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The effect of anionic, cationic and nonionic surfactants on the electrospun poly(vinyl alcohol)_{50,000} nanofibers

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The aim of the study is to produce PVA nanofibers, which have attracted considerable interest in recent years due to the high tissue compatibility. Electrospinning was used for the production of nanofibers and the effects of the parameters such as, viscosity, surface tension and electrical conductivity of polymeric solution altered by concentration and surfactant addition are examined. Furthermore the effects of the amount and type of the added surfactants on the properties of polymer solutions and on obtained nanofibers are investigated as well. For the preparation of PVA nanofibers different concentrations of PVA_{50,000} were dissolved in hot water. After anionic (Sodium dodecyl sulfate), cationic (Benzyltrimethyl hexadecylammonium chloride) and nonionic (Polysorbate20) surfactants (0.5-1, 5% w/w) were added, the solutions were poured in a syringe. For electrospinning, the voltage was applied at 20 kv with 0.3 ml/h flow rate and the distance between the needle and the collector was fixed at 15 cm. Viscosity, conductivity and surface tension of the solutions were measured. Nanofiber was characterized by Scanning Electron Microscope (SEM). Ideal concentration of PVA_{50,000} was found to be 20% w/w for uniform nanofibers. According to the results, when the concentration of anionic and cationic surfactants were increased, the viscosity and conductivity of PVA solution were increased while the surface tension was decreased. It was found that the average diameter of nanofibers was decreased when surfactants, except nonionic forms, were incorporated into PVA solutions. To conclude, it can be stated that anionic and cationic surfactants have multifold effects on the physicochemical properties of the PVA solution whereas nonionic surfactants are not as effective as anionic and cationic forms.

Biography

Ayşe Nurten Özdemir has completed her PhD from the Faculty of Pharmacy, Ankara University, Turkey. She has published more than 60 papers in reputed journals and has been serving as the Head of Pharmaceutical Technology Department in same university. She has studied the subjects; solubility enhancement, controlled release dosage forms and has deep concern over implantable systems and floating dosage forms.

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