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ELECTROSPUN NYLON NANOFIBERS FOR IMMOBILIZATION OF ACETYLCHOLINESTERASE ENZYME

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In this work, we use nylon 6/functionalized multi-wall carbon nanotube (f-MWCNT) nanofiberous composite membrane to immobilize Acetylcholinesterase (AChE) for detecting acetylcholine as an enzyme biosensor. First of all, nylon 6 pellets were dissolved in formic acid at four different concentrations. Thereafter, nano-fibers of nylon 6 were obtained through electrospinning method. Electrospinning was used as a processing method to produce continuous polymer fibers including the diameters in the sub-micron to nano-range. Then the morphology of electropun fibers at different concentrations was examined with scanning electron microscopy (SEM). At low range of concentrations, several beads are appeared, which were totally disappeared with increasing the solution concentration up to 15 wt%. The average diameter of the final fibers at the highest range of concentration was obtained about 110 nm. The enzyme was then immobilized on membrane surface with drop coating process after totally removing the remaining solvent. Stability of enzyme on membrane was examined through different methods including the infrared and the UV-Vis spectrum. The mechanical and electrical properties of the membrane with different f-MWCNT (0%wt, 1%wt, 3%wt, %5wt) were also studied for biosensor application. Then the effect of f-MWCNT on stability of enzyme and response of biosensor was examined through the procedure mentioned previously.