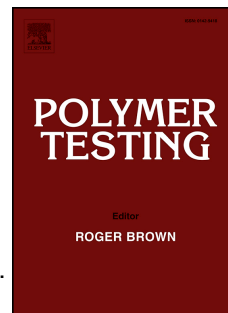


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## Accuracy of Electrospun Fiber Diameters: The Importance of Sampling and Person-to-Person Variation

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### Abstract

Potential sampling errors (regional variation) on an electrospun mat were explored and person-to-person (analyst affect) variation in image analysis of the fiber diameter were investigated via detailed statistical analyses. Scanning electron microscope (SEM) samples were prepared from the vertical midline of a single non-woven mat of electrospun polyethylene oxide. Thirteen analysts with identical training and instructions measured the diameters of the nanofibers from the six SEM images and statistical analyses were performed on the resulting data. The fiber diameters were significantly different in the lower region than the upper and center regions. Furthermore, the fiber diameters in the lower region—from micrographs taken only millimeters apart—were statistically different demonstrating a statistically significant regional variation in the sample. Furthermore, statistically significant variation between the analysts also was observed, with the average fiber diameter ranging from 166 nm to 276 nm.

**Keywords:** Analyst effect, electrospinning, electrostatic spinning, fiber diameter, image analysis, ImageJ, nanofibers, regional effect, sampling.

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