

[P190]

Production of L-histidine imprinted fluorescent nanoparticles

M.E. Corman¹, R. Üzek¹, H. Güngönes², S. Senel¹, L. Uzun*¹, R. Say³ et al
¹Hacettepe University, Turkey, ²Hitit University, Turkey, ³Anadolu University, Turkey

Molecular imprinting is a novel method to produce polymeric network mimicking biological complementary. In this method, as well-known, interested molecules were coordinated with functional polymerizable monomers. By highly crosslinking polymerization, a rigid polymeric network having recognition ability to imprinted molecule could be obtained. Molecular imprinted polymers are used for several applications including separation, purification, pre-concentration and also detection.

A conventional producing method for detection system used in life sciences generally includes radioisotopes, enzymes, fluorescence dyes and chemiluminescent compounds. Although fluorescent dye-based detection has wider application area to detect biological molecules, causing background noise by biological samples and analysis instrument is the most important problem waiting for the solution. Enhanced fluorescent properties, long lifetime, large Stokes shifts, sharp emission peak, of lanthanide ions, i.e. Eu^{3+} , Sm^{3+} , Tb^{3+} and Dy^{3+} , coordinated with appropriate organic ligand are promising alternatives to the dye molecules.

In this study, we have produced L-histidine imprinted fluorescent nanoparticles including Dy^{3+} ions coordinated with methacryloyl-L-tryptophan methyl ester ligand monomer. This complex was added into the imprinting process to gain fluorescent property to molecular imprinted nanoparticles (MINPs). Two-phase emulsion polymerization was applied to produce MINPs. In this step, a pre-polymerization complex including L-histidine and histidine containing monomer, methacryloyl-L-histidine, bridged with Cu(II) ions was prepared. After polymerization process, the obtained MINPs were characterized by zetasizer, atomic force microscopy, Fourier transform infrared spectroscopy. Then, the performance of the MINPs was evaluated by determining the effective factors such as pH, concentration, temperature, contact time etc. According to the results, we can say that the MINPs are promising alternatives to produce fluorescent detection systems.

Keywords: Molecular imprinting, fluorescent nanoparticles, lanthanide complex, L-histidine