

Separation Techniques



HEAD:

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RESEARCH PROFILE:

- Mechanism of retention in liquid chromatography and capillary electrophoresis
- Modification of silica capillary for electrochromatography
- Polyphenolic compounds in food samples
- Antioxidant properties of food products
- Metabolism of polyphenolic compounds in vivo and in vitro
- Interactions between polyphenolic compounds and vitamins
- Sorbents modified with graphene and graphene oxide in solid phase extraction
- Molecularly imprinted sorbents for separation/preconcentration of biologically active compounds

CURRENT RESEARCH ACTIVITIES:

Investigation of basic factors affecting the separation efficiency of chromatographic separation in HPLC and electrophoretic separation. Optimization of chromatographic and electrophoretic separation of selected groups of proteins, pesticides and pharmaceutical residues, polyphenols and metabolites; their identification using LC/MS methods. Trace metal determinations in environmental samples. Development of new methods for sample processing with application of solid sorbents, carbon nanostructures and molecularly imprinted polymers. Application of HPLC in determination of polyphenols in food samples and investigation of antioxidant properties of different polyphenols occurring in foods using spectrophotometric and electrochemical methods.

Application of capillary electrophoresis in determination of selected metabolites, neurotransmitters and proteins in physiological fluids. Application of HPLC in determination of natural dyes in archaeological samples.

SELECTED PUBLICATIONS:

1. A. Kubiak, A. Ciric, M. Biesaga, Dummy molecularly imprinted polymer (DMIP) as a sorbent for bisphenol S and bisphenol F extraction from food samples, *Microchem. J.* 156 (2020) 104836.
2. K. Pyrżyńska, Nanomaterials in speciation analysis of metals and metalloids, *Talanta.* 212 (2020) 120784.
3. K. Pyrżyńska, A. Sentkowska, Liquid chromatographic analysis of selenium species in plant materials, *TrAC – Trends Anal. Chem.* 111 (2019) 128-138.
4. M. Pęgiel, K. Kilian, K. Pyrżyńska, Enrichment of scandium by carbon nanotubes in the presence of calcium matrix, *Microchem. J.* 137 (2018) 371–375.
5. B. Witkowski, M. Ganeczko, H. Hryszko, M. Stachurska, T. Gierczak, M. Biesaga, Identification of orcein and selected natural dyes in 14th and 15th century liturgical paraments with high-performance liquid chromatography coupled to the electrospray ionization tandem mass spectrometry (HPLC-ESI/MS/MS), *Microchem. J.* 133 (2017) 370-379.
6. K. Pyrżyńska, A. Kubiak, I. Wysocka, Application of solid phase extraction procedures for rare earth elements determination in environmental samples, *Talanta.* 15 (2016) 15-22.
7. K. Kilian, M. Pęgiel, K. Pyrżyńska, The fast method of Cu-porphyrin complex synthesis for potential use in positron emission tomography imaging, *Spectrochim. Acta Part A.* 159 (2016) 123–127.
8. E. Poboży, A. Sentkowska, A. Piskór, Comparison of three modifications of fused-silica capillaries and untreated capillaries for protein profiling of maize extracts by capillary electrophoresis, *J. Sep. Sci.* 37 (2014) 2388-2394.
9. I. Sergiel, P. Pohl, M. Biesaga, A. Mirończyk, Suitability of three-dimensional synchronous fluorescence spectroscopy for fingerprint analysis of honey samples with reference to their phenolic profiles chromatography/tandem mass spectrometry, *Food Chem.* 145 (2014) 319-326.
10. A. Sentkowska, M. Biesaga, K. Pyrżyńska, Effects of the operation parameters on HILIC separation of flavonoids on zwitterionic column, *Talanta.* 115 (2013) 284-290.