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Paper Title: Fabrication of Water-insoluble Polyethylene Oxide (PEO) and Sodium Alginate (NaAlg) using Electrostatic Repulsive Forces: A Preliminary Study

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Abstract

Polyethylene oxide (PEO) and sodium alginate (NaAlg) are widely used in biomedical applications due to their biocompatiblity. The use of electrostatic repulsive forces could be employed to fabricate these polymers into various shapes, including fibers and particles. However, in some cases, their solubility in water could be a drawback. Therefore, this study aims to fabricate samples from PEO-NaAlg blends using electrostatic repulsive forces and stabilizes their structure in water using calcium chloride ($CaCl_2$) crosslinking method. The preliminary results have shown that the water solubility of the fabricated samples in this study was reduced by crosslinking, as analyzed by Fourier-transform spectroscopy (FTIR). Moreover, the images from scanning electron microscope (SEM) reveals that the fabricated samples were particle-like, and the increased NaAlg content could increase fiber density before crosslinking and particle aggregate formation after crosslinking. However, further studies are still required to optimize the parameters for fiber fabrication and also for future incorporation of bioactive molecules.