

Department of Environmental Sciences

Outstanding Achievements of 2023





Foreword



Prof. Dr. Milena Horvat
Head,
Department of
Environmental Sciences

As we look back on 2023, we are pleased to celebrate a year of significant achievements. Five candidates completed their PhD studies and nine earned their master's degrees, marking a year of academic excellence.

This year stands out for its exceptional scientific output. The number of published articles rose from 82 in 2019 to 100 in 2023, with the percentage of articles classified as A increasing from 6.1% to 26%. Citations grew to 27,235, and the H-index improved from 56 to 69, reflecting our growing influence in the academic community.

A major highlight of 2023 was the installation of the DELTA Q IRMS, a state-of-the-art isotope ratio mass spectrometer that represents a significant advancement in our analytical capabilities. The DELTA Q IRMS is designed to offer exceptional sensitivity, linearity, and stability, making it a crucial tool for a wide range of research applications. Integrated with various Thermo Scientific™ peripherals, it enhances our capacity to conduct precise and reliable isotope analysis across multiple disciplines, including metrology, food science, environmental studies, and archaeology. This new installation not only bolsters our existing capabilities but also opens new avenues for research, supporting a broad spectrum of scientific and industrial needs in Slovenia and beyond.

Key highlights of 2023 also include the opening of the SURFBIO Innovation Center for Colloidal Biology and Surface Biology, and the successful organization of the "2nd ISO-FOOD Symposium: From Food Sources to Health." We also made notable progress in calibration and measurement capabilities, with four new CMC applications registered and published in the BIPM KCDB.

Our study on exposure biomarkers in Slovenian children received the Excellent in Science 2023 award, and our involvement in the EU MSCA ITN GMOS-Train project led to a significant publication in Nature Geosciences. Dr. R. Chouhan and M. Štrok's article on microbial fuel cells in Renewable and Sustainable Energy Reviews and the Summa cum laude recognition for Dr. Ana Kovačič and Lidija Strojnik further highlight our accomplishments.

These achievements underscore our ongoing commitment to excellence and innovation. We look forward to building on this success in the future.

About us

In 2023, the Department of Environmental Sciences (O-2) reinforced its commitment to advancing research with a clear vision: to address pressing environmental challenges and human health impacts through innovative and multidisciplinary approaches. Our vision is to integrate cutting-edge science and technology to understand and manage complex environmental processes and their interactions with human systems. Our multidisciplinary approach spans environmental analytical chemistry, biogeochemical cycling, microbial systems ecology, environmental monitoring, and technical solutions for environmental management.

A key focus this year has been the **analytical chemistry of environmental and biological systems**, particularly in the area of inorganic analysis and chemical speciation. Notably, we completed a comprehensive study on the environmental impacts of galvanizing activities in Zreče, focusing on pollutant levels and their effects. Additionally, we developed and implemented a **rapid method for analyzing Sr-90** in water and milk, providing crucial data for radiation safety monitoring. Our work on mercury species in atmospheric samples has gained attention, with new methodologies offering improved accuracy in assessing airborne mercury pollution.

In **organic analysis**, the department made significant strides in the development of novel methods for the detection of compounds in biological systems. We introduced innovative techniques for drug extraction, which are now being applied in collaborative research for **cancer diagnostics**, specifically through the study of volatile organic compounds (VOCs). Furthermore, our ongoing research into the use of **stable isotope analysis for tracing illicit drugs** has expanded, contributing valuable tools to forensic science.

Our work in **metrology** saw the successful completion of several interlaboratory comparisons for isotope measurements, helping to standardize practices in Europe. We also developed traceable methods for the analysis of mercury species in various environmental samples, further enhancing our capabilities in **pollution monitoring** and **food safety**.

In the area of **nanomaterials**, we continued our collaborative efforts to develop advanced nanomaterials for environmental applications. In particular, we advanced the development of **biosensors for mercury detection** in aquatic systems, a crucial tool for monitoring water quality. We also made progress on projects related to **antibacterial textiles**, incorporating nanomaterial coatings to improve textile performance and durability.

Research into **biogeochemistry and climate change** remained a strong focus, with our team utilizing stable isotopes as tracers to understand key environmental processes. This year, we expanded our investigation of carbon fluxes in groundwater aquifers and contributed to studies on climate change indicators through the analysis of staurolite formations. Our research on **nanoplastics** and their environmental impact gained momentum, with the aim of understanding their role in ecosystems and potential harm. One of our most important contributions this year



came in the area of **water cycle research**, particularly in the modeling of isotopic compositions of precipitation in the Mediterranean region. These models are critical for water management strategies in areas where data is limited.

In **Colloid Biology**, as part of the SURFBIO project, we developed multicellular structures to transform complex polymers like lignin into value-added compounds, leading to a patent. We also modeled metabolic pathways using bacterial consortia in the BIOSYSMO project and explored microbial responses to radiation at the TRI-GA reactor.

In **Environment, Food, and Health**, we examined PAH exposure in the Amazon, identified maternal APOE alleles linked to lead levels, and completed chemical exposure studies in children and pregnant women. We also assessed chromium trioxide risks from Unior Zreč and endocrine disruptors in childbirth.



In **Wastewater Epidemiology (WBE)**, we monitored drug use in Slovenian cities, tracked antidepressant trends, and identified synthetic stimulants. We also evaluated drug residues' ecotoxicity and radionuclide separation for radiopharmaceuticals.

We also developed methods for studying metal imbalances in biliary cancer and explored VOC detection in sebum for Parkinson's diagnosis. The **Food-ERA Chair ISO-FOOD** examined edible insects, algae, and contaminants in tomatoes grown with purified wastewater, and studied nitrogen uptake in drought-affected chili peppers. In **Environmental Technologies**, we researched eco-friendly recycling of rare-earth magnets and water

treatment methods for drug residues. Finally, in **Environmental Impact and Risk Assessment**, we analyzed sustainable transport alternatives, created mobility criteria for companies, and assessed sustainable renovation for a theater, as well as a chromium plating incident at UNIOR d.d.

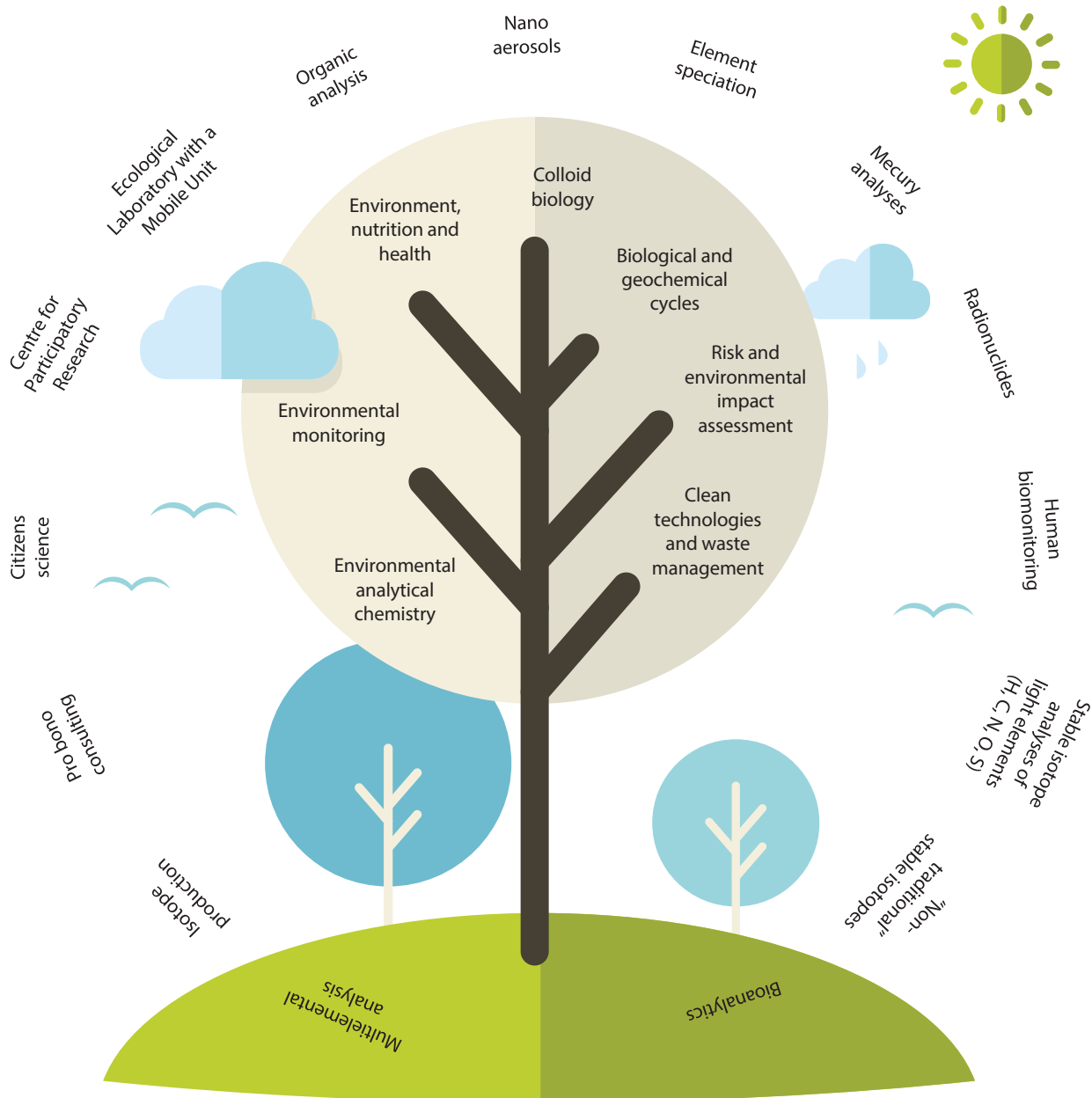
Infrastructure Center for Mass Spectrometry (CMS) engages in projects and measurements using fourteen mass spectrometers for chemistry, biochemistry, pharmaceutical and synthetic chemistry, medical sciences, food control, and environmental protection. Key activities include chemical speciation, nanoparticle size distribution, trace element spatial distribution, food element toxicity, and pollutant tracking.

The **Infrastructure Center for Ionizing Radiation Measurements (ICMIS)**, managed with the Department of Low and Medium Energy Physics, offers extensive research equipment and accredited procedures for radiological sample characterization across various sectors. ICMIS serves as a national infrastructure and international standard for ionizing radiation, with its top measurement capabilities listed in the KCDB of the International Bureau of Weights and Measures (BIPM).

The **Ecological Laboratory with Mobile Unit (ELME)**, within the Department of Environmental Sciences, supports Civil Protection and Rescue Units in environmental emergencies. In 2023, ELME intervened in seventeen incidents, including floods, industrial explosions, and fires. ELME also conducted toxic metal measurements during the August floods in the Meža Valley and enhanced their expertise through regular and international exercises.



O-2 at the glance

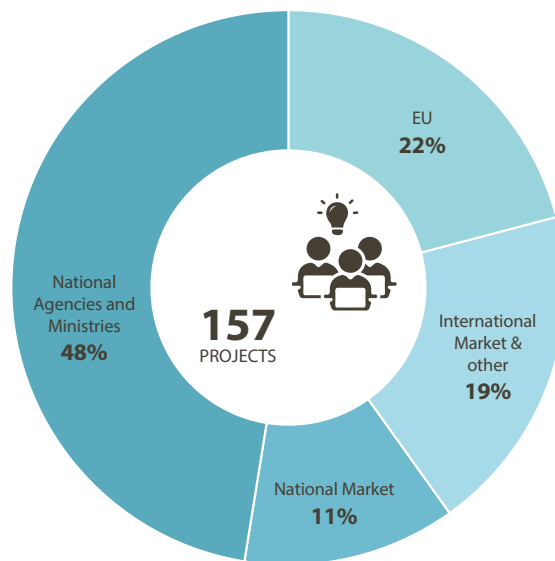


Highlights of 2023

The Department of Environmental Sciences has a long tradition of developing collaborative partnerships with industry. This collaboration helps deliver new products and services, which advances the Slovene economy, improves our quality of life, and brings real-world technologies and management issues into our research laboratories. Building international partnerships are recognized as a necessity for advancing technologies and solving global challenges.

In 2023 the Department was involved in **93** national and **64** international projects, **35** projects were within the EU framework projects.

Total number of projects:	157
EU:	22%
International Market & Other:	19%
National Market:	11%
National Agencies and Ministries:	48%



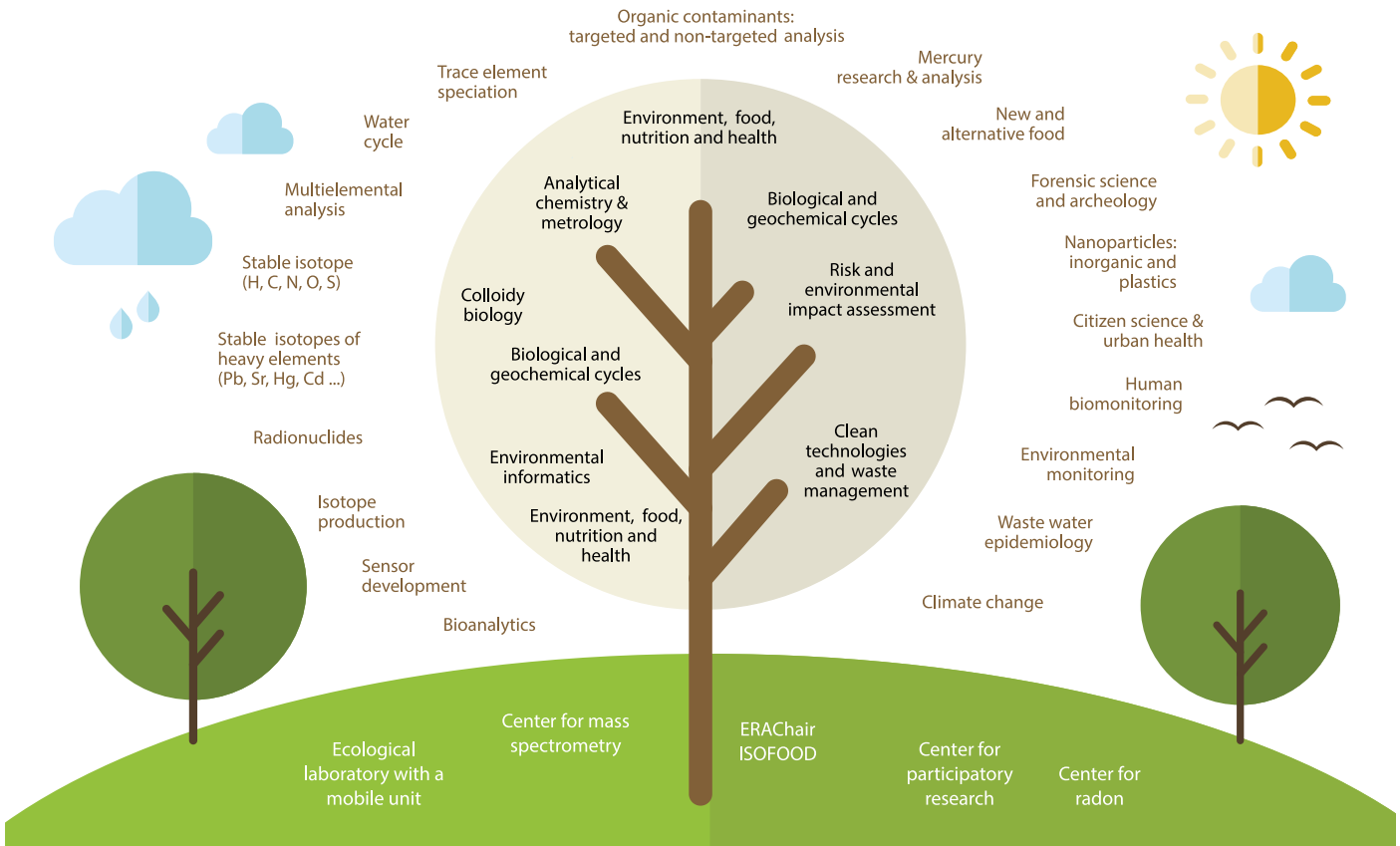
Positioning our research in time and space

UN SDGs:

- ★ Partnerships to achieve the Goal
- ★ Life Below Water
- ★ Clean Water and Sanitation
- ★ Gender Equality
- ★ Life on Land
- ★ Zero Hunger
- ★ Climate Action
- ★ Responsible Consumption and Production
- ★ Sustainable Cities and Communities
- ★ Good Health and Well-being
- ★ Industry, Innovation and Infrastructure
- ★ Affordable and Clean Energy
- ★ Quality Education

Strategic goals

- ★ Food safety, security and traceability
- ★ Bring about transformational change in relation to the environment, climate change and health
- ★ Climate change and biodiversity loss – reduce effects on health and the environment
- ★ Improve health impact assessment of environmental factors and promote implementation research
- ★ Cities and communities – promote healthy lives in sustainable and inclusive societies
- ★ Chemical and physical stressors – prevent and eliminate harmful substances exposures to health



Between the sky, the ocean, and the bedrock

Carbon and water cycles in the atmosphere, continental settings, and the sea were investigated. Distribution of O, H, C, and N isotopes and their isotopic compositions were used for source appointment of atmospheric and dissolved CO₂, CO₂ storage, and paleoclimate reconstruction based on multi-proxy analysis.

