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*in kemijsko tehnologijo*

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VABILO NA PREDAVANJE  
V OKVIRU DOKTORSKEGA ŠTUDIJA  
KEMIJSKE ZNANOSTI / INVITATION TO THE  
LECTURE WITHIN DOCTORAL PROGRAMME IN  
CHEMICAL SCIENCES

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z naslovom / title:

**Improvements in the methods of preparing  
samples for analysing persistent organic  
pollutants in water and soil - Case of Polycyclic  
aromatic hydrocarbons (PAH)**

**v sredo, 13. 12. 2023 ob 15. uri /**

**on Wednesday, 13. 12. 2023 at 15.00**

**v predavalnici 1 v 1. nadstropju Fakultete za kemijo in  
kemijsko tehnologijo, Večna pot 113 / in lecture room 1,  
1st floor at the Faculty of Chemistry and Chemical  
Technology, Večna pot 113**

*Vljudno vabljeni! / Kindly invited!*

## Abstract:

The instruments in analytical fields such as spectroscopy, chromatography, microscopy, sensors, and microdevices have progressed significantly. Despite these advancements, one critical aspect of instrumental analysis often overlooked is sample preparation, preceded by sampling and sample conservation. Unfortunately, these steps are frequently treated merely as “a means to an end” and are inadequately documented in published literature. The sample preparation phase consumes a significant amount of time and is prone to errors during chemical analysis. Therefore, improvements in this fundamental process can substantially reduce analysis time, enhance precision and accuracy, and cut down costs.[1]

Persistent Organic Pollutants (POPs) are organic chemical substances based on carbon. They exhibit distinct physical and chemical characteristics, leading to various environmental behaviors upon release, including remarkable durability, widespread environmental distribution through natural processes, and accumulation in living organisms, including humans. Polycyclic Aromatic Hydrocarbons (PAHs) are considered intentionally produced POPs. [2] The US EPA and EU have identified 16 PAHs as priority pollutants due to their extensive environmental distribution and potential risks to human health. Among various techniques for preparing water samples, dispersive micro-solid-phase extraction was modified with novel sorbents. The validated method for PAH analysis by GC-MS was applied to river water analysis. [3] Similarly, the QuEChERS technique for analyzing PAHs in soil samples, followed by GC-MS, was optimized and validated using different sorbents for urban soil analysis. [4]

Innovative sorbents, such as physicochemically modified natural zeolitic mineral-clinoptilolite, have demonstrated extraordinary potential for treating water and soil samples for PAH analysis followed by GC-MS.

[1] Sargazi M, Hossein Hashemi S and Kaykhai M, Modern Sample Preparation Techniques: A Brief Introduction. *Sample Preparation Techniques for Chemical Analysis*. (2021) IntechOpen. Available at: <http://dx.doi.org/10.5772/intechopen.100715>.

[2] F. Madrid, M.C. Florido, M. Rubio-Bellido, J. Villaverde, E. Morillo, Dissipation of a mix of priority PAHs in soils by using availability enhancers. Effect of aging and pollutant interactions, *Science of The Total Environment*, (2022) 837:155744, Available at <https://doi.org/10.1016/j.scitotenv.2022.155744>.

[3] Ćirić S, Mitić V, Jovanović S, Ilić M, Nikolić J, Stojanović G, Stankov Jovanović V, Dispersive micro-solid phase extraction of 16 priority polycyclic aromatic hydrocarbons from water by using thermally treated clinoptilolite, and their quantification by GC-MS, *Microchimica Acta* (2018) 185: 556 <https://doi.org/10.1007/s00604-018-3091-0>

[4] Nikolić J, Mitić V, Stankov Jovanović V, Dimitrijević M, Ilić M, Simonović S, Stojanović G, Novel Sorbent and Solvent Combination for QuEChERS Soil Sample Preparation for the Determination of Polycyclic Aromatic Hydrocarbons by Gas Chromatography–Mass Spectrometry, *Analytical Letters*, (2018) 51:7, 1087-1107, DOI: 10.1080/00032719.2017.1367007