



Mađarska-Srbija
IPA prekogranični program

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PROJECT CLOSING EVENT

HU-SRB/0901/121/116

**Optimization of Cost Effective and Environmentally
Friendly Procedures for Treatment of Regional
Water Resource
OCEEFTRWR**

December 15, 2011

Project closing event, Novi Sad

OCEEFTRWR



Mađarska-Srbija
IPA prekogranični program

Program sufinansira
Evropska unija



SVEČANOST OBELEŽAVANJA ZAVRŠETKA RADA NA PROJEKTU

HU-SRB/0901/121/116

**Optimizacija ekonomičnih i za okolinu pogodnih
postupaka obrade regionalnih vodenih resursa
OCEEFTRWR**

December 15, 2011

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CÍMŰ PROJEKT ZÁRÓESEMÉNYÉRE

HU-SRB/0901/121/116

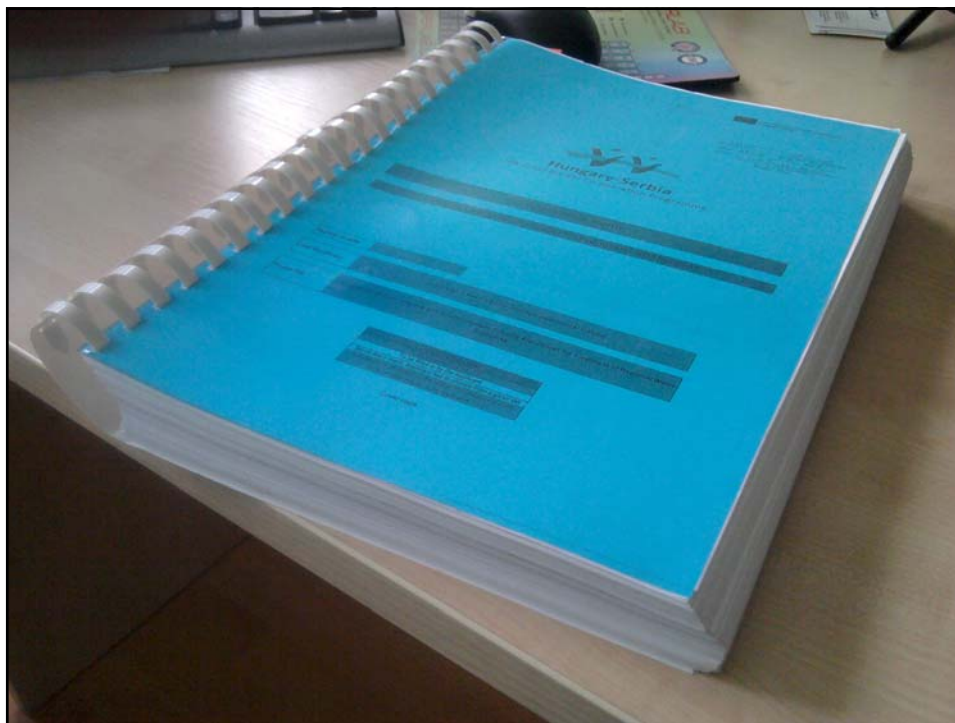
**Regionális vízkészletek gazdaságos és környezetbarát
módszerekkel történő kezelésének optimalizálása**

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December 15, 2011

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Member team from Novi Sad

Biljana Abramović, PhD, Project manager
Bjelica Luka, PhD, Research coordinator,
Valéria Guzsvány, PhD, Research,
Daniela Šojić, PhD, Research,
Milena Dalmacija, PhD, Research
Ljiljana Rajić, PhD, Research
Dejan Orčić, PhD, Research
Vesna Despotović, MSc, Research,
Sanja Kler, BSc, Research

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Magyarország-Szerbia
IPA Határon Átnyúló Együttműködési Program

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Member team from Szeged

Krisztina Gajdáné Schrantz, PhD, Project manager
András Dombi, PhD, Research coordinator,
Károly Mogyorósi, PhD, Research,
Csaba Vágvölgyi, PhD, Research
László Manczinger, PhD, Leading researcher
László Kredics, PhD, Research
Zsuzsanna Laszlo, PhD, tender manager
Sandor Beszedes, MSc, dissemination manager
Szabolcs Kertész, MSc, Research
Alapi Tünde, PhD,

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Meeting of the project staff in Novi Sad, July 15, 2010

December 15, 2011

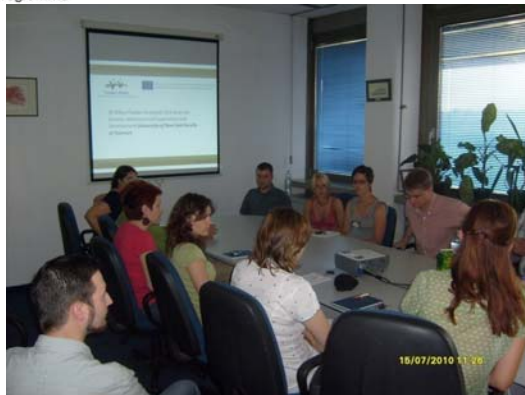
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Meeting of the project staff in Novi Sad, July 15, 2010

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At the Project opening events I said:

I hope that we will sign the contract soon, and that our cooperation will be fruitful, that it will result in a lot of high-quality publications and that we will be able to buy the equipment we need – in a word, that we will realize our project very successfully.



