Twinning to address the PFAS challenge in Serbia – PFAStwin

Dr. Marija Lješević
marija.ljesevic@ihtm.bg.ac.rs

BgF summer school
October 10th, 2023

Project: 101059534 — PFAStwin
HORIZON-WIDERA-2021-ACCESS-02

Funded by the European Union

Overall information

- **Project:** Twinning to address the PFAS challenge in Serbia
- **Acronym:** PFAStwin
- **Project leader:** Vladimir BEŠKOSKI, University of Belgrade, Faculty of Chemistry
- **Financed by:** Horizon Europe, Widening participation and spreading excellence
- **Budget:** 1,182,431.25 €
- **Duration:** 3 years
- **Project start date:** September 1th 2022

Twinning to address the PFAS challenge in Serbia – PFAStwin

University of Belgrade

Faculty of Chemistry

iqog-csic

Institute of General Organic Chemistry

The Spanish National Research Council (CSIC)

Géosciences pour une Terre durable

brgm

Bureau de Recherches Géologiques et Minières

PFAS twin

Project: 101059534 — PFAStwin

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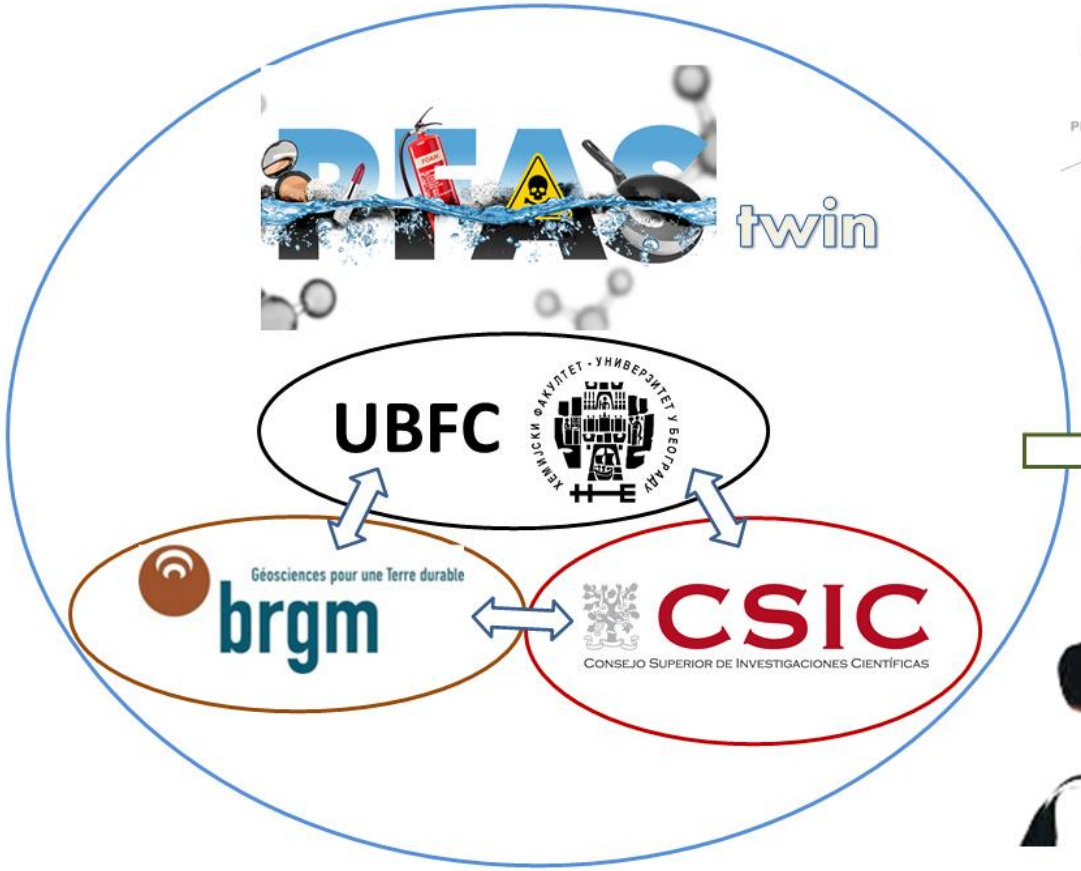
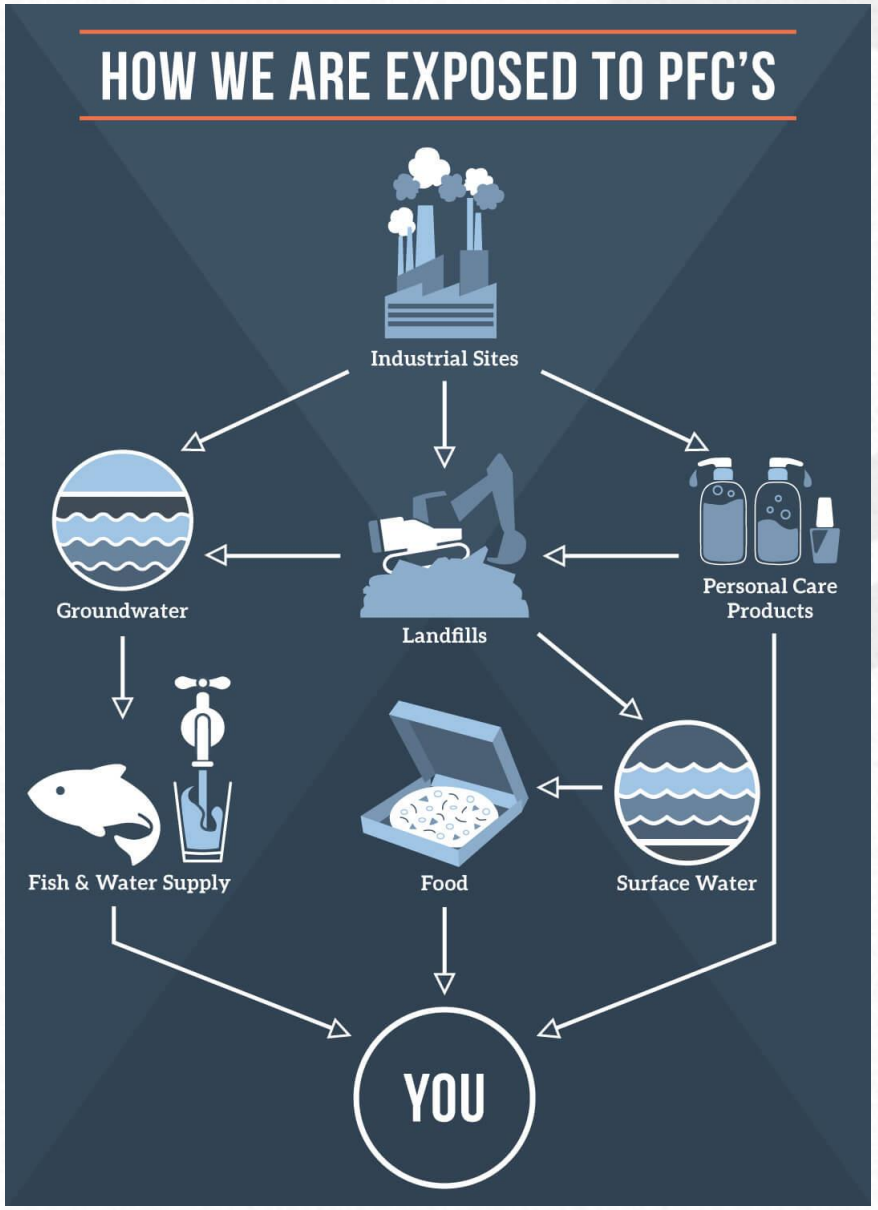
Overall objective



Strengthening the capacity UBFC in the field of state of the art **PFAS analysis and bioremediation**
Rising the capacities **to mitigate the PFAS pollutions** and **develop innovative strategies** for solving the most challenging environmental problems.