DOI: [10.1016/j.jhydrol.2022.128925](https://doi.org/10.1016/j.jhydrol.2022.128925)

DOI: [10.3390/min13010057](https://doi.org/10.3390/min13010057)

DOI: [10.1017/RDC.2023.72](https://doi.org/10.1017/RDC.2023.72)

DOI: [10.1007/s10498-023-09414-3](https://doi.org/10.1007/s10498-023-09414-3)

DOI: [10.3390/w15010111](https://doi.org/10.3390/w15010111)

DOI: [10.1002/jqs.3461](https://doi.org/10.1002/jqs.3461)

DOI: [10.1007/s11368-023-03622-8](https://doi.org/10.1007/s11368-023-03622-8)

Isotopes in studies of environment degradation related to coal extraction and landfills

DOI: [10.1007/s10661-023-11755-z](https://doi.org/10.1007/s10661-023-11755-z)

DOI: [10.5474/geologija.2023.014](https://doi.org/10.5474/geologija.2023.014)

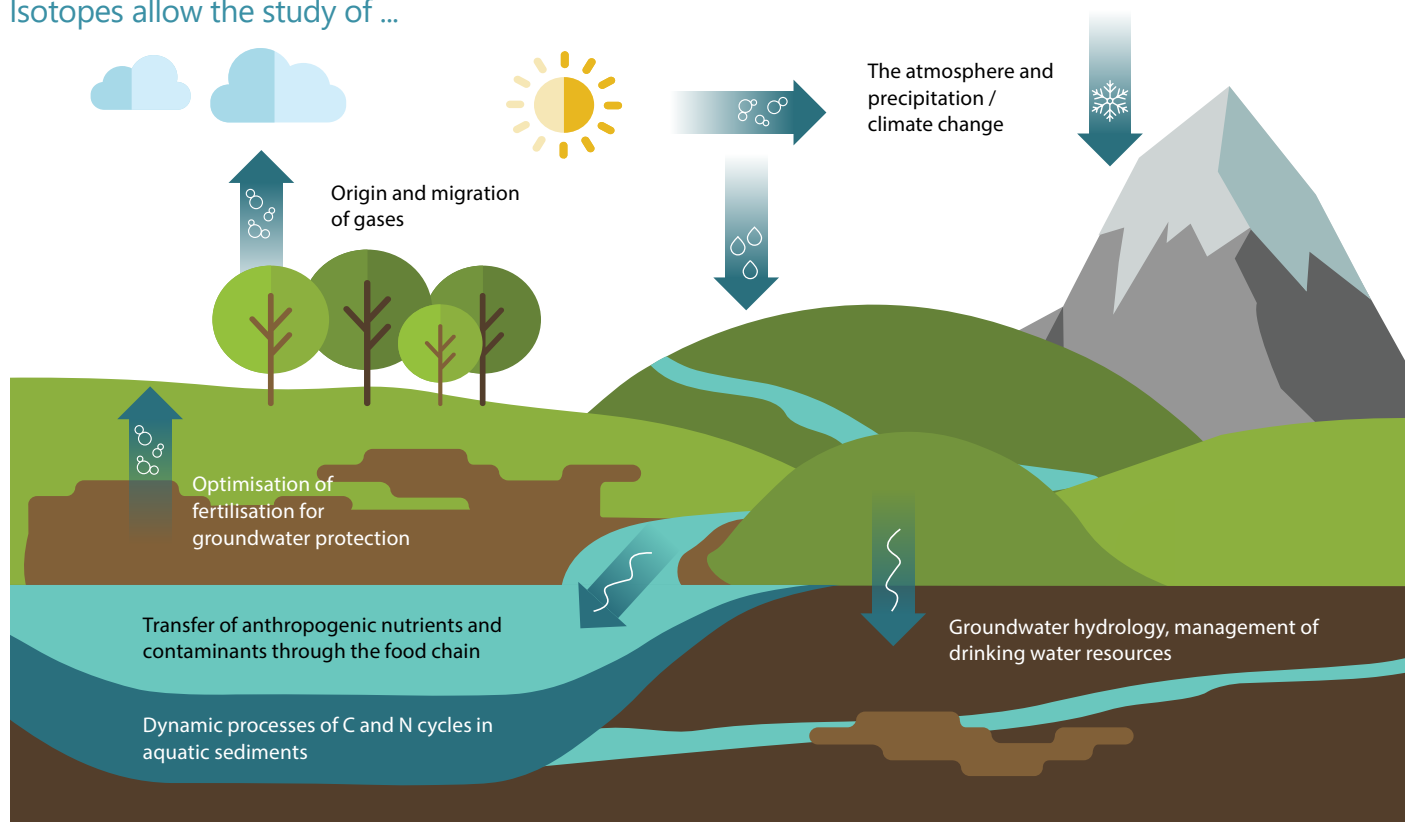
Coupled global biogeochemical cycles of water and dissolved elements, natural and anthropogenic compounds including contaminants.

Water acts as a universal solvent driving the cycling of elements through lithosphere, hydrosphere, biosphere and atmosphere.

The majority of elements have multiple naturally occurring isotopes and their ratios in physical, chemical, and biological reactions change in predictable ways.

This opens a myriad of possible applications, among others, in ecology, oceanography, hydrology, geology, climatology, life sciences and technology.

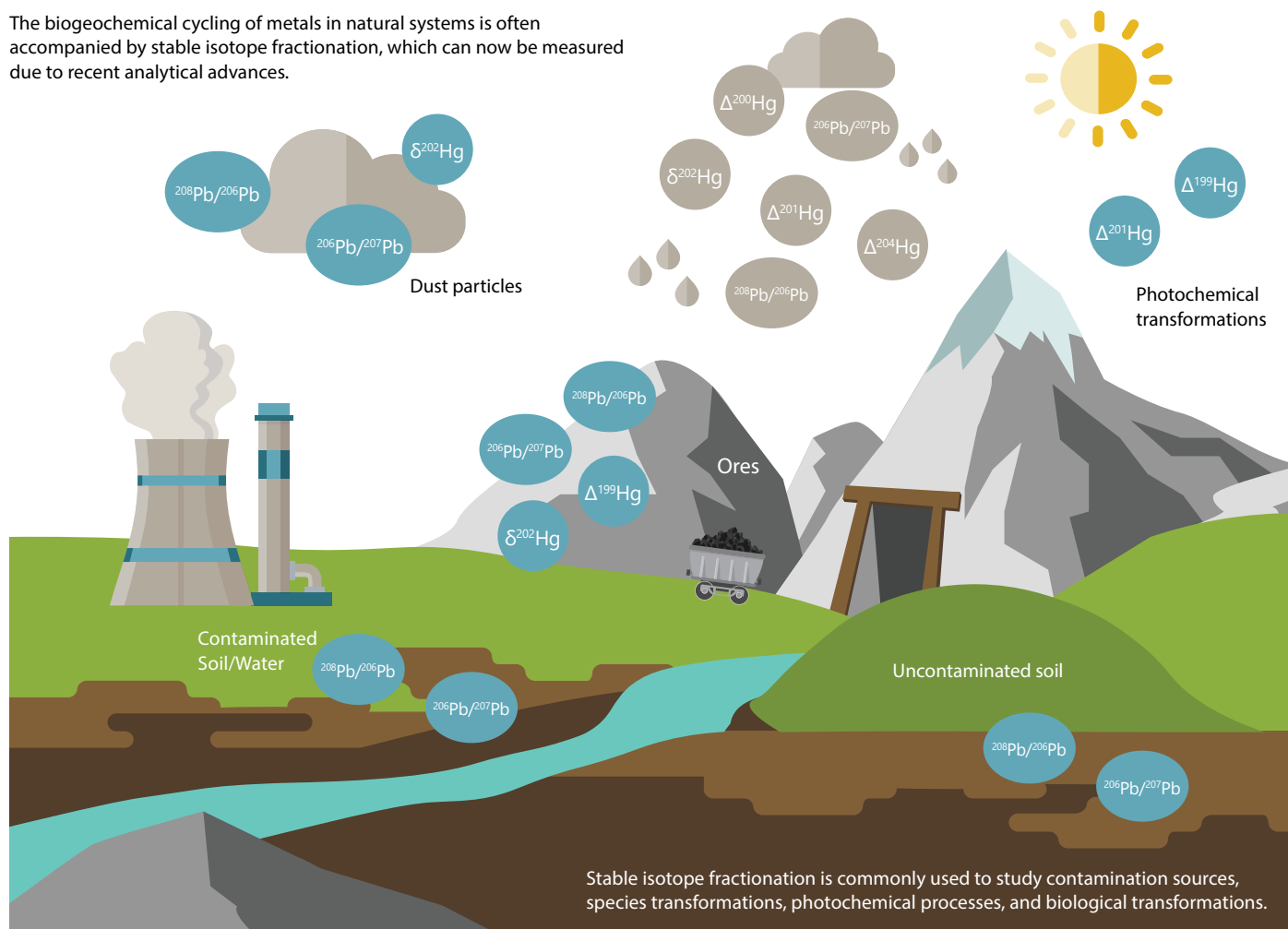
Isotopes allow the study of ...



Metalloids, metals and their isotopes in the environment

Tracing natural and anthropogenic processes

The biogeochemical cycling of metals in natural systems is often accompanied by stable isotope fractionation, which can now be measured due to recent analytical advances.



Spatial distribution, isotope composition, and historic records of mercury were studied in different environments and materials

DOI: [10.33390/min13091227](https://doi.org/10.33390/min13091227)

DOI: [10.1016/j.scitotenv.2023.165562](https://doi.org/10.1016/j.scitotenv.2023.165562)

DOI: [10.1007/s10661-023-11122-y](https://doi.org/10.1007/s10661-023-11122-y)

DOI: [10.1007/s11368-023-03625-5](https://doi.org/10.1007/s11368-023-03625-5)

Multiple metal and metalloid contamination sources, their preservation and accumulation in suspended matter, river- and marine sediments were investigated

DOI: [10.1016/j.apgeochem.2023.105619](https://doi.org/10.1016/j.apgeochem.2023.105619)

DOI: [10.1016/j.gca.2023.08.020](https://doi.org/10.1016/j.gca.2023.08.020)

DOI: [10.1007/s11368-023-03519-6](https://doi.org/10.1007/s11368-023-03519-6)

Environmental analysis in support of the development of sustainable materials and management of contaminated sites

DOI: [10.33390/ijerph20032014](https://doi.org/10.33390/ijerph20032014)

DOI: [10.1007/s00506-023-00985-7](https://doi.org/10.1007/s00506-023-00985-7)

DOI: [10.1007/s10967-023-08779-7](https://doi.org/10.1007/s10967-023-08779-7)

Radionuclides in our daily lives

Coal ash, enriched in U-series isotopes, acts as a source of radionuclides and stable toxic elements for vegetation. However, the plant species plays a decisive role in determining the response to multiple stressors from coal ash.

DOI: [10.1016/j.jhazmat.2022.129880](https://doi.org/10.1016/j.jhazmat.2022.129880)

A study on the vertical and spatial extent of radon-based atmospheric mixing states provided new insights into controlling urban pollution dynamics

DOI: [10.1016/j.scitotenv.2023.162126](https://doi.org/10.1016/j.scitotenv.2023.162126)

International collaboration, education, mentoring

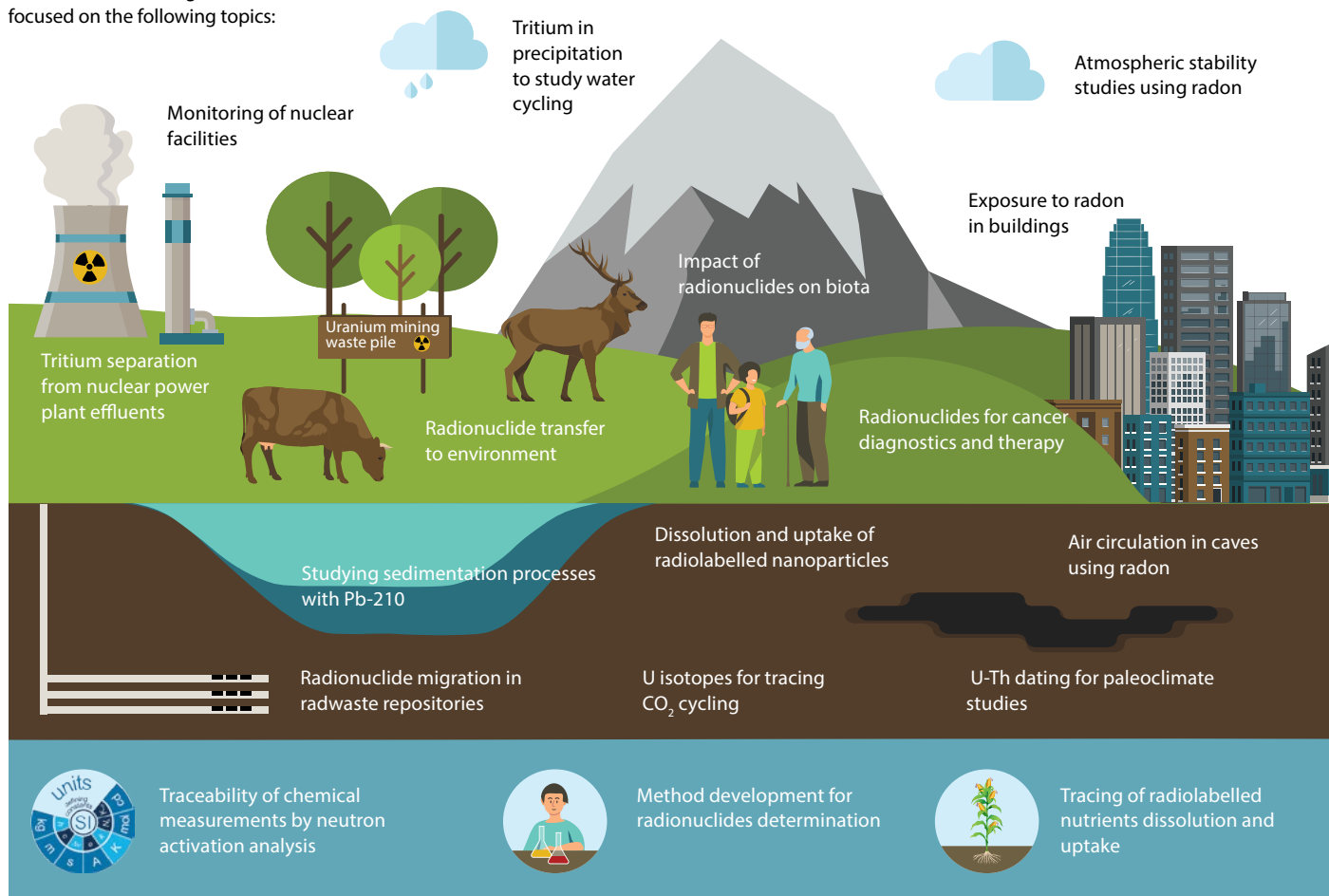
DOI: [10.1016/j.jhazmat.2022.129880](https://doi.org/10.1016/j.jhazmat.2022.129880)

DOI: [10.1007/s10967-023-08804-9](https://doi.org/10.1007/s10967-023-08804-9)

DOI: [10.54779/chl20230708](https://doi.org/10.54779/chl20230708)

Natural and man-made radionuclides are perceived as highly dangerous by the public. The truth is, we use radionuclides in numerous ways to help solve problems in our society.

Our research involving radionuclides is focused on the following topics:



Food authenticity, geographic origin, sustainability and safety

Stable isotopes of light (H, C, N, O, S) and heavy (Sr) elements, elemental analysis, and chemical profiling (e.g. sugar, fatty acid, or even volatile compounds) provide a robust analytical tool to determine:

New cultivars and sustainable agricultural production techniques adapted to climate change were explored

DOI: [10.1186/s40538-023-00501-9](https://doi.org/10.1186/s40538-023-00501-9)

DOI: [10.1016/j.plana.2023.100039](https://doi.org/10.1016/j.plana.2023.100039)

DOI: [10.1002/jeq2.20464](https://doi.org/10.1002/jeq2.20464)

Food authenticity of wine and alternative foods based on stable isotope and elemental data was investigated

DOI: [10.1016/j.jfca.2022.104988](https://doi.org/10.1016/j.jfca.2022.104988)

Production and marketing of new truffle species – ecology and gastronomic value

DOI: [10.1590/1678-992X-2022-0102](https://doi.org/10.1590/1678-992X-2022-0102)

Biotechnology for increased nutritional value of bread

DOI: [10.3390/antiox12020487](https://doi.org/10.3390/antiox12020487)

DOI: [10.3390/molecules28176311](https://doi.org/10.3390/molecules28176311)

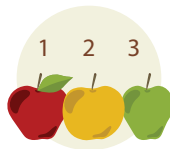
From language models to large-scale food and biomedical knowledge graphs

DOI: [10.1038/s41598-023-34981-4](https://doi.org/10.1038/s41598-023-34981-4)



SLOVENIAN?

The region from which the product originated



VARIETY?

The species, cultivars and agricultural practices



AUTHENTIC?

The type and degree of adulteration



NATURAL?

The naturalness of flavors

Developed analytical methods, established databases, and selected chemometric models allow insight into potential mislabelling and adulteration, preventing economic losses and enhancing consumer trust.



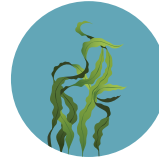
What we'll eat in the future

Exploring possibilities of wastewater use for irrigation of crops and hydroponic solutions: uptake of organic contaminants and potentially toxic metals in tomatoes
DOI: [10.1016/j.jhazmat.2023.130964](https://doi.org/10.1016/j.jhazmat.2023.130964)



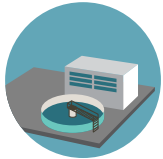
Eating farmed insects as a way of saving the planet

Farmed insects have high protein and nutritional content, high fertility and reproduction rates, high feed conversion efficiency, rapid growth rates, and a low overall ecological footprint.



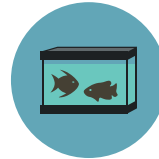
Spirulina to treat various diseases

Ethanol extracts have greater antioxidant efficiencies than water extracts when comparing fermented to non-fermented *Spirulina*. Fermented *Spirulina* lowers the cell stress response.



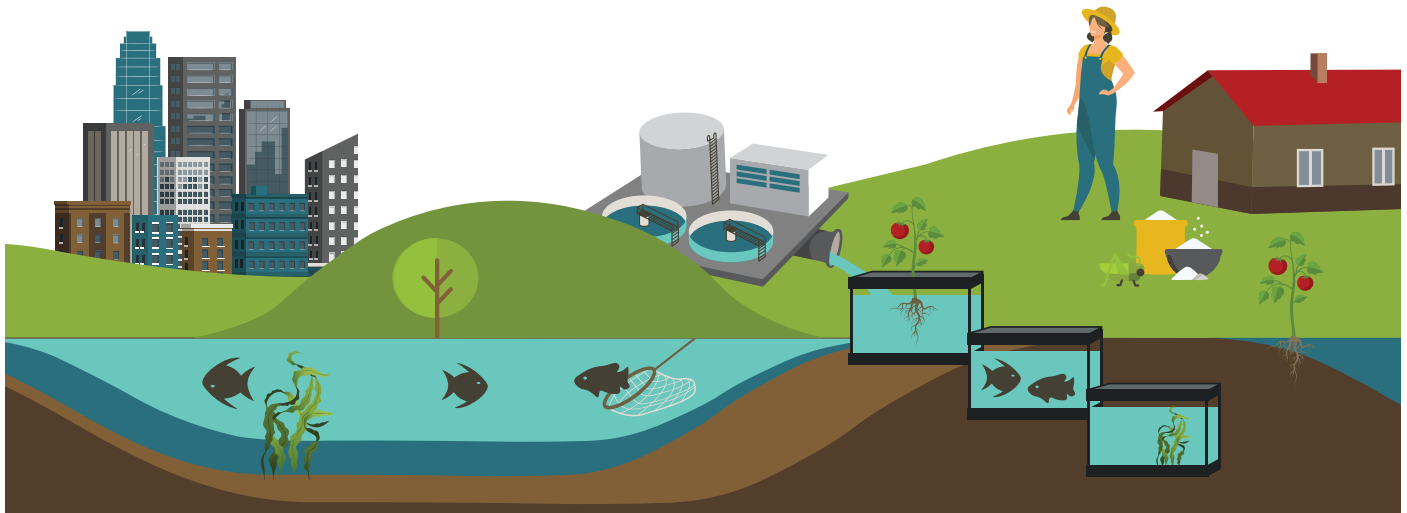
Crops irrigated with treated wastewater

Reuse of urban wastewater could be a solution for regions with water scarcity. However, monitoring is needed regarding safety (emerging contaminants, nanoplastics, potentially toxic elements) and quality (amino acids, aromas, fatty acids, polyphenols, lipids) of crops irrigated with wastewater.



