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Open Environment Degradability Study of CS/PVP/PNIPAm Hydrogel Film

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ABSTRACT

Recent environmental regulations and societal concerns throughout the world have triggered renewed efforts in pharmaceutical industry to develop products which are compatible to the environment. This article reports the synthesis of CP1 hydrogel film and its nature of biodegradability in an open environment after 12 weeks. FTIR spectra of the hydrogel films (after biodegradation) show shift of peaks and change in peaks intensities, as for PVP characteristics peak at 1678 cm^{-1} was totally diminished, which refer to the chemical change in the hydrogel film. From DSC study of CP1S, T_g shifted from 57°C to 47°C and exothermic peak observed at 290°C which was 5°C lower than CP1. In TGA, second weight loss of CP1S started 50°C less than CP1 and weight loss % was also decreased by 3%. CP1S has only one X-RD peak at 20.43 and all the peaks were absent from their position it means that crystallinity of the sample reduced to minimal level by microbial degradation. Rod shaped fungus observed once the image of the film surface was scanned. So, variation in bonding, thermal properties and weight loss of the hydrogel films with time provide the direct evidence of environmental degradation of the hydrogel film.

Keywords: CS, PVP, PNIPAm, Degradation.