PFAS are surface-active compounds (surfactants) with extremely low surface tensions, and they repel water, fat and dirt.

https://www.microsaic.com/environmental-analysis/pfas/



https://www.berkeywater.com/news/black-berkey-purification-elements-the-final-barrier-against-pfoa-and-other-pfcs-in-drinking-water/

PFAS twin
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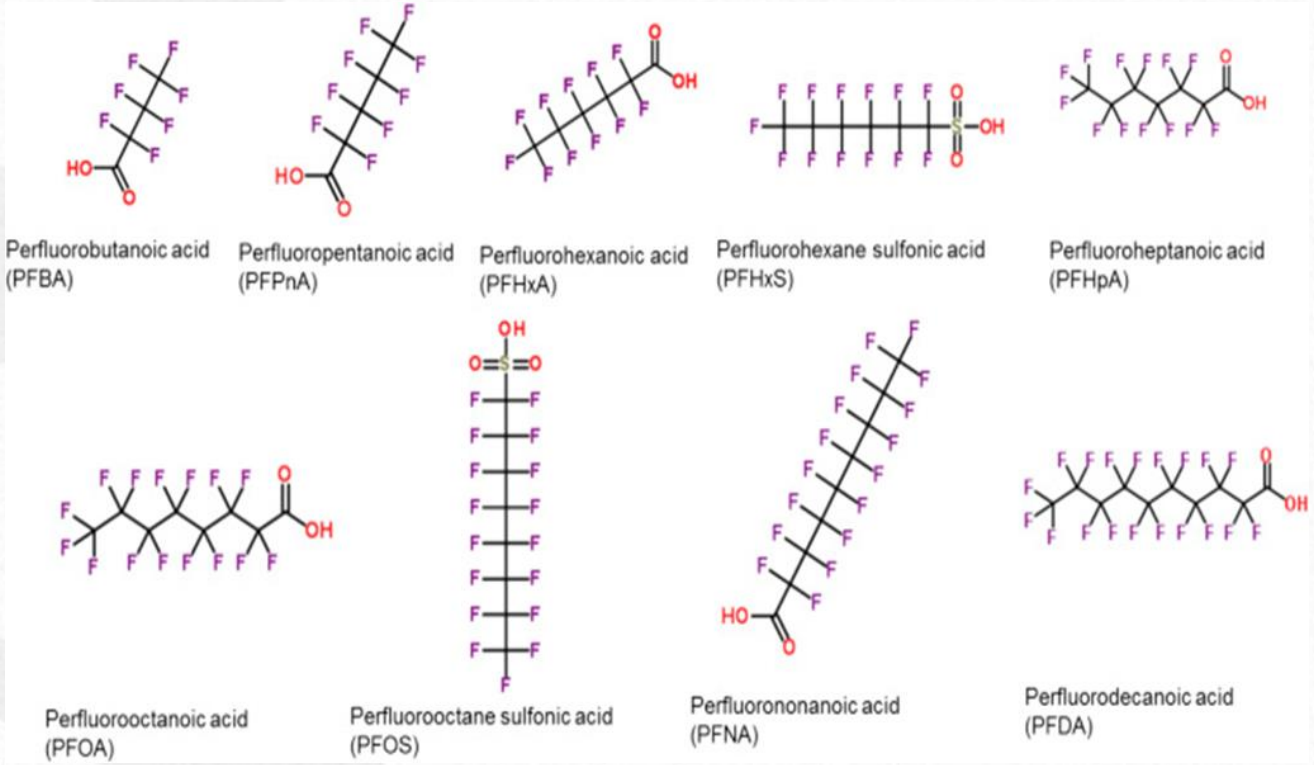
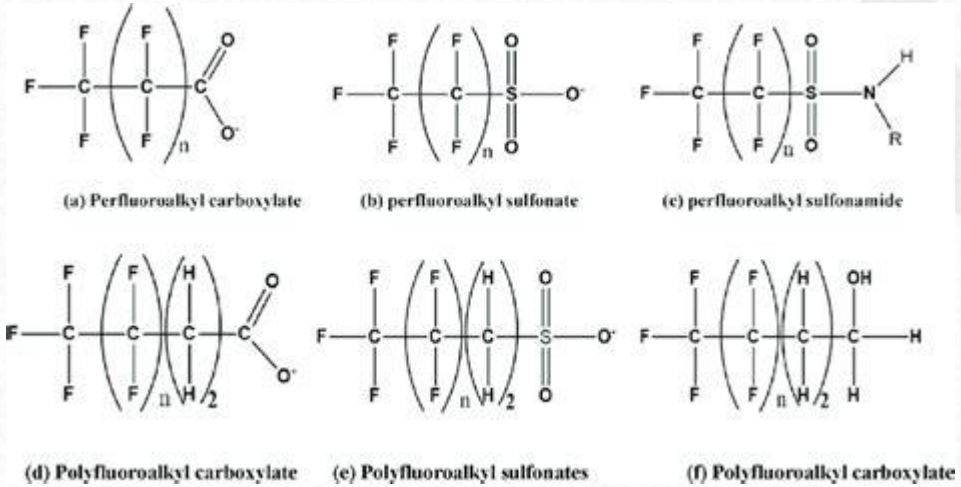
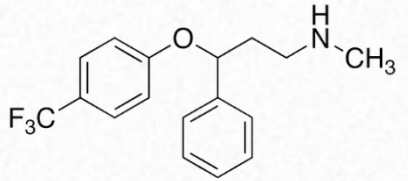
Per- and polyfluoroalkyl substances (PFAS)





