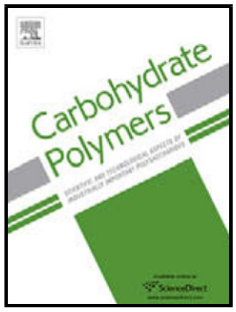

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<AT>Fabrication and characterization of chitin nanofibers through esterification and ultrasound treatment

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<ABS-HEAD>Highlights► Chitin nanofibers (CNFs) with diameter of ~15 nm were prepared. ► Esterification improved ultrasound disintegration of chitin fibrils into nanofibers. ► Size of CNFs decreased with increase in power and time of the ultrasound treatment. ► Crystallinity of CNFs increased with increase in power/time of ultrasound treatment.

<ABS-HEAD>Abstract

<ABS-P>Chitin nanofibers were prepared from commercially available chitin powder via esterification modification and subsequent ultrasound treatment. The obtained chitin nanofibers were characterized using dynamic light scattering (DLS), scanning electron microscopy (SEM), Fourier transform infrared (FTIR), ^{13}C CP-MAS (cross-polarization under magic-angle spinning) solid state nuclear magnetic resonance (NMR), elemental analysis, and X-ray diffraction (XRD).
<ABS-P><ST>Results</ST> showed that the esterification of chitin with maleic anhydride significantly improved the ultrasound disintegration of chitin fibrils into nanofibers. With increasing power and time, the ultrasound treatment yielded smaller chitin nanofibers with narrower size distribution, and the diameter of the chitin nanofibers could reach ~15 nm. The effect of the ultrasound treatment on degree of acetylation and degree of substitution of the chitin nanofibers was negligible. However, crystallinity of the chitin nanofibers increased with increase in power and time of the ultrasound treatment.

<KWD>Keywords: Chitin; nanofibers; esterification; ultrasound treatment