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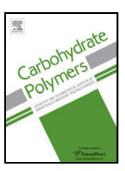
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ACCEPTED MANUSCRIPT

Effect of Retrogradation	Time on	Preparation	and	Characterization

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2	of Proso Millet Starch Nanoparticles
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9	Abstract
10	Starch nanoparticles were prepared from proso millet starch using a green and facile method
11	combined with enzymolysis and recrystallization. Scanning electron microscopy (SEM), X-ray
12	diffraction (XRD), Fourier transform infrared spectroscopy (FTIR), differential scanning
13	calorimeter (DSC) and thermal gravimetric analysis (TGA) were used to characterize the
14	morphology and crystal structure of the starch nanoparticles prepared with different retrogradation
15	time (0.5, 4, 12, and 24 h). The results showed that the sizes of the starch nanoparticles were
16	between 20 nm and 100 nm. The crystal pattern changed from A-type (native starch) to B-type
17	(nanoparticles), and the relative crystallinity of the nanoparticles increased obviously, as compared
18	with the native starch. The nanoparticles prepared with the 12 h retrogradation time had the
19	highest degree of crystallinity (47.04%). Compared to conventional acid hydrolysis to make starch
20	nanoparticles, the present approach has the advantage of being quite rapid and presenting a higher
21	yield (about 55%).
22	Keywords: proso millet starch, starch nanoparticles, debranching, recrystallized, retrogradation

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