More than 9,000 **PFAS** have been identified!!!

https://www.cdc.gov/niosh/topics/pfas/default.html



Fluoxetine (Prozac)

Chemical Formula: $C_{17}H_{18}F_3NO$

???

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PFAS in Serbia

Chemosphere 91 (2013) 1408–1415

Contents lists available at SciVerse ScienceDirect

Chemosphere

journal homepage: www.elsevier.com/locate/chemosphere

Perfluorinated compounds in sediment samples from the wastewater canal of Pančevo (Serbia) industrial area

Vladimir P. Beškoski [a,b,*], Shusuke Takemine [c], Takeshi Nakano [d], Latinka Slavković Beškoski [e], Gordana Gojgić-Cvijović [b], Mila Ilić [b], Srdjan Miletić [b], Miroslav M. Vrvić [a,b]

[a] Faculty of Chemistry, University of Belgrade, Studentski trg 16, P.O. Box 51, 11158 Belgrade, Serbia
[b] Department of Chemistry, Institute of Chemistry, Technology and Metallurgy, University of Belgrade, Njegoševa 12, P.O. Box 473, 11001 Belgrade, Serbia
[c] Hyogo Prefectural Institute of Environmental Sciences, 3-1-27 Yukihira-cho, Suma-ku, Kobe 654-0037, Japan
[d] Center for Advanced Science and Innovation, Osaka University Bldg. D
[e] Institute of Nuclear Sciences "Vinča", University of Belgrade, Mike Petr

HIGHLIGHTS

- This is the first report of the presence of PFCs in the samp
- PFOS up to 5.7 ng g^{-1} dw and total PFCs up to 6.3 ng g^{-1} c
- Compared to other worldwide reports high levels of PFOS
- A mass load of 1.38 kg $year^{-1}$ PFOS discharged in Danube
- Our work contributes to identification of PFCs pollution of

Science of the Total Environment 662 (2019) 77–87

Contents lists available at ScienceDirect

Science of the Total Environment

journal homepage: www.elsevier.com/locate/scitotenv

Emerging contaminants in sediment core from the Iron Gate I Reservoir on the Danube River

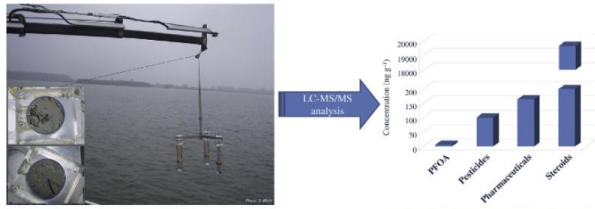
Ivana Matić Bujagić [a,*], Svetlana Grujić [a], Mila Laušević [a], Thilo Hofmann [b], Vesna Micić [b]