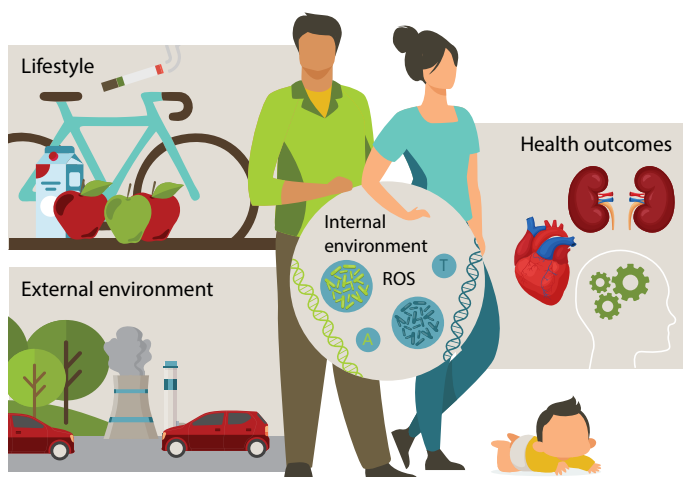
Aquacultured fish, shellfish and aquatic plants

These have a smaller carbon footprint, and require less land and fresh water. Alternative systems with recirculation lower water use and the environmental impact.

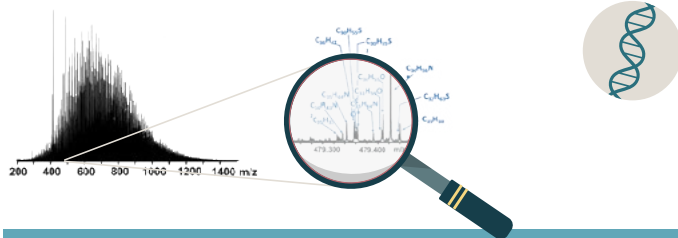


Human biomonitoring

Human biomonitoring (HBM) is an efficient tool to assess human exposure to environmental pollutants from various sources and potential health effects of such pollutants.



Non-targeted screening



... and provides comparison of exposure levels between different population groups, analyse time and spatial trends, identify exposure sources, identify substances of concern, establish a link between exposure and health, and to support risk assessment and policy decisions for risk reduction and evaluation of their effectiveness.

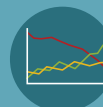
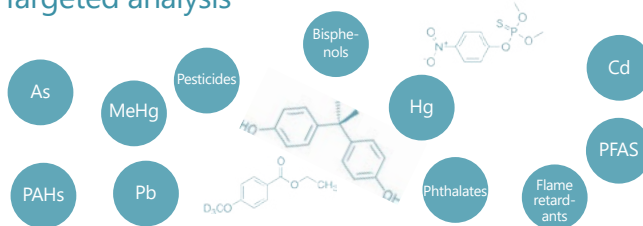
The HBM4U and the national human biomonitoring programme project examined human exposure to potentially toxic metals and metalloids, alongside the environmental and health risks they pose.

DOI: [10.13075/ijomeh.1896.02139](https://doi.org/10.13075/ijomeh.1896.02139) DOI: [10.1007/s00216-022-04408-6](https://doi.org/10.1007/s00216-022-04408-6)
 DOI: [10.1080/10807039.2022.2143319](https://doi.org/10.1080/10807039.2022.2143319) DOI: [10.1016/j.ijheh.2023.114213](https://doi.org/10.1016/j.ijheh.2023.114213)
 DOI: [10.1515/cclm-2023-0731](https://doi.org/10.1515/cclm-2023-0731) DOI: [10.1016/j.envres.2023.115226](https://doi.org/10.1016/j.envres.2023.115226)
 DOI: [10.1016/j.ijheh.2023.114115](https://doi.org/10.1016/j.ijheh.2023.114115) DOI: [10.3389/fpubh.2022.871218](https://doi.org/10.3389/fpubh.2022.871218)
 Organic pollutants, including PFAS, phthalates, and flame retardants, were studied in European children and adolescents.
 DOI: [10.1016/j.ijheh.2022.114057](https://doi.org/10.1016/j.ijheh.2022.114057) DOI: [10.1016/j.envpol.2022.120566](https://doi.org/10.1016/j.envpol.2022.120566)
 DOI: [10.1016/j.ijheh.2022.114101](https://doi.org/10.1016/j.ijheh.2022.114101) DOI: [10.1016/j.ijheh.2022.114101](https://doi.org/10.1016/j.ijheh.2022.114101)
 DOI: [10.1016/j.scitotenv.2023.164219](https://doi.org/10.1016/j.scitotenv.2023.164219) DOI: [10.1016/j.chemosphere.2023.138096](https://doi.org/10.1016/j.chemosphere.2023.138096)
 DOI: [10.1016/j.ijheh.2022.114071](https://doi.org/10.1016/j.ijheh.2022.114071) DOI: [10.1016/j.ijheh.2022.114070](https://doi.org/10.1016/j.ijheh.2022.114070)
 From science to policy: data from the HBM4EU Aligned Studies (2014–2021) provided insight into population-level exposure variability across Europe, and supported health risk assessment and policy recommendations.
 DOI: [10.1016/j.ijheh.2022.114073](https://doi.org/10.1016/j.ijheh.2022.114073) DOI: [10.1016/j.ijheh.2023.114119](https://doi.org/10.1016/j.ijheh.2023.114119)
 DOI: [10.1007/s13280-023-01831-6](https://doi.org/10.1007/s13280-023-01831-6) DOI: [10.1016/j.ijheh.2023.114139](https://doi.org/10.1016/j.ijheh.2023.114139)

HBM starts with recruitment of volunteers, collection of biological samples, and continues with the determination of chemical substances and biochemical and molecular changes in the collected samples,



Targeted analysis



Citizen Science, urban environment & health

Citizen science projects primarily focused on linking urban environmental exposures with health outcomes. The exposure to stressors was assessed using wearable biometric and environmental sensors, and the relationship between the exposure and daily activities was explored. The potential health risks were modelled and compared to personal monitoring data.

DOI: [10.3390/s23249890](https://doi.org/10.3390/s23249890)

DOI: [10.1016/j.healthplace.2023.103111](https://doi.org/10.1016/j.healthplace.2023.103111)

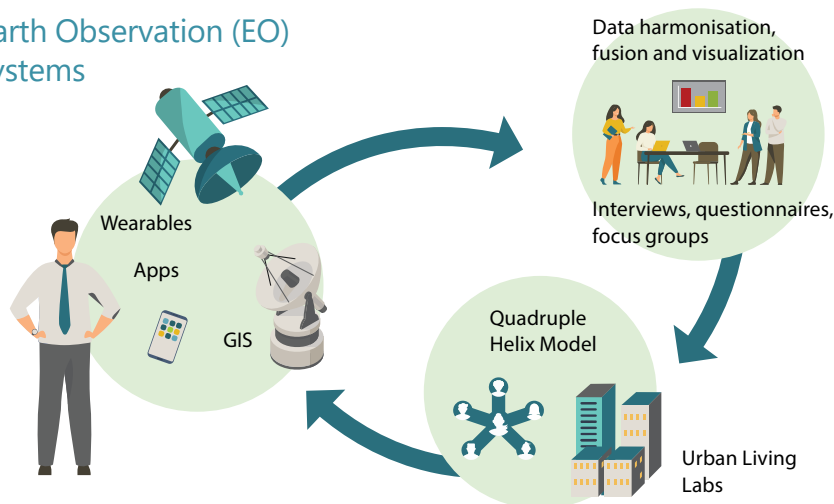
DOI: [10.1016/j.envres.2023.117469](https://doi.org/10.1016/j.envres.2023.117469)

DOI: [10.1016/j.envres.2023.115685](https://doi.org/10.1016/j.envres.2023.115685)

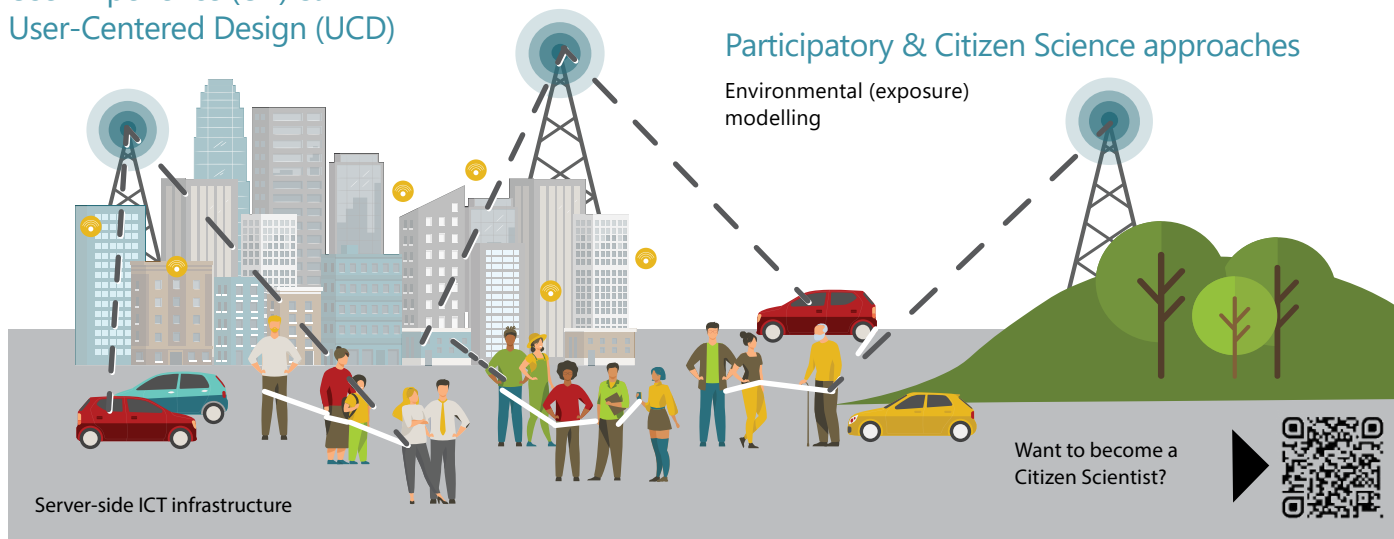
DOI: [10.3389/fenvs.2023.1177413](https://doi.org/10.3389/fenvs.2023.1177413)

Urban stressors, such as polluted air, noise and heat stress negatively effect human health. Assessing exposure on an individual level improves spatial and temporal resolution and provides information about the relative importance of micro-environments, activities and exposure pathways. In Citizen science participants co-design and co-create research, making it more inclusive and better suited for urban environments.

Earth Observation (EO) systems



User Experience (UX) & User-Centered Design (UCD)

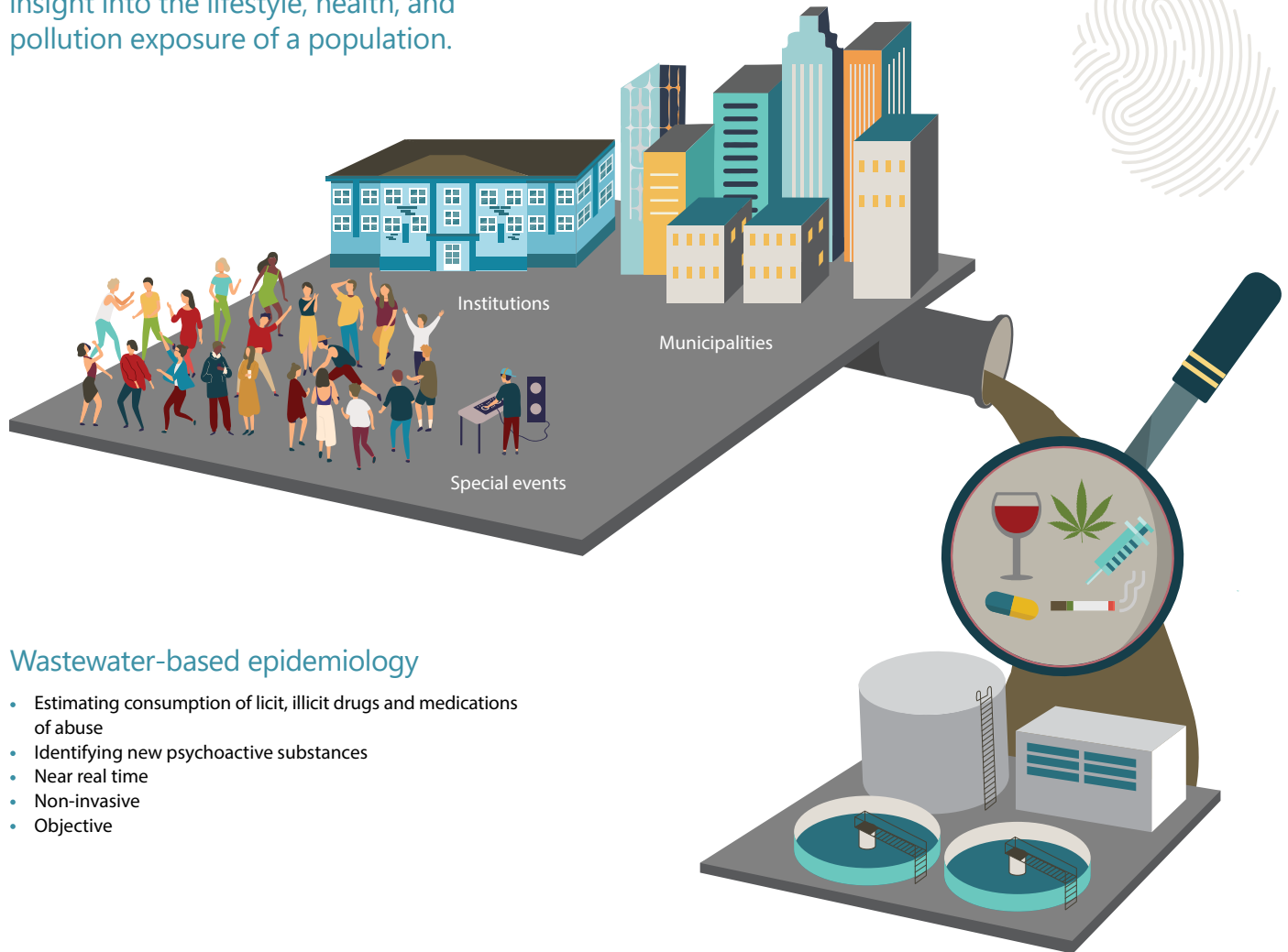


Want to become a Citizen Scientist?



Wastewater - A fingerprint of human activity

The analysis of wastewater can provide insight into the lifestyle, health, and pollution exposure of a population.



Wastewater-based epidemiology data were employed to assess biological and chemical risks associated with the voluntary and involuntary intake of pharmaceuticals, drugs, their transformation products and metabolites, and environmental contaminants at the population level.

DOI: [10.1002/dta.3392](https://doi.org/10.1002/dta.3392)

DOI: [10.1016/j.wroa.2023.100179](https://doi.org/10.1016/j.wroa.2023.100179)

DOI: [10.1016/j.envres.2023.117061](https://doi.org/10.1016/j.envres.2023.117061)

DOI: [10.1016/j.teac.2022.e00192](https://doi.org/10.1016/j.teac.2022.e00192)

DOI: [10.1016/j.scitotenv.2023.166586](https://doi.org/10.1016/j.scitotenv.2023.166586)

Wastewater-based epidemiology

- Estimating consumption of licit, illicit drugs and medications of abuse
- Identifying new psychoactive substances
- Near real time
- Non-invasive
- Objective

The journey of emerging contaminants

Sources of emerging contaminants

Municipal and industrial waste



Wastewater treatment

Conventional wastewater treatment plants are not designed to remove emerging contaminants.

Treated wastewater is the main source of emerging contaminants in the environment.



Residual contaminants & their degradation / transformation products

Environment



Contaminants of emerging concern (CEC) include pharmaceuticals, personal care products, illicit drugs, flame retardants, solvents, inorganics such as rare earth elements, and microplastics. We supported the development of materials and technologies for their determination and removal from aquatic solutions.

DOI: [10.1021/acsomega.3c00820](https://doi.org/10.1021/acsomega.3c00820)

DOI: [10.1016/j.cattod.2022.09.010](https://doi.org/10.1016/j.cattod.2022.09.010)

DOI: [10.3390/pr11092803](https://doi.org/10.3390/pr11092803)

DOI: [10.3390/catal13050909](https://doi.org/10.3390/catal13050909)

The occurrence, transformations, and fate of CEC in the environment and in human body was investigated.

DOI: [10.1016/j.envres.2023.115790](https://doi.org/10.1016/j.envres.2023.115790)

DOI: [10.1016/j.scitotenv.2023.164364](https://doi.org/10.1016/j.scitotenv.2023.164364)

DOI: [10.1016/j.jhazmat.2023.131478](https://doi.org/10.1016/j.jhazmat.2023.131478)

DOI: [10.1007/s00216-022-04321-y](https://doi.org/10.1007/s00216-022-04321-y)

DOI: [10.1016/j.scitotenv.2022.161257](https://doi.org/10.1016/j.scitotenv.2022.161257)

DOI: [10.1007/s11356-023-29070-y](https://doi.org/10.1007/s11356-023-29070-y)

New alternative wastewater treatment technologies



Algal ponds
lab-scale →
pilot-scale



Photocatalysis



Molecularly imprinted polymers



Cavitation



Plasma



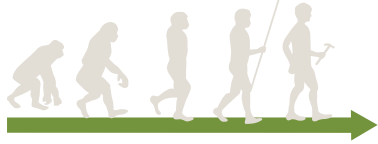
Nanoremediation with Fe nanoparticles

These technologies improve the removal efficiency of persistent emerging contaminants, and can be used before or after conventional treatment.

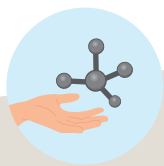
Sensing the impossible, making the invisible using nature-inspired tools

Utilizing microbial mechanisms, developed over billions of years of evolution in a new generation of sensory systems.

