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Co-electrospinning of bacteria and viruses WAEL SALALHA, Faculty of Mechanical Enginnering, JONATHAN KUHN, Faculty of Biology, SHMUEL CHERVINSKY, EYAL ZUSSMAN, Faculty of Mechanical Enginnering, Technion —
Co-electrospinning provides a novel and highly versatile approach towards composite fibers with diameters ranging from a few hundred nm down to 30 nm with embedded elements. In the present work, co-electrospinning of poly(vinyl alcohol) (PVA) and viruses *(T7, T4,* λ) or bacteria (*Escherichia coli*, *Staphylococcus albus*) was carried out. These preparations should have applications for tissue engineering, gene therapy, phage therapy and biosensing. The average diameter of the co-spun nanofibers was about *300 nm*. We found that the encapsulated viruses and bacteria manage to survive the electrospinning process, its pressure buildup in the core of the fiber and the electrostatic field in the co-electrospinning process. Approximately 10% of the *Escherichia coli* and 20% of *Staphylococcus albus* cells are viable after spinning. Approximately 5% of the bacterial viruses were also viable after the electrospinning. It should be noted that the encapsulated cells and viruses remain stable for two months without a further decrease in number. These results demonstrate the potential of the co-electrospinning process for the encapsulation and immobilization of bio-objects and the possibility of adapting them to technical applications (e.g., bio-chips).

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