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Nanofibrous gelatin structures: Effect of high-yield electrospinning on the fiber formation and stability[1] AMANDA KENNELL, ANNA KRUM, ANDREI STANISHEVSKY PHD, University of Alabama in Birmingham — Nanofibrous biopolymer materials represent an attractive platform for many biomedical applications. Such materials are frequently made by the electrospinning process, which is based on complex electrohydrodynamic phenomena leading to the formation of solid nanofibers from electrified polymer solutions. Textural properties and composition of nanofibers and fibrous assemblies play a big role in the physiological performance of electrospun biopolymer structures. In this study, gelatin nanofibers were produced at a rate of up to 20 g/h by using a recently developed high-yield free-surface electrospinning process. The dense nanofibrous flow in this process moves at 0.20.7 m/s speed due to the effect of ionic wind, which allowed easy assemblage of the resulting nanofibers. Depending on the type of gelatin and process parameters, the fiber diameter varied from 100 nm to 2000 nm. Nanofibrous gelatin mats with up to 3 mm thickness were physically and chemically crosslinked to increase the material stability in simulated body fluids (SBFs). The effect of process conditions on the changes in the fiber morphology and textural properties of as-prepared, crosslinked, and SBF-exposed nanofibrous mats was explored. Initial results on the tensile properties of gelatin nanofibers are discussed.

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