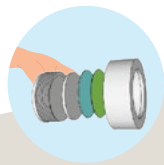
Billions of years of microbial evolution ...



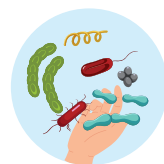
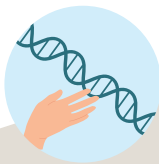
... gave us a toolbox inspired by the Nature itself



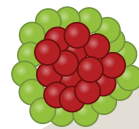
Highly specific peptides



Proteins that can specifically capture/detoxify Methylmercury



Microbial diversity



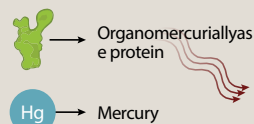
Artificially constructed microbial communities

Advanced long-term sampling techniques

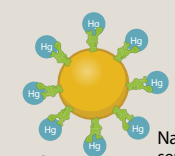


Advanced sensor for monitoring processes happening in marine ecosystems

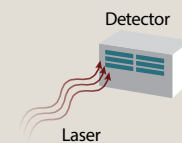
Sensors for mercury detection in water



Purified proteins used to capture mercury in water

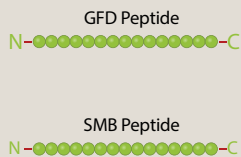


Nanoparticle sensors

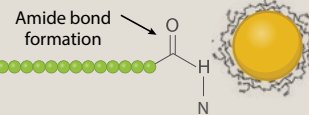
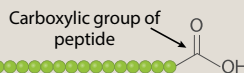


Detector

Laser



FITC Labeling



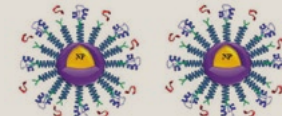
Ovarian cancer detection



IONPs



Chitosan coated IONPs



Peptide functionalized IONPs

Bio-mimetic materials and advanced nanotechnologies have become integral to our daily lives. They are virtually omnipresent—in functional textiles, microbial fuel cells, biosensors, advanced drug delivery systems, and nano vaccines—helping to create a cleaner and safer environment.

New materials and technologies

DOI: [10.1039/D3EN00367A](https://doi.org/10.1039/D3EN00367A)

DOI: [10.3390/diagnostics13040697](https://doi.org/10.3390/diagnostics13040697)

Drug delivery systems, nanovaccines, and more

DOI: [10.3390/ma16093593](https://doi.org/10.3390/ma16093593)

DOI: [10.1039/d3ma00399j](https://doi.org/10.1039/d3ma00399j)

DOI: [10.3390/nano13030408](https://doi.org/10.3390/nano13030408)

DOI: [10.1016/j.rser.2023.113813](https://doi.org/10.1016/j.rser.2023.113813)

DOI: [10.1186/s43094-023-00515-y](https://doi.org/10.1186/s43094-023-00515-y)

Challenges of analytical chemistry

To advance the development and analyses of new materials, nanocomposites, and pharmaceuticals, as well as the extraction of rare elements from complex matrices and the management of emerging environmental contaminants, novel and highly accurate analytical methods are being developed.

DOI: [10.1007/s00216-023-04675-x](https://doi.org/10.1007/s00216-023-04675-x)

DOI: [10.1016/j.talanta.2023.124765](https://doi.org/10.1016/j.talanta.2023.124765)

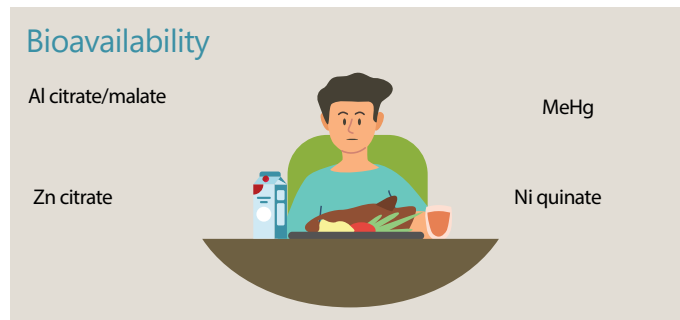
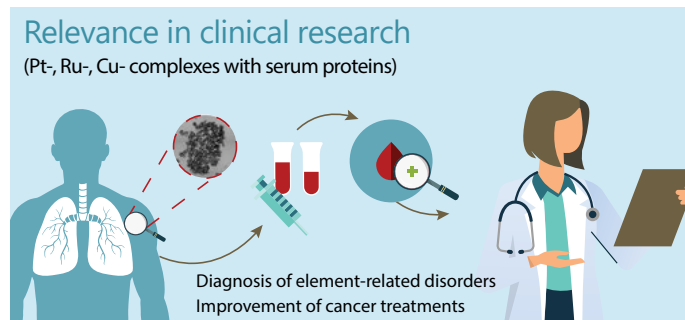
DOI: [10.1063/5.0153094](https://doi.org/10.1063/5.0153094)

DOI: [10.1016/j.scitotenv.2023.165669](https://doi.org/10.1016/j.scitotenv.2023.165669)

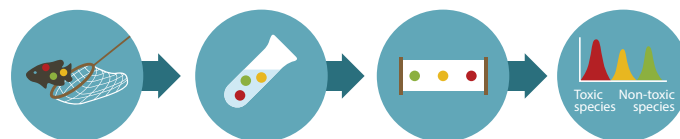
The role of element speciation

An element's properties, including its mobility, reactivity, and toxicity, depends on the chemical species in which the element is present in the environment. Identification and quantification of chemical species – element speciation – provides a powerful analytical tool to study their transformation, toxicity, relevance in clinical research, and bioavailability.

Transformation



Element speciation analysis requires reliable, sensitive, and selective analytical procedures that must be able to preserve species integrity during all analytical steps.

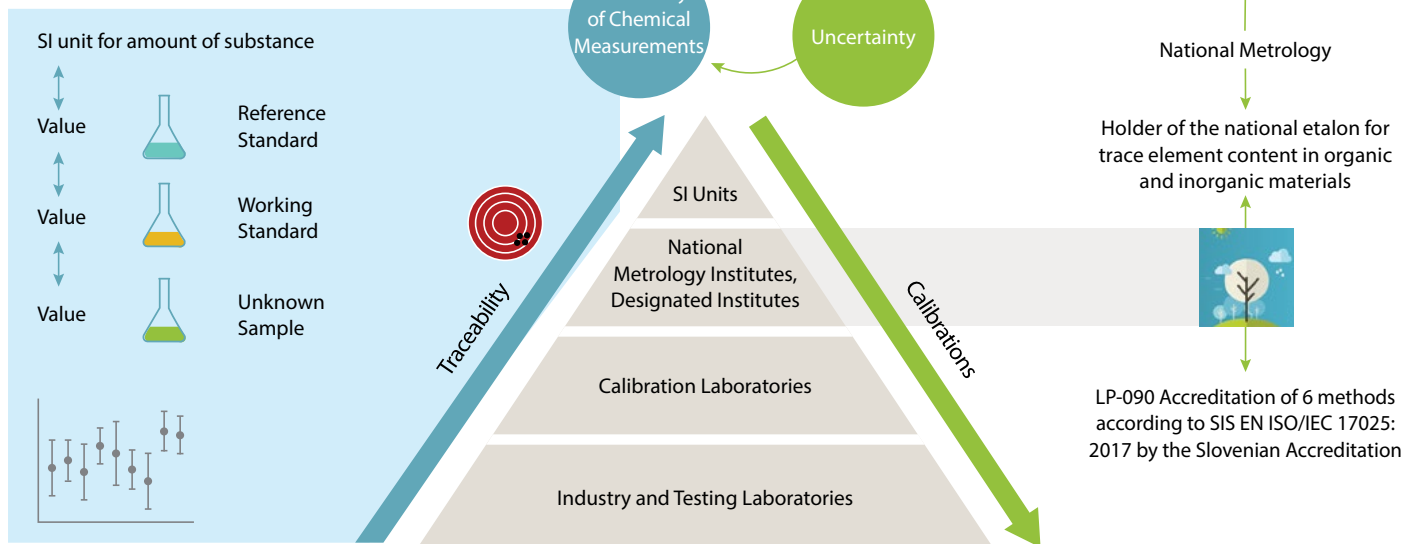


Comparability of measurement results

The International Bureau of Weights and Measures (BIPM) defines Metrology as "the science of measurement".

Two main objectives of Metrology:

- Defining units of measurement
- Linking measurements to the reference standards for traceability



The comparability and uncertainty of analytical methods were evaluated for the determination of elemental concentrations in river water, methylated mercury species in seawater, strontium isotope ratios in inorganic materials, and isotope ratios of pure CO₂.

DOI: [10.1088/0026-1394/60/1A/08026](https://doi.org/10.1088/0026-1394/60/1A/08026)

DOI: [10.1111/ggr.12517](https://doi.org/10.1111/ggr.12517)

DOI: [10.1016/j.aca.2023.341735](https://doi.org/10.1016/j.aca.2023.341735)

DOI: [10.1088/0026-1394/60/1A/08001](https://doi.org/10.1088/0026-1394/60/1A/08001)

Irradiation channels in the TRIGA Mark I IPR-R1 research reactor in Brazil were characterized for the application of the k₀-standardization method in neutron activation analysis

DOI: [10.1007/s10967-022-08688-1](https://doi.org/10.1007/s10967-022-08688-1)



Traditional approach

My 'correct' results; the smaller the '±' the better; no need for traceability



Metrological approach

Establish and demonstrate traceability; standard assessment of uncertainty; 'true' result is theoretical; critical review of imperfect methods

Our Calibration and Measurement Capability (CMC) through key intercomparisons resulted in 25 CMCs in the BIPM Key Comparison Database (KCDB).

BIPM KCDB for CMC's of O₂

25 CMCs in four categories (updated 2022-11-18):

Category 10:

Biological fluids and materials; (5 CMCs)

Category 11:

Food; (14 CMCs)

Category 13:

Sediments, soils, ores and particulates; (4 CMCs)

Category 14:

Other materials; (14 CMCs)



Colloid biology

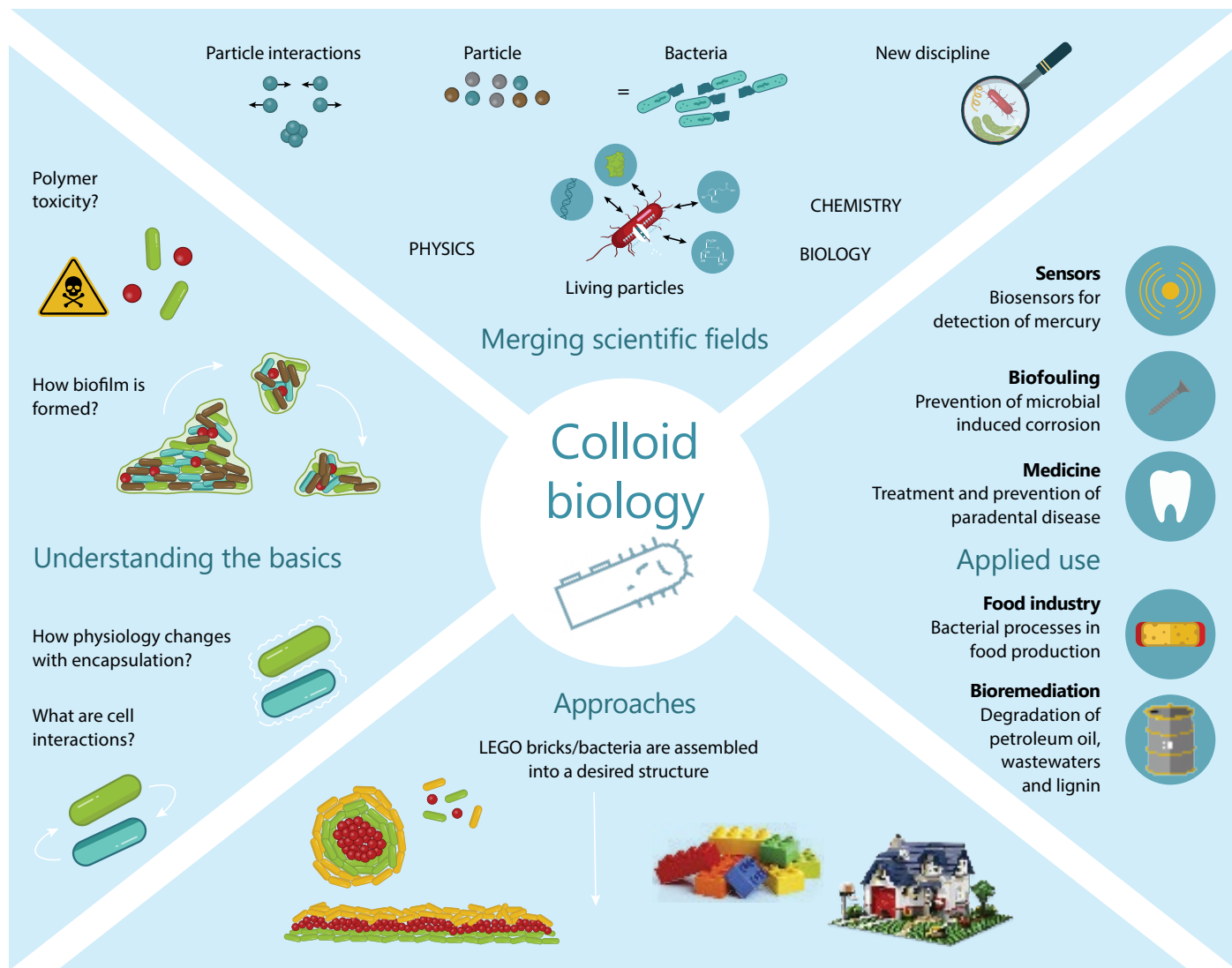
Patent application: EP23169641.0, 2023-04-24

Aggregates of PES-encapsulated bacteria with magnetite nanoparticles were formed, offering the potential for use as an *in-vivo* remotely guided drug delivery system in cancer treatment

DOI: [10.3389/fbioe.2022.1070851](https://doi.org/10.3389/fbioe.2022.1070851)

In the TRIGA-Mark II experimental reactor, a biofilm with vertically stratified resistance/tolerance to ionizing radiation was formed. One of the *A Bacillus* strains isolated from the biofilm exhibited tolerance to up to 15 kGy combined gamma and proton radiation.

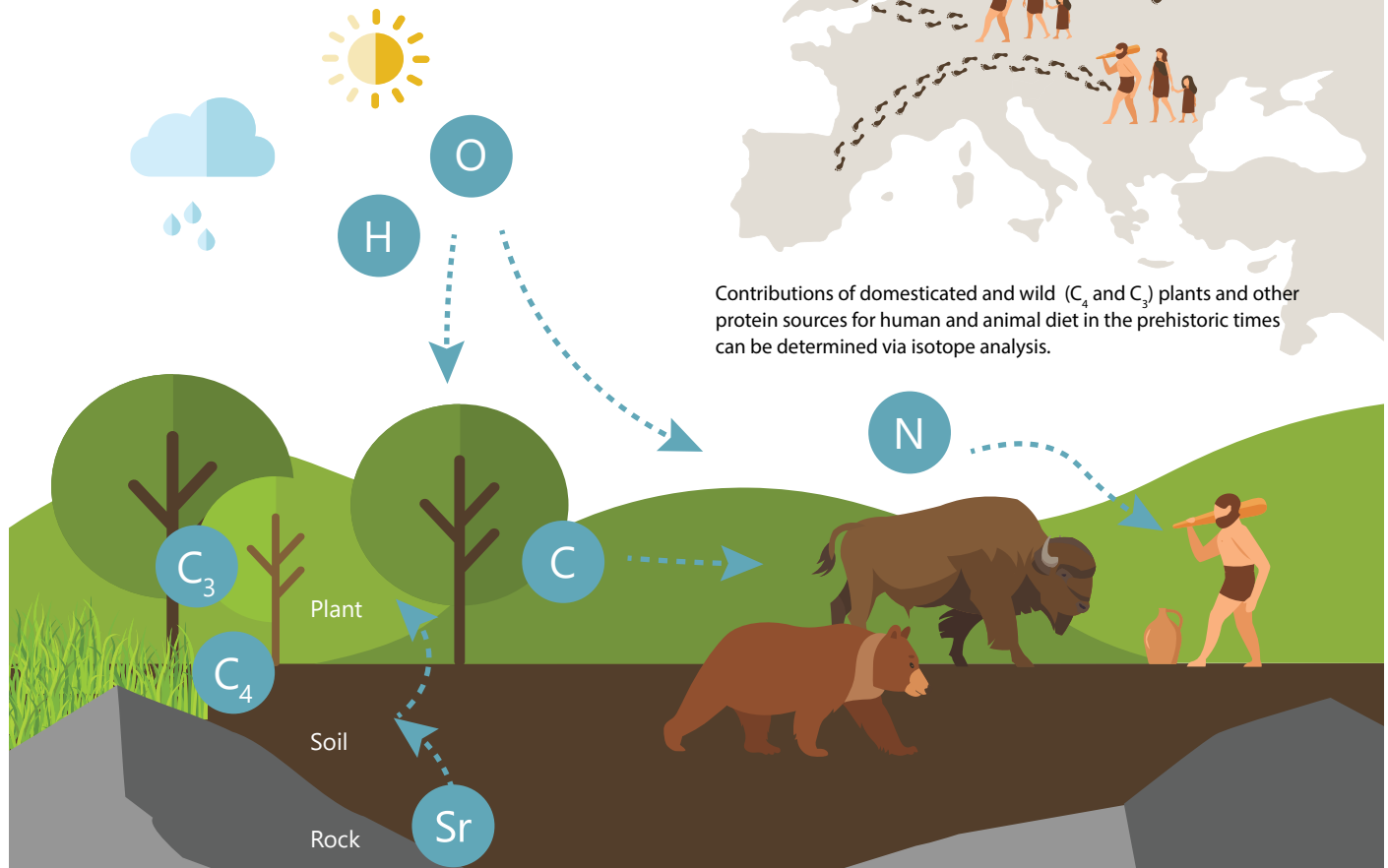
DOI: [10.1080/09553002.2023.2258206](https://doi.org/10.1080/09553002.2023.2258206)



The archaeology of bones, teeth and vessels

Stable isotope analysis allows researchers to reconstruct ancient diets and population movements.

These analyses can help determine whether a person (or animal) lived his/her entire life in one location or moved from one area to another.



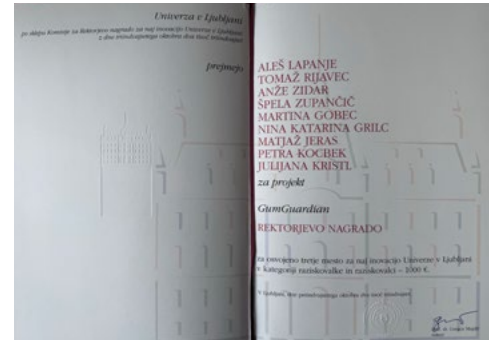
The study of glass production in Roman Aquileia revealed evidence of glass recycling, production of coloured glass (amber black, emerald green) from primary glasses from Egyptian and Syro-Palestinian furnaces.

