viruses, while PVP was added to make the surface of membrane hydrophilic to enhance the filtration efficiency. Two water samples were chosen for filtration processes, including the dam water and city wastewater. The filtered dam water samples showed great reductions in total coliforms, E.coli, turbidity, and silica (SiO₂) particles. The filtered wastewater samples also showed huge reductions in total coliforms, E.coli, turbidity, total suspended solids, chemical oxygen demand, and biochemical oxygen demand. The morphology, dimensions and surface contaminations of the nanofibers were observed by scanning electron microscope and optical microscopy studies. Both SEM and microscopic images on the nanomembranes before and after filtrations indicated that the electrospun PAN nanofibers have superior water filtration performance.