Functional Electrospun Phospholipid Nano-microfibers

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Functional asolectin phospholipid nano-microfibers were developed using electrospinning processing with a range of fiber diameters and morphologies, depending on the phospholipid concentration and the solvent used [1,2]. Chloroform and dimethylformamide, isooctane, cyclohexane and limonene were used as solvents. A critical concentration of phospholipids is essential to favor the intermolecular association between the micelles, required for the formation of asolectin electrospun fibers. The dielectric constant of the solvents had a strong influence on the electrospinning jet split properties and affected the morphology of the electrospun asolectin nano-microfibers, while co-axial electrospinning could be used to tune their average diameter. The mechanical properties and the stability at ambient conditions of phospholipid fibers were assessed by nanoindentation using Atomic Force Microscopy [2]. Their elastic modulus was found to be approximately 17.2 ±1 MPa, and at a cycle of piezo expansion-retraction (loading-unloading) of a silicon tip on a fiber, a relatively high adhesion was observed during unloading. Moreover, the efficacy of electrospun phospholipid microfibers as antioxidants, encapsulation, and delivery matrices for bioactive compounds and transdermal drugs, were also confirmed [3,4].

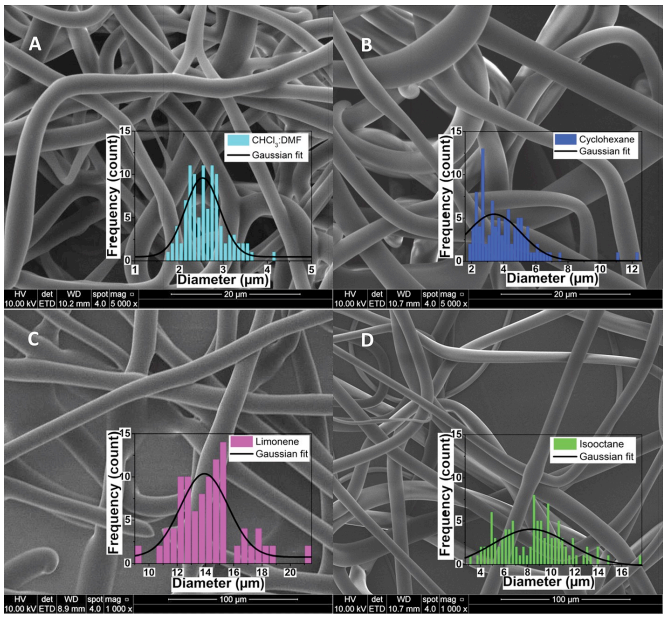

Figure 1. SEM images of electrospun asolectin solution using a single needle: (A) 45% w/w in CHCl3 : DMF [3 : 2 v/v], scale bar 20 µm, (B) 50% w/w in cyclohexane, scale bar 20 µm, (C) 60% w/w in limonene, scale bar 100 µm, (D) 60% w/w in isooctane, scale bar 100 µm. Inserts: histogram of the fiber diameter distribution.

References.

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