DOI: [10.1016/j.jasrep.2023.104067](https://doi.org/10.1016/j.jasrep.2023.104067)

Prestigious Awards

- ☆ Polona Klemenčič was awarded the Krka Award for her master thesis on "Exposure to Cadmium in the Slovenian Population" in Novo Mesto, September 2023.
- ☆ Adna Alilović received the ERASS prize in the Specialty Section Award, Chemical Risk Assessment Research category, at the EUROTOX 2023 conference for her research on methyl mercury after ingesting tuna in Ljubljana, September 2023.
- ☆ Dr. Ana Kovačič and Dr. Lidija Strojnik achieved Summa Cum Laude, a prestigious distinction at the Jožef Stefan International Postgraduate School, for their extraordinary academic excellence in Ljubljana, July, December 2023.
- ☆ Cathrine Terro received the award for the best contribution at the 15th Jožef Stefan IPSS Conference in Kamnik, June 2023.
- ☆ Anja Vehar was honored with the 10th Saubermacher Environmental Award for the best Master's thesis in the field of energy and the environment, titled "Monitoring the Efficiency of the Removal of Bisphenols from Wastewater in a Municipal Wastewater Treatment Plant" in Kidričevo, May 2023.
- ☆ The CitieS-Health Project received an Honorary Mention in the European Union Citizen Science Award in Linz, Austria, September 2023.
- ☆ Eirini Andreassidou won 1st Place in the Science Slam of the ISO-FOOD Symposium: From Food Source to Health in Portorož, Slovenia, April 2023.
- ☆ Eirini Andreassidou was the winner of the Public Engagement Activity Competition at the FoodTraNet Summer School 2 in Almeria, Spain, June 2023.
- ☆ Dr. Aleš Lapanje and Dr. Tomaž Rijavec achieved third place in the University of Ljubljana's Rector award for Best Innovation in the Researchers category, recognizing their outstanding work on the GumGuardian project in Ljubljana, October 2023.
- ☆ Klara Žagar received an award for her contribution at the ISO-FOOD conference for her work on $\delta^{18}O$ and δ^2H fingerprinting of tap water, Portorož, April 2023.
- ☆ The Scientific Research Council for the Natural Sciences has selected the achievement titled "*Non-targeted analysis identified 74 biomarkers of exposure in the urine of Slovenian children*" by Dr. Žiga Tkalec and colleagues from the Department of Environmental Sciences as Excellent in Science 2023, Ljubljana, November 2023





Theses and Mentoring

Doctoral Dissertations

- ☆ NOVAK, Rok. Assessment of individual-level exposure to air pollutants using personal monitoring, doctoral dissertation, Ljubljana 2023
- ☆ MASTEN RUTAR, Jasmina. Characterization of Spirulina microalgae as a new alternative food source, doctoral dissertation, Ljubljana 2023
- ☆ ĐURIĆ, Marija. Investigation of the environmental acceptability of geotechnical composites, made from different recycled materials investigation of the environmental acceptability of geotechnical composites, made from different recycled materials, doctoral dissertation, Ljubljana 2023
- ☆ VEROVŠEK, Taja. Licit and illicit drugs in waste- and environmental waters : epidemiological and environmental applications, doctoral dissertation, Ljubljana 2023
- ☆ BERISHA, Sabina. Temperature fractionation of mercury in the cement production process, doctoral dissertation, Ljubljana 2023

Master Theses

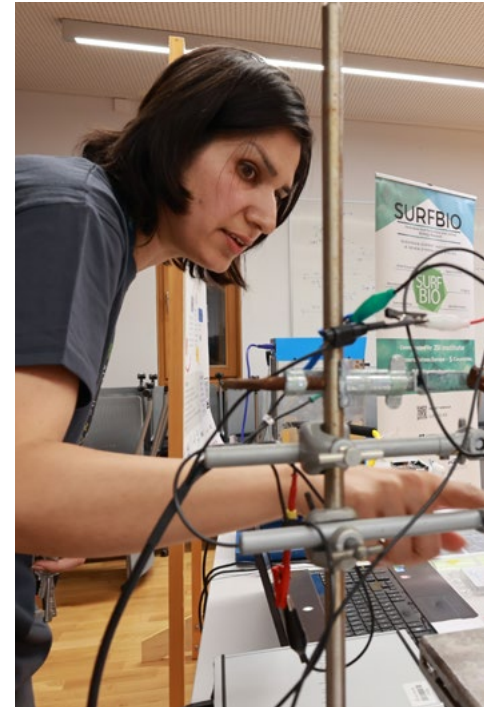
- ☆ LOVŠE, Urša. Optimization of bacterial genomic DNA isolation for nanopore sequencing and sequence analysis of selected strains, master's thesis, Ljubljana 2023
- ☆ MEDVED, Tomaž. Impact of climate change on the isotopic composition of oxygen and carbon in tree cellulose, master's thesis, Maribor 2023
- ☆ VENE, Ožbej. Analysis of building ventilation efficiency based on measurements and simulations of carbon dioxide and radon concentrations, master's thesis, Ljubljana 2023
- ☆ BOŽIČ, Tajda. Analysis of the effects of airtightness and natural ventilation on the concentration of particles in indoor air, master's thesis, Ljubljana 2023
- ☆ HAUPTMAN, Žan. Determination of the isotopic composition of molybdenum in water and sediments of karstic Lake Brljan, master's thesis, Ljubljana 2023
- ☆ FRKAL, Neja. Mass spectrometric characterization of extracts from invasive knotweed species, master's thesis, Ljubljana 2023
- ☆ TESOVNIK, Anže. Natural and anthropogenic impact on Holocene marine sedimentation in the Gulf of Trieste, master's thesis, Ljubljana 2023
- ☆ RUPČIČ, Anja. Dependence of radon dynamics on building characteristics and work regime in selected educational buildings in Slovenia and Montenegro, master's thesis, Ljubljana 2023
- ☆ KOSIRNIK, Neja. Development and validation of the analytical method for the determination of biomarkers of phthalates and their replacements in human breast milk, master's thesis, Ljubljana 2023.

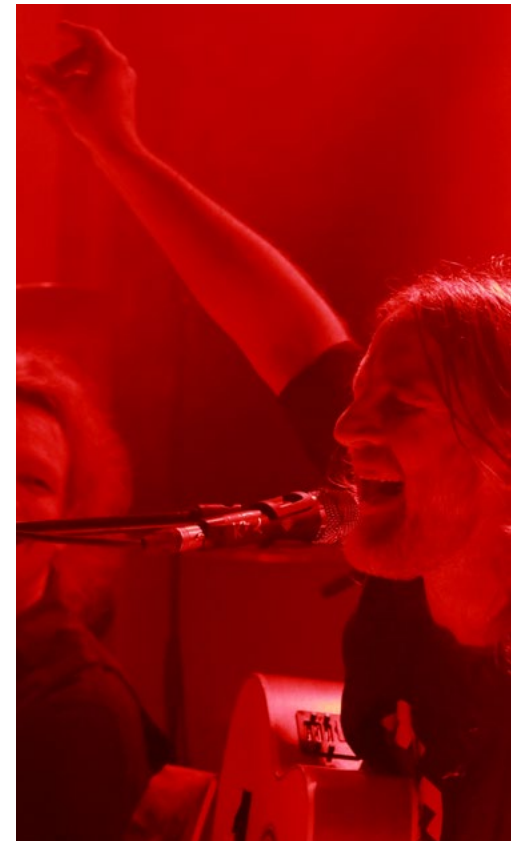


You are invited to become part of our team!

Would you like to conduct research in an international environment alongside exceptional researchers? Are you interested in working with state-of-the-art research equipment and expanding your knowledge of advanced scientific methods? The Department of Environmental Sciences brings together students and professionals with a drive to develop both personally and professionally in an innovative research setting. We are currently offering graduates who wish to pursue a master's degree in Environmental Sciences the opportunity to work with top researchers in the field and become part of a dynamic, productive, and highly efficient team.

For more information, visit www.environment.si.





Bring cutting edge research in real life!

We aim to understand better the relationship between natural processes and human activities and the influence that these activities have on human health and the environment. Our research groups cooperate with leading research institutions and universities worldwide. Our goal is to provide our students with the highest quality post-graduate studies at the master's and doctoral levels through joint research and education within a dynamic research and development environment and contribute to the strengthening of science and technology to better society. We cooperate closely with the Jožef Stefan International Postgraduate School (IPS), an independent higher education institution, that is strongly supported by industry (including Gorenje, Kolektor, and Saloni) and an international network of cooperating universities and research institutions from the European Union, the USA, and Japan.



5
SCHOLARSHIP
HOLDERS
in 2023/24



9
MAGISTRANDS
in 2023



5
DOCTORANDS
in 2023



100
RESEARCH
ARTICLES





Research visitors in 2023

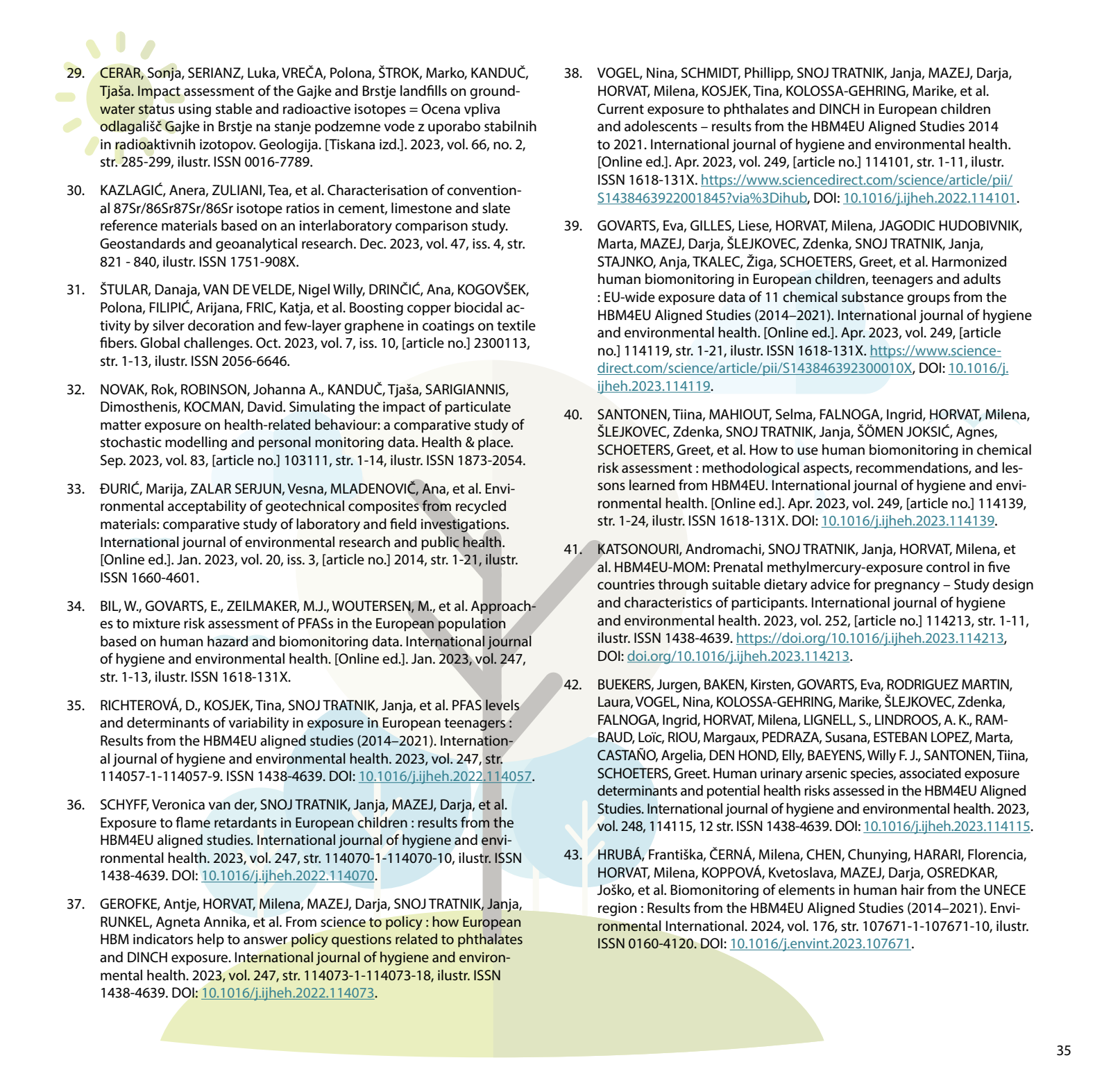
1. Klaudia Block, University of Gdansk, Gdansk, Poland, 1. 1.–3. 3. 2023 & 1.–14. 6. 2023
 2. Marija Petrović, University of Belgrade, Belgrade, Serbia, 12. 2.–7. 3. 2023
 3. Dorice Seif, Ministry of education, science and technology, Dodoma, Tanzania, 27. 3.–24. 6. 2023
 4. Olfa Kallech ep Ziri, INRAP, Ariana, Tunis, 16.–23. 4. 2023
 5. Mohsen Ben Alaya, INRAP, Ariana, Tunis, 16.–30. 4. 2023
 6. Sassi ep Souissi, INRAP, Ariana, Tunis, 16.–30. 4. 2023
 7. Emna Jridette ep Dougari, INRAP, Ariana, Tunis, 16.–30. 4. 2023
 8. Manel Haraketi ep Hosni, INRAP, Ariana, Tunis, 16.–30. 4. 2023
 9. Riadh Hamdi, INRAP, Ariana, Tunis, 16.–30. 4. 2023
 10. Dr. Houyem Abderrazak ep Snani, INRAP, Ariana, Tunis, 16.–30. 4. 2023
 11. Dr. Alejandro Cifuentes, Foodomics, CIAL, Madrid, Spain, 22.–26. 4. 2023
 12. Dr. George Melikadze, Georgian Geothermal Association, Tbilisi, Georgia, 8.–12. 5. 2023
 13. Mara Antonietta Carrera, EEZA-CSIC, Almeria, Spain, 15. 8.–30. 9. 2023
 14. Dr. Alexandre Soares Leal, CDTN, Belo Horizonte, Brasil, 16. 8. 2023
 15. Dr. Bahriddin Nishonov, Scientific Research Hydrometeorological Institute, Tashkent, Uzbekistan, 22. 8. 2023
 16. Dr. Igor Nicoara, Institute of Geology and Seismology of Moldavian State University, 22. 8. 2023
 17. Nayyer Rehman, WRG Europe, Exeter, Great Britain, 1. 9.–15. 10. 2023
 18. Dr. Maria Angela de Barros Correia Menezes, CDTN, Bello Horizonte, Brasil, 14. 9.–7. 10. 2023
 19. Petra Škvorova, Czech University of Life Sciences Prague, Prague, Czech Republic, 18. 9.–18. 10. 2023
 20. Allen Anies, University of Antwerp, Antwerp, Belgium, 18. 9.–31. 10. 2023
 21. Aseel Husain Almohammad, Jordan Atomic Energy Commission, Aman, Jordan, 2.–6. 10. 2023
 22. Dr. Lubertus Bijlsma, Universitat Jaume I, Valencia, Spain, 16.–19. 10. 2023
 23. Niki Simonović, Institut Ruđer Bošković, Zagreb, 2. 11.–3. 12. 2023
 24. Samira Bejaoui ep Jelassi, INRAP, Ariana, Tunis, 20. 11.–3. 12. 2023
 25. Dr. Martina Furdek Turk, Institut Ruđer Bošković, Zagreb, Croatia, 22.–24. 11. 2023
 26. Dr. Maja Ivanić, Institut Ruđer Bošković, Zagreb, Croatia, 22.–24. 11. 2023
 27. Dr. Vesna Despotović, Faculty of Sciences, University of Novi Sad, Novi Sad Serbia, 3.–8. 12. 2023
 28. Dr. Daniela Šojić Merkulov, Faculty of Sciences, University of Novi Sad, Novi Sad Serbia, 3.–8. 12. 2023
- 



