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ABSTRACTS**

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## Swelling behavior of synthesized poly(1-vinyl-2-pyrrolidone-co-vinyl acetate) hydrogels

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Poly(1-vinyl-2-pyrrolidone-co-vinyl acetate) has great application in cosmetics, primarily in personal care products. It is used in drug delivery, and in a variety of biomedical applications. Also, significant is the application as an adsorbent of various pesticides. The aim of this paper is to examine structural characterization and the swelling behavior of synthesized poly(1-vinyl-2-pyrrolidone-co-vinyl acetate) copolymer hydrogels with 10 mol% of vinyl acetate and with 1.0; 1.5; 2.0; 2.5 and 3.0 mol% of cross-linker ethylene glycol dimethacrylate (EGDM). The characterization of the synthesized hydrogels was performed using FTIR spectroscopy. The swelling study was monitored gravimetrically until equilibrium was reached in solutions of different pH values (3.0, 6.0, 9.0) at a temperature of 25°C. The sensitivity of poly(1-vinyl-2-pyrrolidone-co-vinyl acetate) hydrogels to changes in external temperature was examined by monitoring the change in the equilibrium degree of swelling with increasing fluid temperature from 25°C to 80°C in a pH solution of 6.0. FTIR spectra of xerogels confirm the performed synthesis. Swelling of hydrogels poly(1-vinyl-2-pyrrolidone-co-vinyl acetate) was favored at a lower temperature (25°C), in a solution whose pH=6.0, when the sample with 1.0 mol% EGDM reaches the highest degree of swelling ( $\alpha_e=87.23$ ) compared to the achieved capacity at a temperature of 80°C ( $\alpha_e=20.74$ ). The most intense phase transition was observed in the temperature range of 40-45°C. Based on the obtained results, the synthesized copolymers can be classified into negative thermosensitive hydrogels that have a lower critical dissolution temperature (LCST). pH sensitivity analysis led to the conclusion that the highest value of the equilibrium degree of swelling ( $\alpha_e=168.97$ ) was observed in the hydrogel sample with 1.5 mol% EGDM in the solution whose pH=9 at 25°C. An increase in the molar content of cross-linkers in the hydrogels composition shows a decrease in swelling capacity at all pH values and temperatures.

**Keywords:** Hydrogels, 1-vinyl-2-pyrrolidone, vinyl-acetate, swelling capacity, LCST

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