[a] University of Belgrade, Faculty of Technology and Metallurgy, Karnegijeva 4, 11000 Belgrade, Serbia
[b] University of Vienna, Department of Environmental Geosciences and Environmental Science Research Network, Althanstrasse 14, 1090 Vienna, Austria

HIGHLIGHTS

- Occurrence and fate of emerging contaminants in Danube sediment core were studied.
- Sediment profiles reflect diverse contaminant sources, use patterns and regulations.
- Risk of detected compound levels for benthic organisms was assessed.
- Contaminants of high risk were proposed for inclusion in regular monitoring.

GRAPHICAL ABSTRACT



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JSCS–11811

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Temporal trend of perfluorinated compounds in untreated wastewater and surface water in the middle part of the Danube River belonging to the northern part of Serbia

MAJA B. BULJOVČIĆ[1], IGOR S. ANTIĆ[1], KIWAO KADOKAMI[2] and BILJANA D. ŠKRBIĆ[1]*

[1]*University of Novi Sad, Faculty of Technology Novi Sad, Bulevar cara Lazara 1, 21000 Novi Sad, Republic of Serbia and 2Institute of Environmental Science and Technology, University of Kitakyushu, Fukuoka, 808-0135Kitakyushu, Japan*

(Received 27 April; Revised 24 June; Accepted 18 July 2022)

Abstract: The occurrence and temporal variation of selected priority substances and contaminants of emerging concerns, *i.e.* eleven perfluorinated compounds (PFCs) (belonging to perfluorosulphonates, perfluorocarboxylic acids, and perfluorinated sulphonamides) have been investigated in composite surface water samples of the Danube River at the upstream and downstream locations from the discharge point of wastewater. Among the analyzed compounds, six PFCs (PFOA, PFOS, PFHxA, PFNA, PFDA and PFUnA) were quantified. Overall, the detection frequency for most quantified compounds was very high (>90 %), only PFDA and PFUnA were quantified with less frequency, 33 and 67 %, respectively. The highest quantified concentrations of PFOA and PFOS were 14.9 ng/L (average 12.1 ng/L) and 14.2 ng/L (average 6.11 ng/L), respectively. These ones together with PFHxA (average 10.0 ng/L) were quantified at the highest concentrations in comparison to the other investigated compounds. However, the determined levels of PFOS during investigated sampling period for all samples analyzed were always lower than the maximum allowable concentration set for inland river waters but were always higher than the environmental quality standard threshold value-AA-EQS of 0.65 ng/L sets by the Directive of European Parliament. Moreover, the levels of PFOA were always several times lower than the set AA-EQS value.

Keywords: emerging contaminants; PFCs occurrence; PFOS; PFOA; environmental pollution

INTRODUCTION

Project: 101059534 — PFAStwin
HORIZON-WIDERA-2021-ACCESS-02

Funded by the European Union

WP1

- Scientific strategy and action plan for dealing with PFAS

WP2

- Training courses at CSIC and BRGM
- Summer Schools at UBFC, CSIC, BRGM

WP3

- Monitoring of PFAS and risk assessment
- PFAS (bio)degradation studies

WP4

- Capacity building of Grant office at UBFC

WP5

- Dissemination activites (popular lectures, social media and website, conferences)
- Workshop

WP6

- Management

Implementation

- Budget changes
- Amendments
- Any requested change/deviation should not lower the impact and results

PFAStwin core team

@PfaStwin

Project: 101059534 — PFAStwin
HORIZON-WIDERA-2021-ACCESS-02

Funded by the European Union

Phytoremediation for in situ treatment of agricultural soil and surface waters polluted with per- and polyfluoroalkyl substances – research on PFOS and PFOA as model compounds

