RESPONSIVE BEHAVIOR OF GRAFT COPOLYMERS BASED ON CHITOSAN

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Poly(*N*-isopropylacrylamide) (PNIPAAm) is synthetic polymer which shows solubility changes in water around a specific temperature, which is well known as the lower critical solution temperature (LCST). This polymer is one of the most commonly used thermo-responsive polymers, because its phase transition temperature is close to the temperature of the human body. Recently, copolymers with grafted PNIPAAm side chains are highly researched, taking into account their great opportunities in biomedical field including drug delivery systems. One of the most perspective biopolymers which could be used as the backbone of these graft copolymers is chitosan. The importance of this polymer for biomedical application is due to its biodegradability, biocompatibility, low toxicity and pH-sensitivity. Therefore, the combination of synthetic PNIPAAm and chitosan in the macromolecular structures could be promising as dual-responsive (pH- and thermoresponsive) graft copolymers can be obtained.

The aim of the present work was to investigate thermal and pH-responsive behavior of chitosan-*graft*-poly(*N*-isopropylacrylamide) copolymers in aqueous solutions. Herein, seven chitosan-*graft*-poly(*N*-isopropylacrylamide) (CS-*g*-PNIPAAm) copolymers were synthesized by free-radical polymerization of CS and NIPAAm in aqueous solution using potassium persulfate (PPS) as an initiator. By changing molar ratio of CS:NIPAAm from 1:0.25 to 1:10 the copolymers with different composition were prepared. The obtained copolymers were characterized by X-ray, ^{1}H-NMR, FT-IR spectroscopy and other techniques. The thermo- and pH-responsive behavior of synthesized copolymers was assessed by cloud point, particle size and zeta potential measurements.