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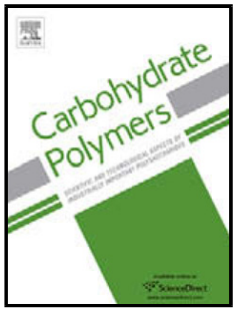

Title: Preparation and properties of wet-spun agar fibers

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ACCEPTED MANUSCRIPT

Preparation and properties of wet-spun agar fibers

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Highlights:

- The agar fibers were prepared under different coagulation bath using custom-made wet spinning devices.
- The effects of dope concentration, bath composition and post-processing on fiber morphological, chemical, and mechanical properties were evaluated.
- Amino silicone was absorbed in the surface of the fibers and formed into films on the surface of the fibers by the amino functional groups interact with –OH sites on the surface of agar fibers.
- The agar fibers immersed in amino silicone showed high strength, elongation and desired morphological characteristics.

Abstract:

Motivated by the extensive application of agar, this work developed a wet-spinning process to fabricate micro-scale fibers using the gelation process of agar. The effect of three vital spinning parameters, namely dope concentration, coagulation bath composition, and fiber post-processing on morphological properties, tensile properties and chemical structure of the fiber have been discussed. The concentration of agar was determined by the results of rheological measurement. The addition of barium chloride in the coagulation process improved the mechanical properties of fibers as compared to deionized water as coagulation. The agar fibers immersed in amino silicone demonstrated significantly showed better mechanical properties compared to the agar fibers only immersed in ethanol. The physical and chemical properties of agar fibers were characterized by X-ray diffraction, FTIR, tensile testing, and SEM. The results showed that excellent agar fibers with several potential applications can be produced with amino silicone modification in optimum

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