## Nanochemistry and biotechnology

# Some polymerization techniques onto renewable sources to obtain graft copolymers

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Free radical polymerization, ring opening polymerization, one-pot polymerization (free radical and ring-opening polymerization), aqueous free radical polymerization (redox) and nitroxy-mediated polymerization methods have been used respectively [1-4].

These obtained graft copolymers' biomedical and industrial applications have been investigated. Poly(linoleic acid)-*g*-poly(ε-caprolactone) (PLina-*g*-PCL) and poly(linoleic acid)-*g*-poly(styrene)-*g*-poly(ε-caprolactone) (PLina-*g*-PSt-*g*-PCL) were synthesized by ring-opening polymerization of ε-caprolactone initiated by PLina and one-pot synthesis of graft copolymers, and by ring-opening polymerization and free radical polymerization by using PLina, respectively [2].

Polymeric linoleic acid graft copolymers have been synthesized via nitroxide mediated radical polymerization (NMRP) method in the presence of 2,2-6,6-tetramethylpiperidinyl-1-oxy (TEMPO). For this purpose, PLina-ox exposed to polymerization with styrene (Sty) or Sty and pentafluorostyrene ($F_5$Sty) in the presence of TEMPO by NMRP method in order to obtain PLina-*g*-PSty and PLina-*g*-P$F_5$Sty-*g*-PSty graft copolymers with controlled structure and low polydispersity [3].

Water soluble hydroxylated soya oil polymer has been used in the redox polymerization of N-isopropylacrylamide (NIPAM) in order to obtain water-based hydroxylated-soya oil polymer-g-PNIPAM graft copolymer [4].

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.
3. *Allı A., Allı S.,Becer R.C., Hazer B.,* Nitroxide-mediated copolymerization of styrene and pentafluorostyrene initiated by polymeric linoleic acid// European Journal of Lipid Science and Technology.-2016.N **118**.-P.279-287.
4. *Allı A., Sanal T., Hazer B.,* Redox polymerization of N-isopropylacrylamide by using hydroxylated soya oil polymer// Turkish Journal of Chemistry.-2015.N **39**.-P.382-394.