Original peer-reviewed articles

1. MACHREKI, Manel, CHOUKI, Takwa, TYULIEV, Georgi, ŽIGON, Dušan, OHTANI, Bunsho, LOUKANOV, Alexandre, STEFANOV, Plamen, EMIN, Saim. Defective TiO₂ nanotube arrays for efficient photoelectrochemical degradation of organic pollutants. ACS omega. 2023, vol. 8, issue 24, str. 21605-21617, ilustr. ISSN 2470-1343. <https://pubs.acs.org/doi/10.1021/acsomega.3c00820>, DOI: [10.1021/acsomega.3c00820](https://doi.org/10.1021/acsomega.3c00820).
2. KLEINDIENST, Alina, ŽIVKOVIĆ, Igor, TESSIER, Emmanuel, KOENIG, Alkuin Maximilian, HEIMBÜRGER-BOAVIDA, Lars-Eric, HORVAT, Milena, AM-OROUX, David. Assessing comparability and uncertainty of analytical methods for methylated mercury species in seawater. Analytica chimica acta. [Online ed.]. Oct. 2023, vol. 1278, [article no.] 341735, str. 1-11, ilustr. ISSN 1873-4324. <https://www.sciencedirect.com/science/article/pii/S000326702300956X?via%3DIhub>, DOI: [10.1016/j.aca.2023.341735](https://doi.org/10.1016/j.aca.2023.341735).
3. ŠLEJKOVEC, Zdenka, STAJNKO, Anja, MAZEJ, Darja, JAGODIĆ HUDO-BIVNIK, Marta, MESTEK, Oto, LAJIN, Bassam, GÖSSLER, Walter, ELTEREN, Johannes Teun van, FALNOGA, Ingrid. Trimethylselenonium ion determination in human urine by high-performance liquid chromatography–hydride generation–atomic fluorescence spectrometry optimization of the hydride generation step. Analytical and bioanalytical chemistry. Jan. 2023, vol. 415, iss. 2, str. 317-326, ilustr. ISSN 1618-2642. DOI: [10.1007/s00216-022-04408-6](https://doi.org/10.1007/s00216-022-04408-6).
4. PLEŠNIK, Helena, OMERZEL, Maša, ČEMAŽAR, Maja, SERŠA, Gregor, KOSJEK, Tina. An effective validation of analytical method for determination of a polar complexing agent: the illustrative case of cytotoxic bleomycin. Analytical and bioanalytical chemistry. [Online ed.]. Jun. 2023, vol. 415, iss. 14, str. 2737-2748, ilustr. ISSN 1618-2650. <https://link.springer.com/article/10.1007/s00216-023-04675-x>, DOI: [10.1007/s00216-023-04675-x](https://doi.org/10.1007/s00216-023-04675-x).
5. MENCIN, Marjeta, MARKANOVIĆ, Nika, MIKULIĆ PETKOVŠEK, Maja, VEBERIĆ, Robert, TERPINC, Petra. Changes in the bioaccessibility of antioxidants after simulated in vitro digestion of bioprocessed spelt-enhanced wheat bread. Antioxidants. Feb. 2023, vol. 12, issue 2, [article no.] 487, str. 1-19, ilustr. ISSN 2076-3921. <https://www.mdpi.com/2076-3921/12/2/487>, DOI: [10.3390/antiox12020487](https://doi.org/10.3390/antiox12020487).
6. DIJK, Gerwin, JOLIEN, Pas, MARKOVIĆ, Katarina, ŠČANČAR, Janez, O'CONNOR, Rodney P. PEDOT:PSS-coated platinum electrodes for neural stimulation : special collection: Implantable bioelectronics. APL bioengineering. 2023, vol. 7, no. 4, str. 046117-1-046117-12. ISSN 2473-2877. DOI: [10.1063/5.0153094](https://doi.org/10.1063/5.0153094).
7. LUČIĆ, Mavro, MIKAC, Nevenka, VDOVIĆ, Neda, BAČIĆ, Niko, DINIS, Pedro, MILAČIĆ, Radmila. Distinguishing between natural and anthropogenic sources of potentially toxic elements in sedimentary materials along the Sava River (Slovenia, Croatia). Applied geochemistry. [Print ed.]. 2023, vol. 151, str. 105619-1-105619-11. ISSN 0883-2927. DOI: [10.1016/j.apgeochem.2023.105619](https://doi.org/10.1016/j.apgeochem.2023.105619).
8. KANDUČ, Tjaša, GERŠL, Milan, GERŠLOVÁ, Eva, MCINTOSH, Jennifer. Temporal and seasonal variations of silicate svratka river and sediment characterization, Czech Republic : geochemical and stable isotopic approach. Aquatic geochemistry. Sep. 2023, vol. 29, iss. 3, str. 145-171, ilustr. ISSN 1380-6165. DOI: [10.1007/s10498-023-09414-3](https://doi.org/10.1007/s10498-023-09414-3).
9. SHARIFI, Tayebah, SALAMON, Krešimir, BOHAČ, Mario, PETER, Robert, ČIŽMAR, Tihana, PETRAVIĆ, Mladen, JURAIĆ, Krunoslav, GRČIĆ, Ivana, GAJOVIĆ, Andreja. Photocatalytic properties of semi-transparent WxTi1-xO2 thin films for water treatment. Catalysis today. [Online ed.]. Mar. 2023, vol. 413/415, [article no.] 113904, str. 1-7, ilustr. ISSN 1873-4308. DOI: [10.1016/j.cattod.2022.09.010](https://doi.org/10.1016/j.cattod.2022.09.010).
10. RADIĆ, Gabrijela, PEROVIĆ, Klara, SHARIFI, Tayebah, KUŠIĆ, Hrvoje, KOVAČIĆ, Marin, KRALJIĆ ROKOVIĆ, Marijana. Electrochemical characterisation of the photoanode containing TiO₂ and SnS₂ in the presence of various pharmaceuticals. Catalysts. [Online ed.]. May 2023, vol. 13, iss. 5, [article no.] 909, str. 1-15. ISSN 2073-4344. DOI: [10.3390/catal13050909](https://doi.org/10.3390/catal13050909).
11. ZAMLJEN, Tilen, LOJEN, Sonja, ZUPANC, Vesna, SLATNAR, Ana. Determination of the yield, enzymatic and metabolic response of two Capsicum spp. cultivars to deficit irrigation and fertilization using the stable isotope ¹⁵N. Chemical and biological technologies in agriculture. 2023, vol. 10, art. no. 129, 11 str. ISSN 2196-5641. DOI: [10.1186/s40538-023-00501-9](https://doi.org/10.1186/s40538-023-00501-9).

12. AIRAKSINEN, Anu, CONCIA, ŠTROK, Marko, WALTHER, Clemens, et al. Hromadny oteveny online kurz „Vyznam radiochemie pro nasi spolecnost“. *Chemické listy*. 2023, vol. 117, no. 11, str. 708-713, ilustr. ISSN 1213-7103. DOI: [10.54779/chl20230708](https://doi.org/10.54779/chl20230708).
13. RUNKEL, Agneta Annika, STAJNKO, Anja, SNOJ TRATNIK, Janja, MAZEJ, Darja, HORVAT, Milena, PRIBYLOVÁ, Petra, KOSJEK, Tina. Exposure of children and adolescents from Northeastern Slovenia to per- and polyfluoroalkyl substances. *Chemosphere*. [Online ed.]. Apr. 2023, vol. 321, [article no.] 138096, str. 1-11, ilustr. ISSN 1879-1298. DOI: [10.1016/j.chemosphere.2023.138096](https://doi.org/10.1016/j.chemosphere.2023.138096).
14. FRANCE ŠTIGLIC, Alenka, SEŠEK-BRIŠKI, Alenka, ŽAVBI, Marko, OSREDKAR, Joško, SKITEK, Milan, MARC, Janja, FALNOGA, Ingrid. Reference intervals of 24 trace elements in blood, plasma and erythrocytes for the Slovenian adult population. *Clinical chemistry and laboratory medicine*. [Online ed.]. 2023, vol. 62, iss. 5, str. 946-957, ilustr. ISSN 1437-4331. DOI: [10.1515/ccmlm-2023-0731](https://doi.org/10.1515/ccmlm-2023-0731).
15. BOOGAERTS, Tim, HEATH, Ester, et al. Optimization, validation and application of a high-throughput 96-well elution protocol for the quantification of psychoactive substances in influent wastewater. *Drug testing and analysis*. Feb. 2023, vol. 15, iss. 2, str. 240-246. ISSN 1942-7611. DOI: [10.1002/dta.3392](https://doi.org/10.1002/dta.3392).
16. ODUMAH HOOD, Christiana, JAČIMOVIČ, Radojko, MENSAH, Samuel Yeboah, HORVAT, Milena. Spatial distribution of Hg in Pra River Basin, South-western Ghana using HF acid combination method. *Environmental monitoring and assessment*. May 2023, vol. 195, iss. 5, article no. 604, str. 1-7.
17. RANJEK, Gregor, HORVAT, Milena, MILAČIČ, Radmila, ROŠER, Janez, KOTNIK, Jože. Assessment of dimethyl sulphide odorous emissions during coal extraction process in Coal Mine Velenje. *Environmental monitoring and assessment*. 2023, vol. 195, str. 1269-1-1269-19. ISSN 1573-2959. DOI: [10.1007/s10661-023-11755-z](https://doi.org/10.1007/s10661-023-11755-z).
18. SCHILLEMANS, Tessa, KOSJEK, Tina, TKALEC, Žiga, VOGEL, Nina, et al. Cross-sectional associations between exposure to per- and polyfluoroalkyl substances and body mass index among European teenagers in the HBM4EU aligned studies. *Environmental pollution*. [Print ed.]. Jan. 2023, vol. 316, pt. 1, [article no.] 120566, str. 1-11, ilustr. ISSN 0269-7491. DOI: [10.1016/j.envpol.2022.120566](https://doi.org/10.1016/j.envpol.2022.120566).
19. FROELING, Frederique, GIGNAC, Florence, KOCMAN, David, FTIČAR, Jure, SNOJ TRATNIK, Janja, BASAGAÑA, Xavier, et al. Implementing co-created citizen science in five environmental epidemiological studies in the CiteS-Health project. *Environmental research*. [Online ed.]. [in press] 2023, vol. , [article no.] 117469, str. 1-58, ilustr. ISSN 1096-0953. DOI: [10.1016/j.envres.2023.117469](https://doi.org/10.1016/j.envres.2023.117469).
20. PALIR, Neža, STAJNKO, Anja, SNOJ TRATNIK, Janja, MAZEJ, Darja, SEŠEK-BRIŠKI, Alenka, FRANCE ŠTIGLIC, Alenka, HORVAT, Milena, FALNOGA, Ingrid, et al. ALAD and APOE polymorphisms are associated with lead and mercury levels in Italian pregnant women and their newborns with adequate nutritional status of zinc and selenium. *Environmental research*. [Online ed.]. Mar. 2023, vol. 220, [article no.] 115226, str. 1-16, ilustr. ISSN 1096-0953. DOI: [10.1016/j.envres.2023.115226](https://doi.org/10.1016/j.envres.2023.115226).
21. KOVAČIČ, Ana, GULIN, Martin Rafael, NANNOU, Christina, KORONAIYOU, Lelouda-Athanasia, KOSJEK, Tina, HEATH, David John, MAIER, Mark S., LAMBROPOULOU, Dimitra A., HEATH, Ester. Aerobic degradation of tetramethyl bisphenol F (TMBPF) with activated sludge: kinetics and biotransformation products. *Environmental research*. [Online ed.]. Jun. 2023, vol. 227, [article no.] 115790, str. 1-10, ilustr. ISSN 1096-0953. DOI: [10.1016/j.envres.2023.115790](https://doi.org/10.1016/j.envres.2023.115790).
22. VEROVŠEK, Taja, CELMA TIRADO, Alberto, HEATH, David John, HEATH, Ester, HERNÁNDEZ, Félix Javier, BIJLSMA, Lubertus. Screening for new psychoactive substances in wastewater from educational institutions. *Environmental research*. [Online ed.]. Nov. 2023, vol. 237, pt. 2, [article no.] 117061, str. 1-7, ilustr. ISSN 1096-0953. DOI: [10.1016/j.envres.2023.117061](https://doi.org/10.1016/j.envres.2023.117061).
23. CHOUHAN, Raghuraj S., GAČNIK, Jan, ŽIVKOVIČ, Igor, VIJAYAKUMARAN NAIR, Sreekanth, VAN DE VELDE, Nigel Willy, VESEL, Alenka, ŠKET, Primož, GANDHI, Sonu, JERMAN, Ivan, HORVAT, Milena. Green synthesis of a magnetite/graphitic carbon nitride 2D nanocomposite for efficient Hg2+ remediation. *Environmental science. Nano*. Oct. 2023, vol. 10, iss. 10, str. 2658-2671, ilustr. ISSN 2051-8161. DOI: [10.1039/D3EN00367A](https://doi.org/10.1039/D3EN00367A).
24. MASTEN RUTAR, Jasmina, STROJNIK, Lidija, NEČEMER, Marijan, BONTEMPO, Luana, OGRINC, Nives. Determining the authenticity of Spirulina dietary supplements based on stable isotope and elemental composition. *Foods*. 2023, vol. 12, no. 3, str. 562-1-562-20. ISSN 2304-8158. DOI: [10.3390/foods12030562](https://doi.org/10.3390/foods12030562).
25. RYBKIN, Iaroslav, PINYAEV, Sergey, SINDEEVA, Olga, GERMAN, Sergey, KOBLAR, Maja, PYATAEV, Nikolay, ČEH, Miran, GORIN, Dmitry A., SUKHORUKOV, Gleb B., LAPANJE, Aleš. Modification of bacterial cells for in vivo remotely guided systems. *Frontiers in bioengineering and biotechnology*. 2023, vol. 10, [article no.] 1070851, str. 1-11, ilustr. ISSN 2296-4185. DOI: [10.3389/fbioe.2022.1070851](https://doi.org/10.3389/fbioe.2022.1070851).
26. KOCMAN, David, RIGHI, Valeria, ERRANDONEA, Lucia, FTIČAR, Jure, BASAGAÑA, Xavier, et al. Toolkit for conducting citizen science activities in environmental epidemiology. *Frontiers in environmental science*. 2023, vol. 11, [article no.] 1177413, str. 1-13, ilustr. ISSN 2296-665X.
27. ANESTI, Ourania, PAPAIOANNOU, Nafsika, GABRIEL, Catherine, HORVAT, Milena, SNOJ TRATNIK, Janja, SARIGIANNIS, Dimosthenis, et al. An exposome connectivity paradigm for the mechanistic assessment of the effects of prenatal and early life exposure to metals on neurodevelopment. *Frontiers in public health*. 2023, vol. 10, [article no.] 871218, str. 1-22, ilustr. ISSN 2296-2565.
28. ŽIVKOVIČ, Igor, BURA-NAKIČ, Elvira, KNEŽEVIČ, Lucija, HELZ, G.R. Deposition of Mo, Re and U under contrasting redox conditions; assessment of the [Re/Mo]SW/[Re/Mo]SW redox proxy. *Geochimica et cosmochimica acta*. [Online ed.]. Oct. 2023, vol. 359, str. 176-190, ilustr. ISSN 1872-9533.

- 
29. CERAR, Sonja, SERIANZ, Luka, VREČA, Polona, ŠTROK, Marko, KANDUČ, Tjaša. Impact assessment of the Gajke and Brstje landfills on ground-water status using stable and radioactive isotopes = Ocena vpliva odlagališč Gajke in Brstje na stanje podzemne vode z uporabo stabilnih in radioaktivnih izotopov. *Geologija*. [Tiskana izd.]. 2023, vol. 66, no. 2, str. 285-299, ilustr. ISSN 0016-7789.
30. KAZLAGIČ, Anera, ZULIANI, Tea, et al. Characterisation of conventional $^{87}\text{Sr}/^{86}\text{Sr}$ isotope ratios in cement, limestone and slate reference materials based on an interlaboratory comparison study. *Geostandards and geoanalytical research*. Dec. 2023, vol. 47, iss. 4, str. 821 - 840, ilustr. ISSN 1751-908X.
31. ŠTULAR, Danaja, VAN DE VELDE, Nigel Willy, DRINČIČ, Ana, KOGOVIŠEK, Polona, FILIPIČ, Arijana, FRIC, Katja, et al. Boosting copper biocidal activity by silver decoration and few-layer graphene in coatings on textile fibers. *Global challenges*. Oct. 2023, vol. 7, iss. 10, [article no.] 2300113, str. 1-13, ilustr. ISSN 2056-6646.
32. NOVAK, Rok, ROBINSON, Johanna A., KANDUČ, Tjaša, SARIGIANNIS, Dimosthenis, KOČMAN, David. Simulating the impact of particulate matter exposure on health-related behaviour: a comparative study of stochastic modelling and personal monitoring data. *Health & place*. Sep. 2023, vol. 83, [article no.] 103111, str. 1-14, ilustr. ISSN 1873-2054.
33. ĐURIČ, Marija, ZALAR SERJUN, Vesna, MLADENOVIČ, Ana, et al. Environmental acceptability of geotechnical composites from recycled materials: comparative study of laboratory and field investigations. *International journal of environmental research and public health*. [Online ed.]. Jan. 2023, vol. 20, iss. 3, [article no.] 2014, str. 1-21, ilustr. ISSN 1660-4601.
34. BIL, W., GOVARTS, E., ZEILMAKER, M.J., WOUTERSEN, M., et al. Approaches to mixture risk assessment of PFASs in the European population based on human hazard and biomonitoring data. *International journal of hygiene and environmental health*. [Online ed.]. Jan. 2023, vol. 247, str. 1-13, ilustr. ISSN 1618-131X.
35. RICHTEROVÁ, D., KOSJEK, Tina, SNOJ TRATNIK, Janja, et al. PFAS levels and determinants of variability in exposure in European teenagers: Results from the HBM4EU aligned studies (2014–2021). *International journal of hygiene and environmental health*. 2023, vol. 247, str. 114057-1-114057-9. ISSN 1438-4639. DOI: [10.1016/j.ijheh.2022.114057](https://doi.org/10.1016/j.ijheh.2022.114057).
36. SCHYFF, Veronica van der, SNOJ TRATNIK, Janja, MAZEJ, Darja, et al. Exposure to flame retardants in European children: results from the HBM4EU aligned studies. *International journal of hygiene and environmental health*. 2023, vol. 247, str. 114070-1-114070-10, ilustr. ISSN 1438-4639. DOI: [10.1016/j.ijheh.2022.114070](https://doi.org/10.1016/j.ijheh.2022.114070).
37. GEROFKE, Antje, HORVAT, Milena, MAZEJ, Darja, SNOJ TRATNIK, Janja, RUNKEL, Agneta Annika, et al. From science to policy: how European HBM indicators help to answer policy questions related to phthalates and DINCH exposure. *International journal of hygiene and environmental health*. 2023, vol. 247, str. 114073-1-114073-18, ilustr. ISSN 1438-4639. DOI: [10.1016/j.ijheh.2022.114073](https://doi.org/10.1016/j.ijheh.2022.114073).
38. VOGEL, Nina, SCHMIDT, Phillipp, SNOJ TRATNIK, Janja, MAZEJ, Darja, HORVAT, Milena, KOSJEK, Tina, KOLOSSA-GEHRING, Marike, et al. Current exposure to phthalates and DINCH in European children and adolescents – results from the HBM4EU Aligned Studies 2014 to 2021. *International journal of hygiene and environmental health*. [Online ed.]. Apr. 2023, vol. 249, [article no.] 114101, str. 1-11, ilustr. ISSN 1618-131X. <https://www.sciencedirect.com/science/article/pii/S1438463922001845?via%3Dihub>, DOI: [10.1016/j.ijheh.2022.114101](https://doi.org/10.1016/j.ijheh.2022.114101).
39. GOVARTS, Eva, GILLES, Liese, HORVAT, Milena, JAGODIČ HUDOBIVNIK, Marta, MAZEJ, Darja, ŠLEJKOVEC, Zdenka, SNOJ TRATNIK, Janja, STAJNKO, Anja, TKALEC, Žiga, SCHOETERS, Greet, et al. Harmonized human biomonitoring in European children, teenagers and adults: EU-wide exposure data of 11 chemical substance groups from the HBM4EU Aligned Studies (2014–2021). *International journal of hygiene and environmental health*. [Online ed.]. Apr. 2023, vol. 249, [article no.] 114119, str. 1-21, ilustr. ISSN 1618-131X. <https://www.sciencedirect.com/science/article/pii/S143846392300010X>, DOI: [10.1016/j.ijheh.2023.114119](https://doi.org/10.1016/j.ijheh.2023.114119).
40. SANTONEN, Tiina, MAHIOUT, Selma, FALNOGA, Ingrid, HORVAT, Milena, ŠLEJKOVEC, Zdenka, SNOJ TRATNIK, Janja, ŠÖMEN JOKSIĆ, Agnes, SCHOETERS, Greet, et al. How to use human biomonitoring in chemical risk assessment: methodological aspects, recommendations, and lessons learned from HBM4EU. *International journal of hygiene and environmental health*. [Online ed.]. Apr. 2023, vol. 249, [article no.] 114139, str. 1-24, ilustr. ISSN 1618-131X. DOI: [10.1016/j.ijheh.2023.114139](https://doi.org/10.1016/j.ijheh.2023.114139).
41. KATSONOURI, Andromachi, SNOJ TRATNIK, Janja, HORVAT, Milena, et al. HBM4EU-MOM: Prenatal methylmercury-exposure control in five countries through suitable dietary advice for pregnancy – Study design and characteristics of participants. *International journal of hygiene and environmental health*. 2023, vol. 252, [article no.] 114213, str. 1-11, ilustr. ISSN 1438-4639. <https://doi.org/10.1016/j.ijheh.2023.114213>, DOI: doi.org/10.1016/j.ijheh.2023.114213.
42. BUEKERS, Jurgen, BAKEN, Kirsten, GOVARTS, Eva, RODRIGUEZ MARTIN, Laura, VOGEL, Nina, KOLOSSA-GEHRING, Marike, ŠLEJKOVEC, Zdenka, FALNOGA, Ingrid, HORVAT, Milena, LIGNELL, S., LINDROOS, A. K., RAMBAUD, Loïc, RIOU, Margaux, PEDRAZA, Susana, ESTEBAN LOPEZ, Marta, CASTAÑO, Argelia, DEN HOND, Elly, BAEYENS, Willy F. J., SANTONEN, Tiina, SCHOETERS, Greet. Human urinary arsenic species, associated exposure determinants and potential health risks assessed in the HBM4EU Aligned Studies. *International journal of hygiene and environmental health*. 2023, vol. 248, 114115, 12 str. ISSN 1438-4639. DOI: [10.1016/j.ijheh.2023.114115](https://doi.org/10.1016/j.ijheh.2023.114115).
43. HRUBÁ, Františka, ČERNÁ, Milena, CHEN, Chunying, HARARI, Florencia, HORVAT, Milena, KOPPOVÁ, Kvetoslava, MAZEJ, Darja, OSREDKAR, Joško, et al. Biomonitoring of elements in human hair from the UNECE region: Results from the HBM4EU Aligned Studies (2014–2021). *Environmental International*. 2024, vol. 176, str. 107671-1-107671-10, ilustr. ISSN 0160-4120. DOI: [10.1016/j.envint.2023.107671](https://doi.org/10.1016/j.envint.2023.107671).

