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Background and objectives:
Thermo-responsive copolymers have been used with increasing interest during the past two decades, particularly in the filed of controlled release. They are probably the most commonly studied class of environment-sensitive polymers in drug delivery research. These hydrogels are able to convert very fast from low viscous fluid to very high viscous gel at specific temperature. Among the polymers exhibiting thermo-responsive properties is the triblock copolymers of PLGA (A-block) and PEG (B-block). Aqueous solutions of these polymers undergo a reversible gel-sol transition and form a free-flowing solution at room temperature and become a high viscous gel at body temperature.

Materials and Methods:
PEG 1500 (6 g) was loaded into a stainless steel reactor and heated 2 hr at 150°C under 5 mmHg vacuum for drying. Then D,L-lactide and glycolide(3:1) were loaded to reactor. The reactor was heated at 150Â°C under vacuum for 30 min. Stannous 2-ethylhexanoate as catalyst was added, and heating was continued at 160°C for 11 hr under 5 mmHg vacuum. After the reaction was completed, the copolymers were dissolved in cold water (5°C) to remove water-soluble impurities and then heated to 80°C to precipitate. The above purification process was repeated three times. Purified copolymer was dried under 5 mmHg vacuum at 37°C.

Results and Discussion Conclusion:
1H NMR spectrum of PLGA-PEG-PLGA copolymer was very similar to the previously reported spectrum . Number average molecular weight and LA/GA ratio were determined by integration of the signals pertaining to each monomer such as the peaks from CH and CH3 of lactide and CH2 of ethylene glycol and glycolide. LA/GA ratio determined by ^{1}H NMR matched very well with the initial ratios of monomers used in the polymerization process (3:1). Molecular number and LA:GA ratio were 5264 and 3.15 respectively. GPC chromatogram of copolymer showed a low polydispersity and suggested that purity was sufficient to study their physical properties. Molecular number and weight determined by GPC were 4270 and 1.70. Sol-gel transition temperature was measured by reversing test tube to confirm immobility in polymer solutions of different concentrations.

Conclusion:
This study described preparation and characterization of a novel PEG-based amphiphilic triblock copolymer, which consisted of LA/GA as hydrophobic moieties joined at the two ends of the chain. Thermosensitive polymer delivery systems may be used for controlled delivery of drugs for an extended period of time by adjusting copolymer compositions and concentrations.

Keywords:
Copolymer, PLGA-PEG-PLGA, thermosensitive

Liquisolid technique as a new approach to sustain Theophylin release from tablet matrices

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