

## Nanochemistry and biotechnology

### Synthesis and characterization of thermo-responsive biodegradable poly(linoleic acid) graft copolymers

**Abdulkadir Allı<sup>1</sup>**,

<sup>1</sup> *Chemistry Department, Faculty of Arts and Sciences, Düzce University, Düzce, Turkey, E-mail: abdulcadiralli@duzce.edu.tr*

Plina / PLinl peroxides were obtained by the auto-oxidation of linoleic acid (Lina) and linolenic acid (Linl) respectively. The autooxidation of Lina and Linl under air at room temperature rendered waxy soluble polymeric peroxide, having soluble fraction more than 98 weight percent (wt%) and containing up to 1.10-1.20 wt % of peroxide. [1,2].

One-step synthesis of graft copolymers by ring-opening polymerization and free radical polymerization by using polymeric linoleic acid peroxide and polymeric linoleic acid peroxide is studied. Graft copolymers having the structure of poly(linoleic acid)-g-poly(N-isopropylacrylamide)-g-poly(D,L-lactid) were synthesized from polymeric linoleic acid peroxide possessing peroxide groups in the main chain by the combination of free radical polymerization of N-isopropylacrylamide and ring opening polymerization of D,L-lactid in one-step. The principal parameters such as monomer concentration, initiator concentration, and polymerization time that affect the one-step polymerization reaction were evaluated.

The graft copolymers obtained were characterized by proton nuclear magnetic resonance (1H NMR), gel permeation chromatography (GPC), thermal gravimetric analysis (TGA) and differential scanning calorimetry (DSC) techniques. These characterization studies of the obtained polymers indicate graft copolymers easily formed as a result of combination free radical polymerization and ring opening polymerization in one-step.

1. *Allı A., Hazer B., Synthesis and Characterization of Poly(N-Isopropyl Acryl Amide)-g-Poly(Linoleic Acid)/Poly(Linolenic Acid) Graft Copolymers // Journal of the American Oil Chemists Society.-2011.-88. N 2.-P. 255-263.*
2. *Allı A., Allı S.,Becer R.C., Hazer B., One-Pot Synthesis of Poly(linoleic acid) g-Poly(styrene)-g-Poly(ecaprolactone) Graft Copolymers // Journal of the American Oil Chemists Society.-2014.N 91.-P.849-858.*