44. BRATKIČ, Arne, JAZBEC, Anže, TOPLAK, Nataša, KOREN, Simon, LOJEN, Sonja, TINTA, Tinkara, KOSTANJŠEK, Rok, SNOJ, Luka. The colonization of an irradiated environment: The case of microbial biofilm in a nuclear reactor. *International journal of radiation biology*. in press [2023]. ISSN 1362-3095. DOI: [10.1080/09553002.2023.2258206](https://doi.org/10.1080/09553002.2023.2258206).
45. ZANINI, Roberta, MORO, Giulia, ORSEGA, Emilio Francesco, PANIGHELLO, Serena, ŠELIH, Vid Simon, JAČIMOVIČ, Radojko, ELTEREN, Johannes Teun van, MANDRUZZATO, Luciana, MORETTO, Ligia Maria, TRAVIGLIA, Arianna. Insights into the secondary glass production in Roman Aquileia: a preliminary study. *Journal of archaeological science: reports*. Aug. 2023, vol. 50, [article no.] 104067, str. 1-10, ilustr. ISSN 2352-4103. <https://www.sciencedirect.com/science/article/pii/S2352409X23002420?via%3Dihub>, DOI: [10.1016/j.jasrep.2023.104067](https://doi.org/10.1016/j.jasrep.2023.104067).
46. GRILC, Nina Katarina, ZIDAR, Anže, KOCBEK, Petra, RIJAVEC, Tomaž, COLJA, Teja, LAPANJE, Aleš, JERAS, Matjaž, GOBEC, Martina, MLINARIČ-RAŠČAN, Irena, GAŠPERLIN, Mirjana, KRISTL, Julijana, ZUPANČIČ, Špela. Nanofibers with genotyped *Bacillus* strains exhibiting antibacterial and immunomodulatory activity. *Journal of controlled release*. [Print ed.]. 2023, vol. 355, str. 371-384, ilustr. ISSN 0168-3659. <https://www.sciencedirect.com/science/article/pii/S0168365923000913?via%3Dihub>, DOI: [10.1016/j.jconrel.2023.01.082](https://doi.org/10.1016/j.jconrel.2023.01.082). [COBISS.SI-ID 141431811]
47. ČERNE, Marko, PALČIČ, Igor, MAJOR, Nikola, LAPANJE, Aleš, HREŠČAK, Jitka, HEATH, David John, BAN, Dean, et al. Effect of olive-processing technology on the utilization of olive mill pomace as a soil amendment. *Journal of environmental quality*. May/Jun. 2023, vol. 52, iss. 3, str. 610-629, ilustr. ISSN 1537-2537. <https://access.onlinelibrary.wiley.com/doi/10.1002/jeq2.20464>, DOI: [10.1002/jeq2.20464](https://doi.org/10.1002/jeq2.20464).
48. COELHO, Inês, MATOS, Ana Sofia, EPOVA, Ekaterina, BARRÉ, Julien, CELLIER, Robin, OGRINC, Nives, CASTANHEIRA, Isabel, BORDADO, João, DONARD, Olivier F. X. Multi-element and multi-isotopic profiles of Port and Douro wines as tracers for authenticity. *Journal of food composition and analysis*. 2023, vol. 115, str. 104988-1-104988-11. ISSN 0889-1575. DOI: [10.1016/j.jfca.2022.104988](https://doi.org/10.1016/j.jfca.2022.104988).
49. SKOKO, Božena, RADIČ BRKANAC, Sandra, KUHARIČ, Željka, JUKIČ, Mirela, ŠTROK, Marko, ROVAN, Leja, ZGORELEC, Željka, PERČIN, Aleksander, PRLIČ, Ivica. Does exposure to weathered coal ash with an enhanced content of uranium-series radionuclides affect flora? Changes in the physiological indicators of five referent plant species. *Journal of hazardous materials*. [Print ed.]. 2023, vol. 441, str. 129880-1-129880-14. ISSN 0304-3894. DOI: [10.1016/j.jhazmat.2022.129880](https://doi.org/10.1016/j.jhazmat.2022.129880).
50. KOVAČIČ, Ana, ANDREASIDOU, Eirini, BRUS, Anže, VEHAR, Anja, POTOČNIK, Doris, JAGODIČ HUDOBIVNIK, Marta, HEATH, David John, PINTAR, Marina, KACJAN-MARŠIČ, Nina, OGRINC, Nives, BLAZNIK, Urška, HEATH, Ester. Contaminant uptake in wastewater irrigated tomatoes. *Journal of Hazardous Materials*. [Online ed.]. Apr. 2023, vol. 448, [article no.] 130964, str. 1-11, ilustr. <https://www.sciencedirect.com/science/article/pii/S0304389423002467?via%3Dihub>, DOI: [10.1016/j.jhazmat.2023.130964](https://doi.org/10.1016/j.jhazmat.2023.130964).
51. KOVAČIČ, Ana, MODIČ, Martina, HOJNIK, Nataša, ŠTAMPAR, Martina, GULIN, Martin Rafael, NANNOU, Christina, KORONAIYOU, Lelouda-Athanasia, HEATH, David John, WALSH, James L., ŽEGURA, Bojana, LAMBROPOULOU, Dimitra A., CVELBAR, Uroš, HEATH, Ester. Degradation and toxicity of bisphenol A and S during cold atmospheric pressure plasma treatment. *Journal of Hazardous Materials*. [Online ed.]. 2023, vol. 454, [article no.] 131478, str. [1]-12, ilustr. <https://www.sciencedirect.com/science/article/pii/S0304389423007616?via%3Dihub>, DOI: [10.1016/j.jhazmat.2023.131478](https://doi.org/10.1016/j.jhazmat.2023.131478).
52. HATVANI, István Gábor, EDDINE SMATI, Alaa, ERDÉLYI, Dániel, SZÁTMÁRI, Gábor, VREČA, Polona, KERN, Zoltán. Modeling the spatial distribution of the meteoric water line of modern precipitation across the broader Mediterranean region. *Journal of Hydrology*. [Print ed.]. 2023, vol. 617, part b, str. 128925-1-128925-11. ISSN 0022-1694. DOI: [10.1016/j.jhydrol.2022.128925](https://doi.org/10.1016/j.jhydrol.2022.128925).
53. ČERNE, Marko, HEATH, David John, et al. Effect of sewage sludge-derived amendments on the nutrient uptake by Chinese cabbage from Mediterranean soils. *Journal of plant nutrition*. 2023, vol. 46, iss. 7, str. 1421-1445, graf. prikazi, tabele. ISSN 1532-4087. DOI: [10.1080/01904167.2022.2071732](https://doi.org/10.1080/01904167.2022.2071732).
54. CAF, Nina, SABATIER, Pierre, ŠMUC, Andrej, OGRINC, Nives, DOLENEC, Matej, RAPUC, William, POTOČNIK, Doris, GRAFENSTEIN, Ulrich von, ANDRIČ, Maja. Multi-proxy reconstruction of the Holocene vegetation and land use dynamics in the Julian Alps, north-west Slovenia. *Journal of quaternary science*. 2023, vol. 38, issue 1, str. 107-122, zvd., graf. prikazi. ISSN 0267-8179. <https://onlinelibrary.wiley.com/doi/pdf/10.1002/jqs.3461>, DOI: [10.1002/jqs.3461](https://doi.org/10.1002/jqs.3461).
55. BARROS CORREIA MENEZES, Maria Ângela de, ALMEIDA MAGALHÃES, Daniel de, JAČIMOVIČ, Radojko. Characterization of irradiation channels in the carousel of TRIGA Mark I IPR-R1 research reactor, Brazil, aiming at the application of k0k0-standardization method of neutron activation analysis. *Journal of radioanalytical and nuclear chemistry*. 2023, vol. 332, str. 3445-3456. ISSN 0236-5731. DOI: [10.1007/s10967-022-08688-1](https://doi.org/10.1007/s10967-022-08688-1).
56. MENEZES, Maria-Angela, SCHAYER SABINO, Claudia de Vilhena, JAČIMOVIČ, Radojko. k0k0-neutron activation analysis at CDTN, Brazil: 27 years of history, development and main achievements. *Journal of radioanalytical and nuclear chemistry*. 2023, vol. 332, str. 3457-3468. ISSN 0236-5731. DOI: [10.1007/s10967-023-08804-9](https://doi.org/10.1007/s10967-023-08804-9).
57. LEAL, Alexandre, MENEZES, Maria-Angela, JAČIMOVIČ, Radojko, SILVA, Bruno C., TOLEDO, Jose R. de, KRAMBROCK, Klaus. Investigation of MoS-2MoS2 by k0k0 instrumental neutron activation analysis and electronic paramagnetic resonance. *Journal of radioanalytical and nuclear chemistry*. 2023, vol. 332, str. 3485-3491. ISSN 0236-5731. DOI: [10.1007/s10967-023-08779-7](https://doi.org/10.1007/s10967-023-08779-7).

58. MILAČIČ, Radmila, MARKOVIĆ, Katarina, MARKOVIĆ, Stefan, ŠČANČAR, Janez, JOLANKAI, Zsolt, CLEMENT, Adrienne, MUSA, Ildikó, KARDOS, Máté Krisztián, ZOBOLI, Ottavia, ZEISSNER, Matthias. Changes in concentrations of potentially toxic elements during storage of hard river water samples at low temperatures using different sample preservation procedures. *Journal of soils and sediments : protection, risk assessment and remediation*. 2023, vol. 23, no. 12, str. 4173-4186. ISSN 1439-0108. DOI: [10.1007/s11368-023-03625-5](https://doi.org/10.1007/s11368-023-03625-5).
59. FAGANELI, Jadran, FALNOGA, Ingrid, KLUN, Katja, MAZEJ, Darja, MOZETIČ, Patricija, ZULIANI, Tea, KOVAČ, Nives. Metal(loid)s in suspended particulate matter and plankton from coastal waters (Gulf of Trieste, northern Adriatic Sea). *Journal of soils and sediments*. [Online ed.]. Dec. 2023, vol. 23, iss. 12, str. 4085-4097, ilustr. ISSN 1614-7480. <https://link.springer.com/article/10.1007/s11368-023-03519-6#article-info>, DOI: [10.1007/s11368-023-03519-6](https://doi.org/10.1007/s11368-023-03519-6).
60. OGRINC, Nives, ŠEGEDIN, Urban, FAGANELI, Jadran. Methane and CO₂CO₂ production in the wetland Lake Podpeč (Slovenia). *Journal of soils and sediments*. [Online ed.]. 2023, vol. 23, str. 4163-4172, ilustr. ISSN 1614-7480. <https://link.springer.com/article/10.1007/s11368-023-03622-8>, DOI: doi.org/10.1007/s11368-023-03622-8.
61. UŠAJ, Anton, LIHTENEGER VIDMAJER, Jon, LOJEN, Sonja. Recovery after running an "Everesting" mountain ultramarathon. *Life*. Oct. 2023, vol. 13, iss. 10, article no. 1946, str. 1-15, ilustr. ISSN 2075-1729. <https://www.mdpi.com/2075-1729/13/10/1946>, DOI: [10.3390/life13101946](https://doi.org/10.3390/life13101946).
62. ABUBAKAR SADIQUE, Mohd., YADAV, Shalu, RANJAN, Pushpesh, CHOUHAN, Raghuraj S., JERMAN, Ivan, KUMAR, Ashok, SAIGAL, Saurabh, KHADANGA, Sagar, KHAN, Raju, SRIVASTAVA, Avanish K. Detection of specific antibodies against SARS-CoV-2 spike protein via ultra-sensitive bio-functionalized carbonnitride-reduced graphene oxide electrochemical immunosensing platform in real samples. *Materials advances*. Nov. 2023, iss. 21, vol. 4, str. 5291-5304, ilustr. ISSN 2633-5409. <https://pubs.rsc.org/en/content/articlelanding/2023/ma/d3ma00399j>, DOI: [10.1039/D3MA00399J](https://doi.org/10.1039/D3MA00399J).
63. RAWAT, Reetika, CHOUHAN, Raghuraj S., SADHU, Veera, SHARMA, Manu. Clarithromycin-loaded submicron-sized carriers : pharmacokinetics and pharmacodynamic evaluation. *Materials*. May 2023, vol. 16, iss. 9, str. 1-16, ilustr. ISSN 1996-1944. <https://www.mdpi.com/1996-1944/16/9/3593>, DOI: [10.3390/ma16093593](https://doi.org/10.3390/ma16093593).
64. KHOSHSIMA, Sina, VIDMAR, Janja, SAMARDŽIJA, Zoran, TOMŠE, Tomaž, KUŠTER, Monika, MISHRA, Amit, ŠTURM, Sašo, ŽUŽEK ROŽMAN, Kristina. Environmentally friendly approach for ND[sub]2Fe[sub]14B magnetic phase extraction by selective chemical leaching : a proof-of-concept study. *Materials*. 2023, vol. 16, no. 14, 14 str. ISSN 1996-1944. DOI: [10.3390/ma16145181](https://doi.org/10.3390/ma16145181).
65. VIALON, Joële, CHOTEAU, T., FLORES, E., KRAJNC, Bor, OGRINC, Nives, CHUBCHENKO, I., et al. Final report of CCQM-P204, comparison on CO₂CO₂ isotope ratios in pure CO₂CO₂. *Metrologia*. [Online ed.]. Jan. 2023, vol. 60, no. 1a, [article no.] 08026, str. 1-47, ilustr. ISSN 1681-7575. <https://iopscience.iop.org/article/10.1088/0026-1394/60/1A/08026>, DOI: [10.1088/0026-1394/60/1A/08026](https://doi.org/10.1088/0026-1394/60/1A/08026).
66. CAN, Süleyman Z., JAČIMOVIĆ, Radojko, ZULIANI, Tea, et al. Determination of elements in river water : supplementary comparison. *Metrologia*. [Online ed.]. 2023, vol. 60, no. 1a, str. 08001-1-08001-38. ISSN 1681-7575. DOI: [10.1088/0026-1394/60/1A/08001](https://doi.org/10.1088/0026-1394/60/1A/08001).
67. AUQUÉ, Luis, CINTA OSÁCAR, M., ARENAS, Concha, CUKROV, Neven, LOJEN, Sonja, SANCHO, Carlos. Controls on Mg/Ca ratios in recent stromatolites : insights from fluvial systems in the Iberian Range (Spain). *Minerals*. [Online ed.]. Jan. 2023, vol. 13, iss. 1, str. 1-27, ilustr. ISSN 2075-163X. DOI: [10.3390/min13010057](https://doi.org/10.3390/min13010057).
68. BOŽIČ, Dominik, ŽIVKOVIČ, Igor, DIZDAREVIČ, Tatjana, PELJHAN, Martina, ŠTROK, Marko, HORVAT, Milena. Insights into the heterogeneity of the mercury isotopic fingerprint of the Idrija mine (Slovenia). *Minerals*. [Online ed.]. 2023, vol. 13, no. 9, str. 1-11, ilustr. ISSN 2075-163X. <https://www.mdpi.com/2075-163X/13/9/1227>, DOI: doi.org/10.3390/min13091227.
69. MENCIN, Marjeta, MARKANOVIČ, Nika, MIKULIČ PETKOVŠEK, Maja, VEBERIČ, Robert, TERPINC, Petra. Bioprocessed wholegrain spelt flour improves the quality and physicochemical characteristics of wheat bread. *Molecules*. Apr. 2023, vol. 28, issue 8, [article no.] 3428, str. 1-22, ilustr. ISSN 1420-3049. <https://www.mdpi.com/1420-3049/28/8/3428>, DOI: [10.3390/molecules28083428](https://doi.org/10.3390/molecules28083428).
70. MENCIN, Marjeta, GOLOB, Katja, KREK, Maja, POLAK, Tomaž, POŽRL, Tomaž, TERPINC, Petra. Contribution of insoluble bound antioxidants from germinated seeds of wheat and spelt to the nutritional value of white bread. *Molecules*. Aug. 2023, vol. 28, issue 17, [article no.] 6311, str. 1-21, ilustr. ISSN 1420-3049. <https://www.mdpi.com/1420-3049/28/17/6311>, DOI: [10.3390/molecules28176311](https://doi.org/10.3390/molecules28176311).
71. ZOBOLI, Ottavia, MILAČIČ, Radmila, et al. Spurenstoffmanagement im Donaeinzugsgebiet. *Österreichische Wasser- und Abfallwirtschaft*. [Print ed.]. Oct. 2023, vol. 75, iss. 9/10, str. 558-571, ilustr. ISSN 0945-358X. <https://link.springer.com/article/10.1007/s00506-023-00985-7>, DOI: [10.1007/s00506-023-00985-7](https://doi.org/10.1007/s00506-023-00985-7).
72. DRAGAR, Črt, REKAR, Žan, POTRČ, Tanja, NEMEC, Sebastjan, KRALJ, Slavko, KOCBEK, Petra. Influence of polymer concentration on drying of SPION dispersions by electrospinning. *Pharmaceutics*. [Online ed.]. 2023, vol. 15, iss. 6, art. 1619, 22 str., ilustr. ISSN 1999-4923. <https://www.mdpi.com/1999-4923/15/6/1619>, DOI: [10.3390/pharmaceutics15061619](https://doi.org/10.3390/pharmaceutics15061619).
73. POPOVIĆ, Marin, SHARIFI, Tayebah, KRALJIĆ ROKOVIĆ, Marijana, GENORIO, Boštjan, ŽENER, Boštjan, PETERNEL, Igor, LAVRENČIČ ŠTANGAR, Urška, KUŠIČ, Hrvoje, LONČARIČ BOŽIČ, Ana, KOVAČIČ, Marin. Enhancing the photocatalytic performance of BiVO₄BiVO₄ for micropollutant degradation by Fe and Ag photomodification. *Processes*. [Online ed.]. Sep. 2023, vol. 11, iss. 9, [article no.] 2803, str. 1-16, ilustr. ISSN 2227-9717. <https://www.mdpi.com/2227-9717/11/9/2803>, DOI: [10.3390/pr11092803](https://doi.org/10.3390/pr11092803).

