



POLISH NATIONAL AGENCY
FOR ACADEMIC EXCHANGE



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PROGRAMME

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| name of the unit TEAM OF ANALYTICAL SEPARATION TECHNIQUES Institute of General and Ecological Chemistry, Lodz University of Technology | | symbol: I-31 https://ichoie.p.lodz.pl/ |
| head of the unit: Prof. Joanna Kałużna-Czaplińska, PhD, DSc | potential promoters: Prof. Joanna Kałużna-Czaplińska, PhD, DSc | contact person: Prof. Joanna Kałużna-Czaplińska, PhD, DSc tel: 42-631-30-91 joanna.kaluzna-czaplińska@p.lodz.pl |
| scope of activities: Determination of composition of samples of various origin with the use of chromatographic techniques (GC, HPLC): - quantitative analysis of solid samples and mixtures of liquid organic compounds - purity analysis of organic compounds and confirmation of identity - trace analysis, including: environmental samples, products: cosmetic, industrial, clinical, foodstuffs. Analysis of body fluids, archaeological objects and plant material with the use of gas chromatography (GC-MS, GC-TOFMS, GC-ECD) and liquid chromatography (HPLC-UV/Vis, HPLC-DAD). | | graphic material    |
| present activities: Analysis of body fluids, archaeological objects and plant material with the use of gas chromatography (GC-MS, GC-TOFMS, GC-ECD) and liquid chromatography (HPLC-UV/Vis, HPLC-DAD). Metabolomic studies including analyses of body fluid composition for biomarkers of neurodegenerative diseases (autism, Parkinson, Alzheimer). The research is aimed at explaining the basis of the development of these disorders, the mechanisms of disease processes, and the efficacy of the applied therapies (medicines, supplements). Archaeometric studies of historical objects, with the particular emphasis on prehistoric ceramics. They allow to determine the original purpose of the vessels and verify the type of food consumed by our ancestors, and consequently provide a fuller understanding of their daily life and habits. Studies of bioactive substances in plants with potential therapeutic properties. | | |
| Future activities: Development of a method of biomarker identification for neurodegenerative and civilizational diseases (e.g. obesity). Interdisciplinary collaboration with archaeologists in the study of Slavic diet. Development of the characteristics of selected useful plants with therapeutic properties. | | |
| publications/patents/awards/projects: 1. Gątarek, P., Kałużna-Czaplińska, J., Pawełczyk, M., Jastrzębski, K., Giebułtowicz, J., Głąbiński, A., Bobrowska-Korczak, B. LC-MS/MS Determination of Modified Nucleosides in The Urine of Parkinson's Disease and Parkinsonian Syndromes Patients. (2020) <i>Molecules</i> , 25, 4959. 2. Gątarek, P., Kałużna-Czaplińska, J. Trimethylamine n-oxide (TMAO) in human health. (2021) <i>EXCLI Journal</i> , 20, 301-319. | | |



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3. Bjørklund, G., Meguid, N. A., Dadar, M., Pivina, L., Kałużna-Czaplińska, J., Józwik-Pruska, J., Aaseth, J., Chartrand, M. S., Waly, M. I., Al-Farsi, Y., Rahman, M. M., Pen, J. J., & Chirumbolo, S. Specialized diet therapies: Exploration for improving behavior in autism spectrum disorder (asd). (2020) *Current Medicinal Chemistry*, 27(40), 6771-6786.
4. Masek, A., Latos-Brozio, M., Kałużna-Czaplińska, J., Rosiak, A., Chrzescijanska, E. Antioxidant properties of green coffee extract. (2020) *Forests*, 11 (5), 557.
5. Gątarek, P., Rosiak, A., Borowczyk, K., Głowacki, R., Kałużna-Czaplińska, J. Higher Levels of Low Molecular Weight Sulfur Compounds and Homocysteine Thiolactone in the Urine of Autistic Children. (2020) *Molecules*, 25, 973.
6. Kufel-Diakowska B., Mozgała-Swacha M., Kałużna-Czaplińska J., Rosiak A., Stoksik H. Between the profane and the sacred. Endless life of tools and vessels [w:] Bjørnevad M., Jensen P. B., (red.), *The Life Biography of Artefacts and Ritual Practice: With Case Studies from Mesolithic-Early Bronze Age Europe*. Oxford: BAR International, 2020, 11-22.

Keywords:

chromatography, metabolomics, archaeometry, biomarkers

List of internship proposal in this research team:

- Metabolomic studies of body fluids.
- Studies on prehistoric ceramics with the use of gas chromatography (GC-MS, GC-TOFMS).
- Studies on bioactive compounds in plants with potential therapeutic activity.