Dr. Marija Lješević, research associate

University of Belgrade, Institute of Chemistry, Technology and Metalurgy

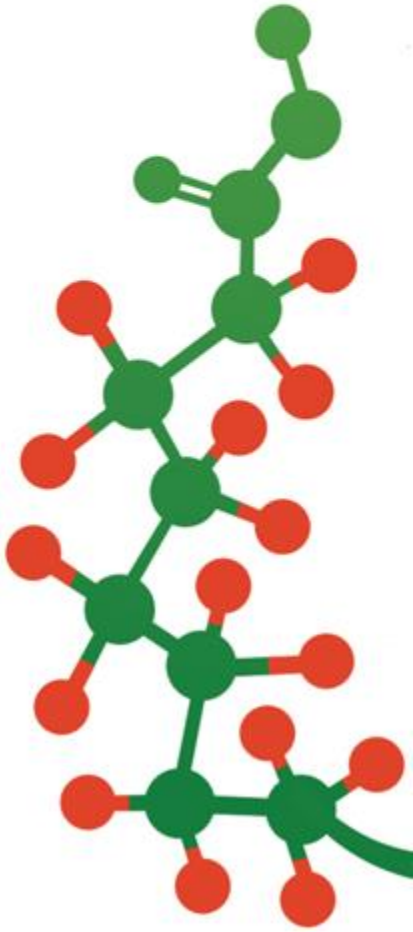
marija.ljesevic@ihtm.bg.ac.rs

BgF summer school

October 10th, 2023

Overall information

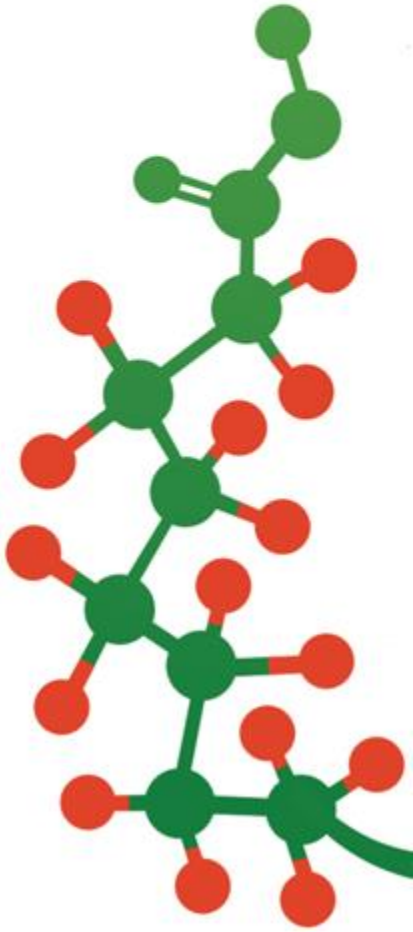
- **Project:** Phytoremediation for in situ treatment of agricultural soil and surface waters polluted with per- and polyfluoroalkyl substances – research on PFOS and PFOA as model compounds
- **Acronym:** PhytoPFAS
- **Project leader:** Vladimir BEŠKOSKI, University of Belgrade, Faculty of Chemistry
- **Financed by:** Science Fund of the Republic of Serbia, Green program of cooperation between science and industry
- **Budget:** 20,550,713.62 RSD /// 174,158.59 EUR
- **Duration:** 2 years
- **Project start date:** May 15th 2023



Science Fund
of the Republic of Serbia

Participants

Logo	SRO	Acronym
	UNIVERSITY OF BELGRADE - FACULTY OF CHEMISTRY	UBFC
	UNIVERSITY OF BELGRADE – INSTITUTE OF CHEMISTRY, TECHNOLOGY AND METALLURGY – NATIONAL INSTITUTE OF THE REPUBLIC OF SERBIA	ICTM
	UNIVERSITY OF BELGRADE - FACULTY OF PHYSICAL CHEMISTRY	FFHUB
	UNIVERSITY OF BELGRADE – FACULTY OF MEDICINE	MFUB



Science Fund of the Republic of Serbia

Overall objective

Overall objective of the PhytoPFAS (Figure 1.1.) is to develop innovative phytoremediation strategies for solving the challenge of PFAS pollution of agricultural soil and surface waters, and to establish good basis for application of this technology in collaboration with industry.

