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Fibroin (degummed silk) and keratin are structural biopolymers respectively from silkworm filaments and from hair, wool, feathers, nails and horns. They are candidate materials for biomediacal applications because they have several useful properties including good biocompatibility and biodegradability.
Many works deal about the electrospinning of silk fibroin solutions, but few works deal about the electrospinning of keratin in blend with other polymers; moreover, keratin hasn't been previously electrospun as pure polymer.

In this work, silk fibroin was dissolved in a ternary solvent system of $CaCl_2/CH_3CH_2OH/H_2O$, dialysed against distilled water, cast in polyester plates and dried at room temperature.
Keratin was extracted from wool using an aqueous solution containing urea and m-bisulphite, dialysed against distilled water, concentrated with rotary vacuum evaporator, cast onto polyester plates and dried at 50°C overnight.
Pure solutions were prepared by dissolving by stirring dried films of fibroin (F) and keratin (K) in formic acid (15%wt/wt). Then, the pure F and K solutions were blended in the following mixing ratio: 100/0, 90/10, 70/30, 50/50, 30/70, 10/90 and 0/100 F/K.
Viscosity of the blend solutions was measured using a rheometer equipped with a Peltier temperature controlled device with cone-plate geometry.
The solutions were either cast to obtain regenerated blend films, or electrospun to produce nanofibres. Also the solution of 100% keratin was successfully electrospun.

F/K nanofibres were collected on a target placed at a distance of 10 cm from the syringe tip. Flow rates of 0,001 - 0,005 and 0,01 ml/min and voltages of 20-25 and 30 kV were tested.
Scanning Electron Microscopy investigation showed nanofibres with different shapes (round and regular, ribbonlike, branched, with beads) and diameters ranging from 700 to 160 nm. Relationships from the nanofibre diameters and mixing ratio of the solutions, flow rate and electric field intensity were investigated.
The thermal behaviour and the structural characterisation of the F/K blend films and nanofibres were studied by Differential Scanning Calorimetry and Fourier Transform Infrared Spectroscopy.