Electrospinning of ultrafine non-hydrolyzed silk sericin/ PEO fibers on PLA: A bilayer scaffold fabricationTitle of the paper

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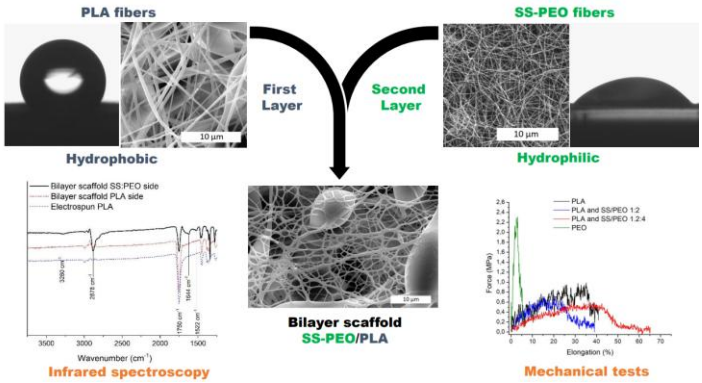
Abstract - 200 words maximum

We report the feasibility of electrospinning of protein-polymer multilayered scaffolds with selected materials: non-hydrolyzed silk sericin (SS), polyethylene oxide (PEO) and polylactic acid (PLA), with tuned fiber size and properties for each layer. We present an innovative way for the electrospinning (ES) of non-hydrolyzed SS with PEO yielding fibers with an average diameter ranging between 120 nm and 150 nm. Different SS:PEO ratios have been electrospun to study the effect of the concentration of silk sericin protein on the fibers size and shape, as well and their electrospinnability. Electrospun SS:PEO fibers display weak to no mechanical resistance (non-measurable) their deposition onto a sturdier scaffold is necessary to allow their use in biomedical and/or pharmaceutical fields. Therefore, bilayer scaffolds were fabricated with PLA support and SS:PEO fibers obtained from the optimized SS:PEO ratio (1.2:4). They are composed of hydrophobic layer of PLA fibers and a layer of sticky hydrophilic SS:PEO fibers. Scaffolds were characterized extensively by Fourier Transforms Infra-Red (FTIR) spectroscopy, X-Ray diffraction (XRD), Scanning Electron Microscopy (SEM) and their resistance to mechanical stress. Finally, hydrophobicity of both layers has been determined by measuring the contact angle of water droplets on the scaffolds, further proving the bilayer nature of the scaffolds.

Keywords Electrospinning, Bilayer scaffolds, Silk Sericin, Polylactic Acid, Nano-fibers..

I. GRAPHICAL ABSTRACT



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