

# Analytical Spectrometry Research Group



## HEAD:

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DEPUTY: Barbara Wagner\*\*, PhD DSc  
(Archaeometry and Conservation Science)

## GROUP MEMBERS:

Anna Konopka, PhD; Anna Ruszczyńska, PhD;

Marcin Wojciechowski, PhD

Staff allocated at Biological and Chemical Research

Center: Prof. Ludwik Halicz, PhD (Professor affilia-

ted to the University of Warsaw); Prof. Katarzyna

Wróbel, PhD DSc (Professor affiliated to the Univer-

sity of Warsaw); Jakub Karasiński, PhD; Eliza Kurek,

PhD; Magdalena Michalska-Kacymirow, PhD;

Julio C.E. Torres, PhD; Andrii Tupys, PhD

PhD students: Marta Bicka, Andrzej Gawor, Aga-

ta Jagielska, Adam Karpiński, Luiza Kępa, Cuc Thi

Nguyen-Marcińczyk

## RESEARCH PROFILE:

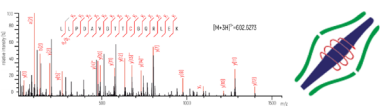
Atomic and mass spectrometry for characterisa-  
tion of matters (atomic and isotopic composition;  
molecular structure); Archaeometric investigation  
of historic objects; conservation science; Metrolo-  
gical principle in chemical measurements.

## CURRENT RESEARCH ACTIVITIES:

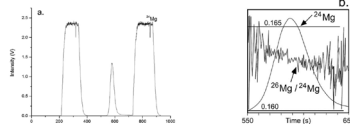
Development of analytical procedures for the investigation of biotransformation and bio-metabolism of biologically active compounds; Trace analysis and chemical speciation in plants, food as well as clinical and environmentally relevant objects; stable isotopes and isotopic effects in nature; proteomic and metabolomics. Archaeometry; development of micro-invasive analytical scenarios for individual diagnosis of monuments, cultural heritage objects and works of art objects; investigation of surface and subsurface domains of solids. Analytical procedures for monitoring of industrial process. Physico-chemical processes of atomisation and ionisation in flame, graphite furnace as well as in plasmas. Development and certification of chemical certified reference materials.

## ANALYTICAL SPECTROMETRY RESEARCH GROUP

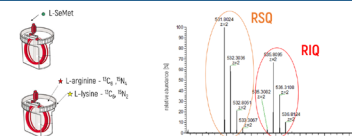
### PROTEOMICS ANALYSIS



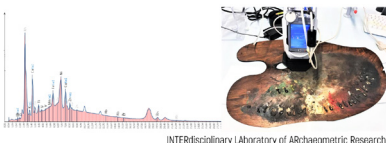
### ISOTOPE FRACTIONATION



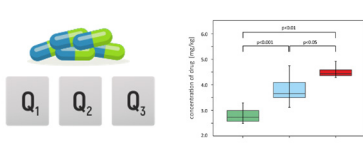
### STABLE ISOTOPE-Labeled PROTEIN STANDARDS



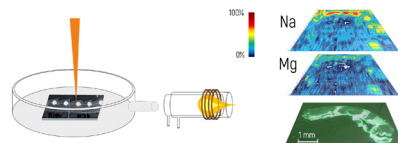
### INVESTIGATIONS OF CULTURAL HERITAGE OBJECTS



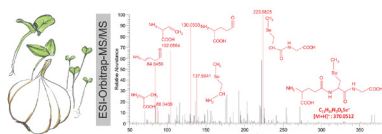
### METABOLOMICS ANALYSIS



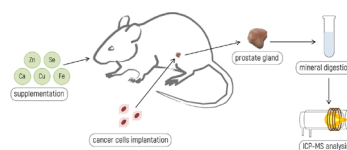
### ELEMENTAL DISTRIBUTION



### RESEARCH ON FUNCTIONAL FOOD



### IMPACT OF CHOSEN ELEMENTS ON DISEASES



### DEVELOPMENT AND CERTIFICATION OF CHEMICAL CERTIFIED REFERENCE MATERIALS



## SELECTED PUBLICATIONS:

1. J. Karasiński, C. Nguyen-Marcińczyk, M. Wojciechowski, E. Bulska, L. Halicz, Determination isotope fractionation of Cr (III) during oxidation by LC/Low-Resolution MC-ICPMS, *Journal of Analytical Atomic Spectrometry*. 35 (2020) 560-566.
2. A. Bertran, D. Khomiak, A. Konopka, E. Rejmak, E. Bulska, J. Seco, L. Kaczmarek, L. Tarragó, R. Prades, Design and synthesis of selective and blood-brain barrier-permeable hydroxamate-based gelatinase inhibitors, *Bioorganic Chemistry*. 94 (2020) 103365.
3. A.A. Krata, M. Wojciechowski, E. Vassileva, E. Bulska, Reference measurements of mercury species in seafood using isotope dilution inductively coupled plasma mass spectrometry, *Journal of Food Composition and Analysis*. 86 (2020) 103381.
4. B. Wagner, L. Kępa, M. Donten, B. Wrzosek, G.Ż. Żukowska, A. Lewandowska, Laser ablation inductively coupled plasma mass spectrometry appointed to subserve pigment identification, *Microchem J*. 146 (2019) 279-285.
5. K. Gucza, K. Kowalczyk, M. Wicka, M. Szutowski, E. Bulska, D. Kwiatkowska, The use of a valid and straightforward method for the identification of higenamine in dietary supplements in view of anti-doping rule violation cases, *Drug Test Anal*. 11 (2019) 912-917.
6. O. Syta, B. Wagner, E. Bulska, D. Zielińska, G.Z. Żukowska, J. Gonzalez, R. Russo, Elemental imaging of heterogeneous inorganic archaeological samples by means of simultaneous laser induced breakdown spectroscopy and laser ablation inductively coupled plasma mass spectrometry measurements, *Talanta*. 179 (2018) 784-791.
7. J. Karasiński, E. Bulska, L. Halicz, M. Wojciechowski, A.A. Krata, Direct determination of  $\delta^{44}/^{42}\text{Ca}$  isotope ratio by ion chromatography/low-resolution multicollector ICPMS, *J Mass Spectrom*. 53 (2018) 78-82.
8. A. Weremczuk, A. Ruszczynska, E. Bulska, D.M. Antosiewicz, NO-Dependent programmed cell death is involved in the formation of Zn-related lesions in tobacco leaves, *Metallomics*. 9 (2017) 924-935.
9. J. Karasiński, K. Wróbel, A.R. Corrales Escobosa, A. Konopka, E. Bulska, K. Wróbel, *Allium cepa* L. Response to Sodium Selenite (Se(IV)) Studied in Plant Roots by a LC-MS-Based Proteomic Approach, *Journal of Agricultural and Food Chemistry*. 65 (2017) 3995-4004.
10. A. Ruszczynska, A. Konopka, E. Kurek, J.C. Torres Elguera, E. Bulska, Investigation of biotransformation of selenium in plants using spectrometric methods, *Spectrochimica Acta - Part B Atomic Spectroscopy*. 130 (2017) 7-16.