

Production of Hollow Fibre Membrane by Co-electrospinning of Cellulose acetate

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Electrospinning is a unique technique to produce submicron fibres through an electrically charged jet of polymer solution. The main aim of the study is to use electrospinning technology in the fabrication of a cellulose acetate (CA) hollow fibre membrane for affinity membrane applications. This involves a three-stage process. The first stage involves the design of a suitable co-axial needle capable of producing a core-shell fiber. The second stage, involves the production of mineral oil/CA core-shell fibres by co-electrospinning. In the third stage, the core is extracted by octane to form hollow fibres.

The materials used include CA dissolved in acetone/dioxin (2:1) (feed rate range = 1~3ml/h), and mineral oil (feed rate range = 0.5~1ml/h). These materials are used as received without further purification.

Cellulose acetate hollow fibres with an average inside and outside diameter of approximately 500 and 1200 nm, respectively, were successfully electrospun using the co-axial electrospinning technique. The obtained results showed that the ability of the spinning solution to be electrospun was directly dependent on its concentration and the feed rate, and also general process parameters such as spinning distance and type of solvents used.