

Abstract:

Starch is an inexpensive, abundant, and biodegradable biopolymer from plants. Nano-fibers made from starch by electrospinning have high surface area, small pore size, and high porosity. This ultra-light weight material could potentially replace synthetic fibers fabricated from petrochemicals in certain applications due to its nature of biocompatibility and biodegradability.

Unlike current electrospinning methods for starch fiber production, the proposed approach uses water instead of non-aqueous chemicals as the solvent. In order to achieve this goal, dissolution of starch in water (helix to coil form) and conformational transitions from solution to solid fibers will be addressed in this work.

Success of this work will reduce the production cost by eliminating chemical consumption and minimizing waste treatment. Starch fibers made from aqueous solution will also expand the utilization of starch fibers in the biomedical field such as wound dressing, drug delivery, and tissue engineering.