

Laboratory of Separation Methods



Current research works

- Capillary and nanochromatography coupled with ICP MS and ESI/APCI MS/MS in examination of natural dyestuffs and historical art works
- *In vitro* investigation of cellular processing of anticancer metallodrugs using multidimensional analytical methodology
- Identification of low molecular bioligands responsible for deactivation of toxic metals in plants
- *In vitro* investigation of bioavailability of metals from supplemented food
- Investigation of drugs biocompatibility to blood components
- Determination of trace elements in functional food and dietary products
- Implementation of digitally controlled rotating field plasmas in analytical spectrochemistry
- Interaction between micelles and nanostructures. Applicability toward characterization of nanostructures using capillary electrophoresis

Selected publications

- K. Lech, K. Połec-Pawlak, M. Jarosz, Characterization of organic natural dyes by electrospray mass spectrometry coupled with HPLC and/or capillary electrophoresis, Chapt. XIII in: "Organic mass spectrometry in art and archaeology" (ed. M.P. Colombini, F. Modugno), J. Wiley and Sons, 2009, 365-388
- K. Lech, M. Jarosz, Novel methodology for the extraction and identification of natural dyestuffs in historical textiles by HPLC–UV-Vis–ESI MS. Case study: chasubles from the Wawel Cathedral collection, Anal. Bioanal. Chem., 3241, **399**, 2011
- E. Lipiec, L. Ruzik, Y. Zhou, M. Jarosz, K. Połec-Pawlak, Study of chicken egg protein influence on bioavailability of vitamin B12 by SEC-ICP MS and ESI MS, J. Anal. Atom. Spectrom., 608, **26**, 2011
- J.K. Abramski, L.S. Foteeva, K. Pawlak, A.R. Timerbaev, M. Jarosz, A versatile approach for assaying in vitro metallodrug metabolism using CE hyphenated with ICP-MS, Analyst, 1999, **139**, 2009
- K. Jankowski, E. Reszke, Microwave Induced Plasma Analytical Spectrometry, RSC Analytical Spectroscopy Monographs, No. 12, The Royal Society of Chemistry, Cambridge, 2011
- S.Oszwałdowski, K. Zawistowska, Copper chelates with 2-pyridylazo ligands as test probes for characterization of micellar effects, Colloid Surf. A, Physicochem. Eng. Aspects, 259, **315**, 2008
- S. Oszwałdowski, K. Zawistowska-Gibuła, K.P. Roberts, Capillary electrophoretic separation of nanoparticles, Anal. Bioanal. Chem., 2831, **399**, 2011

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Research profile

Culture heritage preservation, identification of natural and synthetic dyes in art objects

Food control, speciation analysis of food products

Characterization of metal deactivation mechanisms in plants

Kinetic studies of cytotoxic drug complexes with plasma transport proteins

Plasma sources and sample introduction devices for plasma spectrometry

Separation of metal ion chelates and characterization of their interactions with LC phases and surfactants micelles. Molecular modeling

Characterization of nanostructures and their interactions with selected molecules or objects by capillary electrophoresis