74. SIRONIĆ, Andreja, HESS, Emma, BAREŠIĆ, Jadranka, KANDUČ, Tjaša, BORKOVIĆ, Damir, KRAJCAR BRONIĆ, Ines. Atmospheric CO₂CO₂ carbon isotope composition in urban and clean areas of the Northern Adriatic coast of Croatia. Radiocarbon. [in press] 2023, 11 str. ISSN 0033-8222. DOI: [10.1017/RDC.2023.72](https://doi.org/10.1017/RDC.2023.72).
75. VEROVŠEK, Taja, ŠUŠTARIČ, Ariana, LAIMOU-GERANIOU, Maria, KRIZMAN MATASIĆ, Ivona, PROSEN, Helena, ELERŠEK, Tina, KRAMARIČ ZIDAR, Vlasta, MISLEJ, Vesna, MIŠMAŠ, Boštjan, STRAŽAR, Marjetka, LEVSTEK, Meta, CIMRMANČIČ, Bernardka, LUKŠIČ, Simon, URANJEK, Nataša, KOZLOVIČ-BOBIČ, Tjaša, KOSJEK, Tina, KOCMAN, David, HEATH, David John, HEATH, Ester. Removal of residues of psychoactive substances during wastewater treatment, their occurrence in receiving river waters and environmental risk assessment. Science of the total environment. [Online ed.]. Mar. 2023, vol. 866, [article no.] 161257, str. 1-9, ilustr. ISSN 1879-1026. <https://www.sciencedirect.com/science/article/pii/S0048969722083619?via%3Dihub>, DOI: [10.1016/j.scitotenv.2022.161257](https://doi.org/10.1016/j.scitotenv.2022.161257).
76. KIKAJ, Dafina, CHAMBERS, Scott D., CRAWFORD, Jagoda, KOBAL, Matjaž, GREGORIČ, Asta, VAUPOTIČ, Janja. Investigating the vertical and spatial extent of radon-based classification of the atmospheric mixing state and impacts on seasonal urban air quality. Science of the total environment. May 2023, vol. 872, [article no.] 162126, str. 1-13, ilustr. ISSN 0048-9697. <https://www.sciencedirect.com/science/article/pii/S0048969723007428?via%3Dihub>, DOI: [10.1016/j.scitotenv.2023.162126](https://doi.org/10.1016/j.scitotenv.2023.162126).
77. OLIVEIRA SOUZA, Marília Cristina, ALVES ROCHA, Bruno, CARNEIRO CRUZ, Jonas, PALIR, Neža, DOBAL CAMPÍGLIA, Andres, DOMINGO, Jose L., BARBOSA, Fernando. Risk characterization of human exposure to polycyclic aromatic hydrocarbons in vulnerable groups. Science of the total environment. [Online ed.]. Sep. 2023, vol. 892, [article no.] 164219, str. 1-6, ilustr. ISSN 1879-1026. <https://www.sciencedirect.com/science/article/pii/S0048969723028401?via%3Dihub>, DOI: [10.1016/j.scitotenv.2023.164219](https://doi.org/10.1016/j.scitotenv.2023.164219).
78. VEROVŠEK, Taja, JANŽA, Mitja, HEATH, David John, ŠUŠTARIČ, Ariana, PROSEN, Helena, HEATH, Ester. Occurrence and sources of residues of drugs of abuse in an urban aquifer : chemical analysis and solute transport modelling. Science of the total environment. [Online ed.]. 20 Sep. 2023, vol. 892, [article no.] 164364, str. 1-8, ilustr. ISSN 1879-1026. <https://www.sciencedirect.com/science/article/pii/S0048969723029856>, DOI: [10.1016/j.scitotenv.2023.164364](https://doi.org/10.1016/j.scitotenv.2023.164364).
79. LJONCHEVA, Milka, HEATH, Ester, HEATH, David John, DŽEROSKI, Sašo, KOSJEK, Tina. Contaminants of emerging concern : silylation procedures, evaluation of the stability of silyl derivatives and associated measurement uncertainty. Science of the total environment. [Online ed.]. Nov. 2023, vol. 899, [article no.] 165669, str. 1-11, ilustr. ISSN 1879-1026. <https://www.sciencedirect.com/science/article/pii/S0048969723042924>, DOI: [10.1016/j.scitotenv.2023.165669](https://doi.org/10.1016/j.scitotenv.2023.165669).
80. LAIMOU-GERANIOU, Maria, QUIREYNS, Maarten, BOOGAERTS, Tim, VAN WICHELEN, Natan, HEATH, David John, NUIJS, Alexander L. N. van, COVACI, Adrian, HEATH, Ester. Retrospective spatiotemporal study of antidepressants in Slovenian wastewaters. Science of the total environment. [Online ed.]. 2023, vol. 903, [article no.] 166586, str. 1-10, ilustr. ISSN 1879-1026. <https://www.sciencedirect.com/science/article/pii/S0048969723052117>, DOI: doi.org/10.1016/j.scitotenv.2023.166586.
81. FREIBERG, Joice Aline, GREBENC, Tine, STROJNIK, Lidija, AROCHA MEIRELES, Leonardo, ESCALONA JIMÉNEZ, Maximiliano Segundo, PEREIRA DOS SANTOS RICHARDS, Neila Silvia, OGRINC, Nives, ANTONI-OLLI, Zaida Ines. Production and marketing of Tuber floridanum : ecology and gastronomic value of a recently described truffle species. Scientia Agrícola. 2023, vol. 80, [article no.] e20220102, str. 1-7, ilustr. ISSN 1678-992X. <https://www.scielo.br/j/sa/a/GhVWTPgF3rY8cGbYbKwnVD-F/?format=pdf&lang=en>, DOI: [10.1590/1678-992X-2022-0102](https://doi.org/10.1590/1678-992X-2022-0102).
82. CENIKJ, Gjorgjina, STROJNIK, Lidija, ANGELSKI, Risto, OGRINC, Nives, KOROUŠIĆ-SELJAK, Barbara, EFTIMOV, Tome. From language models to large-scale food and biomedical knowledge graphs. Scientific reports. 2023, vol. 13, article no. 7815, str. 1-14, ilustr. ISSN 2045-2322. <https://www.nature.com/articles/s41598-023-34981-4>, DOI: [0.1038/s41598-023-34981-4](https://doi.org/10.1038/s41598-023-34981-4).
83. NOVAK, Rok, ROBINSON, Johanna A., KANDUČ, Tjaša, SARIGIANNIS, Dimosthenis, DŽEROSKI, Sašo, KOCMAN, David. Empowering participatory research in urban health : wearable biometric and environmental sensors for activity recognition. Sensors. 2023, vol. 23, iss. 24, str. 1-22, ilustr. ISSN 1424-8220. <https://www.mdpi.com/1424-8220/23/24/9890>, DOI: [10.3390/s23249890](https://doi.org/10.3390/s23249890).
84. ALILOVIĆ, Adna, ŽIVKOVIĆ, Igor, HORVAT, Milena. Optimisation of distillation as an isolation method for the determination of low methylmercury concentrations in urine samples. Talanta. [Print ed.]. 2023, vol. 264, str. 124765-1-124765-9. ISSN 0039-9140. DOI: [10.1016/j.talanta.2023.124765](https://doi.org/10.1016/j.talanta.2023.124765).
85. VOGEL, Nina, LANGE, Rosa, SCHMIDT, Phillipp, SNOJ TRATNIK, Janja, STAJNKO, Anja, KOLOSSA-GEHRING, Marike, et al. Exposure to phthalates in European children, adolescents and adults since 2005 : a harmonized approach based on existing HBM data in the HBM4EU Initiative. Toxics : Elektronski vir. Mar. 2023, vol. 11, iss. 3, [article no.] 241, str. 1-23, ilustr. ISSN 2305-6304. <https://www.mdpi.com/2305-6304/11/3/241>, DOI: [10.3390/toxics11030241](https://doi.org/10.3390/toxics11030241).
86. BADE, Richard, ROUSIS, Nikolaos, HEATH, Ester, LAIMOU-GERANIOU, Maria, VEROVŠEK, Taja, MUELLER, Jochen, et al. Three years of wastewater surveillance for new psychoactive substances from 16 countries. Water research. X. May 2023, vol. 19, [article no.] 100179, str. 1-10, ilustr. ISSN 2589-9147. <https://www.sciencedirect.com/science/article/pii/S2589914723000154?via%3Dihub>, DOI: [10.1016/j.wroa.2023.100179](https://doi.org/10.1016/j.wroa.2023.100179).
87. KLUN, Katja, ŠKET, Primož, BERAN, Alfred, FALNOGA, Ingrid, FAGANELI, Jadran. Composition of colloidal organic matter in phytoplankton exudates. Water. 2023, vol. 15, iss. 1, str. 1-10, ilustr. ISSN 2073-4441. <https://doi.org/10.3390/w15010111>, DOI: [10.3390/w15010111](https://doi.org/10.3390/w15010111).

88. GIANI, Michele, OGRINC, Nives, TAMŠE, Samo, COZZI, Stefano. Elevated river inputs of the total alkalinity and dissolved inorganic carbon in the Northern Adriatic Sea. *Water*. 2023, vol. 15, no 5, str. 894-1-894-22. ISSN 2073-4441. DOI: [10.3390/w15050894](https://doi.org/10.3390/w15050894).
89. BAŠU, Niladri, BASTIANSZ, Ashley, DÓREA, José G., FUJIMURA, Masa-take, HORVAT, Milena, SHROFF, Emelyn, WEIHE, Pal, ZASTENSKAYA, Irina. Our evolved understanding of the human health risks of mercury. *Ambio*. May 2023, vol. 52, iss. 5, str. 877-896, ilustr. ISSN 1654-7209. <https://link.springer.com/article/10.1007/s13280-023-01831-6>, DOI: [10.1007/s13280-023-01831-6](https://doi.org/10.1007/s13280-023-01831-6).
90. LOESCHNER, Katrin, VIDMAR, Janja, HARTMANN, Nanna B., BIENFAIT, André Marcel, VELIMIROVIC, Milica. Finding the tiny plastic needle in the haystack : how field flow fractionation can help to analyze nanoplastics in food. *Analytical and bioanalytical chemistry*. Jan. 2023, vol. 415, iss. 1, str. 7-16, ilustr. ISSN 1618-2642. DOI: [10.1007/s00216-022-04321-y](https://doi.org/10.1007/s00216-022-04321-y).
91. CHOUHAN, Raghuraj S., SHAH, Maitri, PRAKASHAN, Drishya, RAMYA, P R, KOLHE, Pratik, GANDHI, Sonu. Emerging trends and recent progress of MXene as a promising 2D material for point of care (POC) diagnostics. *Diagnostics*. Feb. 2023, vol. 13, iss. 4, [article no.] 697, str. 1-24, ilustr. ISSN 2075-4418. <https://www.mdpi.com/2075-4418/13/4/697>, DOI: [10.3390/diagnostics13040697](https://doi.org/10.3390/diagnostics13040697).
92. NOVAK, Rok, ROBINSON, Johanna A., FRANTZIDIS, Christos, SEJDUL-LAHU, Iliriana, PERSICO, Marco Giovanni, KONTIĆ, Davor, SARIGIANNIS, Dimosthenis, KOČMAN, David. Integrated assessment of personal monitor applications for evaluating exposure to urban stressors : a scoping review. *Environmental research*. [Online ed.]. Jun. 2023, vol. 226, [article no.] 115685, str. 1-17, ilustr. ISSN 1096-0953. <https://www.sciencedirect.com/science/article/pii/S0013935123004772>, DOI: [10.1016/j.envres.2023.115685](https://doi.org/10.1016/j.envres.2023.115685).
93. TKALEC, Žiga, RUNKEL, Agneta Annika, KOSJEK, Tina, HORVAT, Milena, HEATH, Ester. Contaminants of emerging concern in urine: a review of analytical methods for determining diisocyanates, benzotriazoles, benzothiazoles, 4-methylbenzylidene camphor, isothiazolinones, fragrances, and non-phthalate plasticizers. *Environmental science and pollution research*. 2023, vol. 30, issue 42, str. 95106-95138, ilustr. ISSN 1614-7499. <https://link.springer.com/article/10.1007/s11356-023-29070-y>, DOI: doi.org/10.1007/s11356-023-29070-y.
94. MANJU, K., RAJ, S. Niranjana, CHOUHAN, Raghuraj S., BAKER, Syed, et al. Nanovaccines to combat drug resistance : the next-generation immunisation. *Future Journal of Pharmaceutical Sciences*. 2023, vol. 9, article no. 64, str. 1-15, ilustr. ISSN 2314-7253. <https://rdcu.be/dkc76>, DOI: [10.1186/s43094-023-00515-y](https://doi.org/10.1186/s43094-023-00515-y).
95. ŠLEJKOVEC, Zdenka, BIZJAK, Tine, HORVAT, Milena, FALNOGA, Ingrid. No clear concerns related to health risks in the European population with low inorganic arsenic exposure (overview). *Human & ecological risk assessment*. 2023, vol. 29, iss. 1, str. 245-283, ilustr. ISSN 1549-7860. <https://www.tandfonline.com/doi/full/10.1080/10807039.2022.2143319?scroll=top&needAccess=true>, DOI: [10.1080/10807039.2022.2143319](https://doi.org/10.1080/10807039.2022.2143319).
96. GLAŽAR, Dominika, JERMAN, Ivan, TOMŠIČ, Brigita, CHOUHAN, Raghuraj S., SIMONČIČ, Barbara. Emerging and promising multifunctional nanomaterial for textile application based on graphitic carbon nitride heterostructure nanocomposites. *Nanomaterials*. [Online ed.]. 19. jan. 2023, vol. 13, iss. 3, article 408, str. 1-26, ilustr. ISSN 2079-4991. <https://www.mdpi.com/2079-4991/13/3/408>, DOI: [10.3390/nano13030408](https://doi.org/10.3390/nano13030408).
97. MANJU, K., RANJINI, H.K., RAJ, S. Niranjana, CHOUHAN, Raghuraj S., BAKER, Syed, et al. Nanoagrosomes : future prospects in the management of drug resistance for sustainable agriculture. *Plant nano biology*. May 2023, vol. 4, [article no.] 100039, str. 1-10, ilustr. ISSN 2773-1111. <https://www.sciencedirect.com/science/article/pii/S2773111123000165?via%3Dihub>, DOI: [10.1016/j.plana.2023.100039](https://doi.org/10.1016/j.plana.2023.100039).
98. CHOUHAN, Raghuraj S., GANDHI, Sonu, VERMA, Suresh Kr., JERMAN, Ivan, BAKER, Syed, ŠTOK, Marko. Recent advancements in the development of Two-Dimensional nanostructured based anode materials for stable power density in microbial fuel cells. *Renewable and sustainable energy reviews*. [Online ed.]. 2023, vol. 188, str. 1-20, ilustr. ISSN 1879-0690. <https://www.sciencedirect.com/science/article/pii/S1364032123006706>, DOI: [10.1016/j.rser.2023.113813](https://doi.org/10.1016/j.rser.2023.113813).
99. GAČNIK, Jan, SEXAUER GUSTIN, Mae. Tree rings as historical archives of atmospheric mercury : a critical review. *Science of the total environment*. 2023, vol. 898, str. 165562-1-165562-11. ISSN 0048-9697. DOI: [10.1016/j.scitotenv.2023.165562](https://doi.org/10.1016/j.scitotenv.2023.165562).
100. LAIMO-GERANIOU, Maria, HEATH, David John, HEATH, Ester. Analytical methods for the determination of antidepressants, antipsychotics, benzodiazepines and their metabolites through wastewater-based epidemiology. *Trends in environmental analytical chemistry*. Mar. 2023, vol. 37, [article no.] e00192, str. 1-24, ilustr. ISSN 2214-1588. <https://www.sciencedirect.com/science/article/pii/S2214158822000393/pdf?md5=dfa2c4fa1e21ab179a89b27141980cd5&pid=1-s2.0-S2214158822000393-main.pdf>, DOI: [10.1016/j.teac.2022.e00192](https://doi.org/10.1016/j.teac.2022.e00192).
101. ZUGAN, Maja, RYBKIN, Iaroslav, RIJAVEC, Tomaž, LAPANJE, Aleš. A method for preparation of hydrophobic porous alginate carriers with incorporated microorganisms : EP23169641.0, 2023-04-24. München: European Patent Office, 2023. 1 USB-ključ (4 datoteke PDF ((1, 4, [3], 1 str.)).

Patent



Jožef Stefan Institute, Ljubljana, Slovenia



Department of Environmental Sciences

Outstanding Achievements of 2023



Publisher: Department of Environmental Sciences (O-2),
"Jožef Stefan" Institute

Editors: Prof. Dr. Milena Horvat,
Tina Vrabec,
Vanja Usenik

Photos: Arne Hodalič & Katja Bidovec (page 2, 30, 40),
Dr. Radojko Jačimovič,
Matt Dempsey,
personal archives of O-2 coworkers

Executive designer: Lenka Trdina

Contact: Department is located at two locations:
Jamova cesta 39, 1000 Ljubljana and
Reactor Center Brinje, Brinje 40, 1262 Dol pri Ljubljani

T: +386 (0)1 588 53 55
E: environment@ijs.si
W: www.environment.si

Ljubljana, 2024