

Nanostructured molecular-imprinting polymers based colorimetric test-systems selective to bisphenol A

Gorbach L.A.¹, Brovko O.O.¹, Lutsyk O.D.¹, Sergeyeva T.A.², Sergeeva L.M.¹

¹*Institute of Macromolecular Chemistry, National Academy of Sciences of Ukraine, 48 Kharkivs'ke shose, 02160 Kyiv, Ukraine*
E-mail: gorbachla@bigmir.net

²*Institute of Molecular Biology and Genetics, National Academy of Sciences of Ukraine, 150 Zabolotnogo str., 03680, Kyiv, Ukraine*

In order to control the bisphenol A (BSA) content in water the colorimetric test-systems that function like “litmus paper” were proposed. Test-systems were obtained on the base of molecularly imprinted acrylate-urethaneacrylate cross-linked polymers.

An idea of development of colorimetric test-systems was founded on ability of molecular-imprinted polymers (MIPs) to absorb high-selectively a compound-analyte and to give a color response as a result of selective qualitative reaction occurring between analyte and relevant reagent. It was shown that BSA formed with 4-aminoantipyrine in the presence potassium ferricyanide - $K_3[Fe(CN)_6]$ within ammonia media more stable complexes as compared with ferrous chloride ($FeCl_3$). Itaconic acid was chosen as a functional monomer that possessed optimal properties and ensured most absorption capacity of BSA, intensity and stability of coloring of MIP.

The colorings of test-systems were compared with control membrane that did not contained matrix molecules and nanostructured binding sites of BSA.

Proposed colorimetric test-systems were shown to capable to selective absorption of BSA from water solution in the concentration range 4,4-0,0068 mM. Within this concentration range namely the practice application of selective MIPs for the purpose of detection of BSA – environment contaminant of was more reasonable.

Financial support from National Academy of Sciences of Ukraine