

Title Study on the degradation of chitosan by pulsed electric fields treatment
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Abstract

Chitosan solution was processed by applying pulsed electric fields (PEF) with different strengths up to 25 kV cm^{-1} . Changes of the physicochemical properties of chitosan, such as molecular weight and crystallinity degree, were measured by analyses of scanning electron microscopy (SEM), viscosity molecular weight (M_v), X-ray diffractometry (XRD), FTIR and UV spectra. The results showed that after being treated at 25 kV cm^{-1} , the chitosan granules were significantly deformed with many pits and cracks appeared on the surface. M_v was decreased with the increasing electric field strength, for example, the M_v was decreased from $2.81 \times 10^5 \text{ Da}$ (initial chitosan) to $1.54 \times 10^5 \text{ Da}$ after the PEF treatment at 25 kV cm^{-1} . Meanwhile, the crystalline region of the treated sample was significantly damaged from XRD patterns. All results showed that the PEF technique is a possible method to obtain low molecular-weight chitosan.