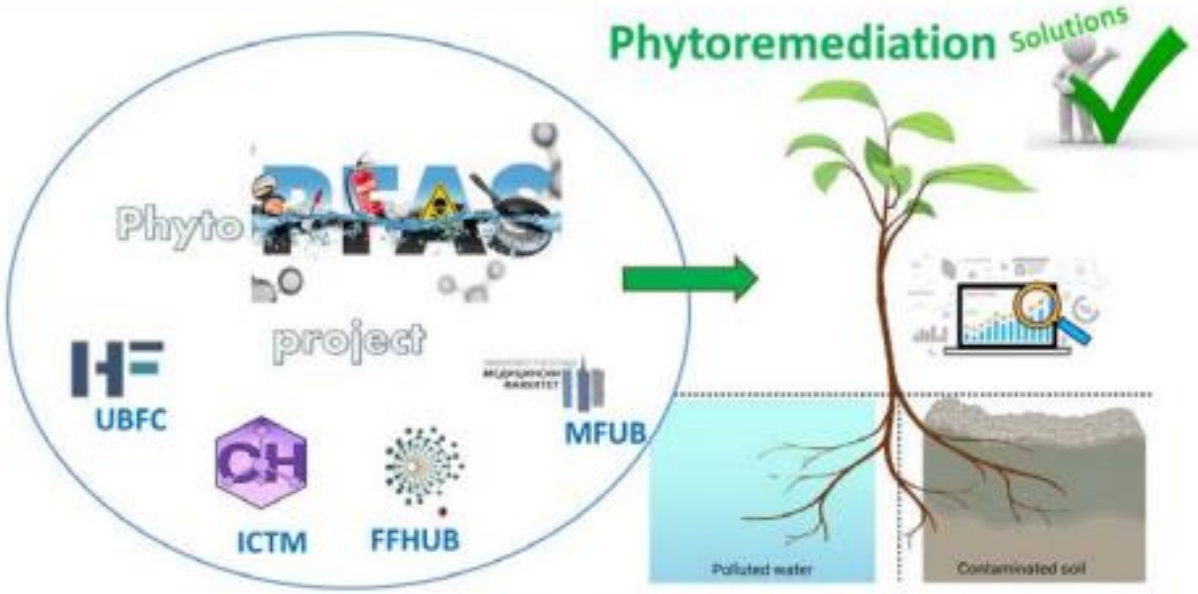
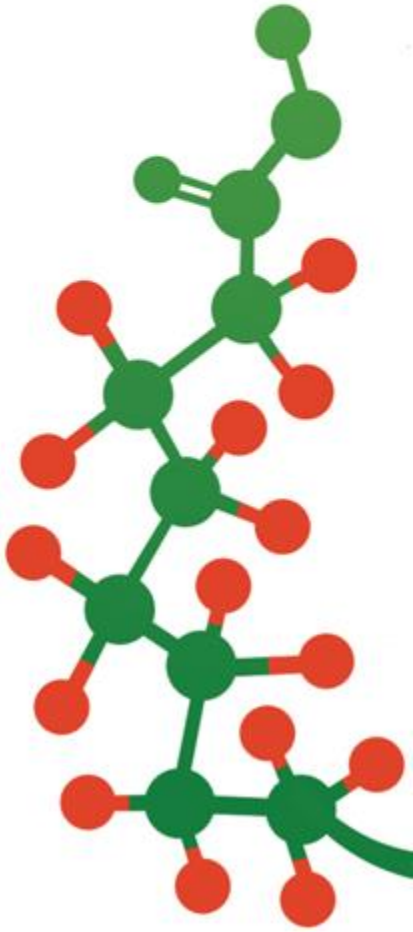


Figure 1.1. Overall objective of the PhytoPFAS project



Science Fund of the Republic of Serbia

Acknowledgement:

This research is supported by the Science Fund of the Republic of Serbia, #6684, *Phytoremediation for in situ treatment of agricultural soil and surface waters polluted with per- and polyfluoroalkyl substances – research on PFOS and PFOA as model compounds* – PhytoPFAS.