The Danube, Tisa and Maros rivers are the most prominent environmental heritage of the cross-border region. Hence, both the Hungarian and Serbian sides are interested in the quality of these surface waters, as the drinking water supply systems are based exclusively on local ground waters. The major problems are **high content of organic matter** and **lack of adequate water treatment**, as ground water cannot often be used without prior treatment. In view of the low level of environmental protection, along with the insufficiently effective wastewater treatment and uncontrolled pollution emission, unacceptable from the viewpoint of preserving natural and cultural heritage, the **objective of this project** is to develop simple and economic methods for cleaning and grooming waters with high content of organic compounds and emerging micropollutants, to improve their chemical and microbiological parameters, as well as to develop simple biological and chemical procedures for their characterization and removal.



With the development of methods based on **ozonation** (with and without UV irradiation), **UV irradiation** (using various radiation sources) with and without addition of **hydrogen peroxide**, and **heterogeneous photocatalysis** based on the application of TiO_2 using UV and Vis light, the formation of potentially carcinogenic and mutagenic intermediates and degradation products in drinking and biologically pretreated wastewaters could be avoided. The first research phase will be concerned with model solutions of particular pollutants, and then the attention will be focused on the determination of pollutants in the rivers (Danube and Tisa), and groundwaters, on the examination of the efficiency of the selected methods in degradation of these pollutants by spiking water samples with the identified pesticides and pharmaceuticals. Kinetic parameters of degradation of selected pollutants will be determined along with testing how the nature of the water influences efficiency of photodegradation.

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The kinetics and mechanism of degradation will be studied by: HPLC-DAD, HPLC-MS, IC, TOC, potentiometry and spectrophotometry. Also, zooplanktons, algae and bacteria will be used to examine toxicity of degradation products generated in all the degradation methods, while the mutagenicity of those obtained in the most efficient methods will be examined by the Ames and SOS tests. Furthermore, our aim is to improve local infrastructure, to enhance the capability of the research groups to perform complex analytical and microbiological methods for characterization of developed water treatment technologies, like the Advanced Oxidation Processes. In our vision, on the basis of common opportunities and complementing potentials of the Serbian and Hungarian sides, the Universities of Novi Sad and Szeged and other organizations will improve capacities and competitiveness of the region through joint activities, as well as support the transfer of knowledge between them.

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We can rightly say that all the activities in the frame of the project have been realized in full.

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Information and publicity

Media coverage	Yes	Hungarian	SZTE	Paid advertisement about the cooperation in case of succesfull project.	01.08.2010.	Citizens	100,000
TV	Yes	Both (HU and SRB)	SZTE	Adverisment about the coopertaion	01.09.2010.	Citizens	100,000
Radio	Yes	Both (HU and SRB)	UNSPMF	Adverisment about the coopertaion	01.09.2010.	Citizens	100,000
Internet (banner)	Yes	Both (HU and SRB)	UNSPMF	Link from the University website.	15.07.2010.	All interested in the work of the University	10,000
Project opening event	Yes	Serbian	UNSPMF	Meeting of the project staff in Novi Sad	15.07.2010.	project participants and interested researchers	30
Project closing event	Yes	Serbian	UNSPMF	Meeting of the project staff in Novi Sad	15.09.2011.	project participants and interested researchers	30
Professional events, Conference, fair	Yes	Both (HU and SRB)	UNSPMF	Work shops summerising the results of a workperiod, with participation of experties.	01.10.2010. - 01-02.12.2011.	project participants and interested researchers	20
Press conference	Yes	Both (HU and SRB)	UNSPMF	Information about cooperallon work	01.09.2010.	Citizens	100,000
Photo-sequence	Yes	Both (HU and SRB)	SZTE	Photos from the work shops and other meetings on the banners.	15.07.2010. - 30.09.2011.	All interested in the work of the University	10,000
Project website	Yes	Other	UNSPMF	Making web pages about the work on the project	1. 10. 2010.	Citizens	100
Others	Yes	Other	UNSPMF	Scientific articles, conference lectures or posters	01.10.2010. - 30.09.2011.	Broad segment of scientific people	1,000

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Press Conference in Novi Sad, February 11, 2011

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Workshop in Novi Sad, June 30, 2011

December 15, 2011

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Workshop in Novi Sad, June 30, 2011

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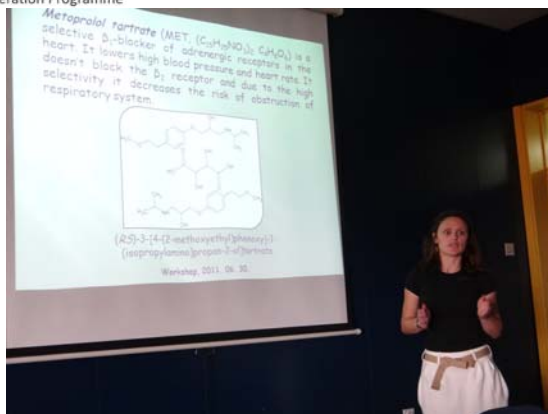
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Workshop in Szeged, December 1-2, 2011

December 15, 2011

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PUBLICATIONS

A considerable number of papers have been published in scientific journals with the impact factor, and there were numerous presentations at the meetings.

- Abramović, B., Kler, S., Šojić, D., Laušević, M., Radović, T., Vione, D., Photocatalytic degradation of metoprolol tartrate in suspensions of two TiO₂-based photocatalysts with different surface area. Identification of intermediates and proposal of degradation pathways, *J. Hazard. Mater.*, 198C (2011) 123-132.
- R.K. Szabó Cs. Megyeri, E. Illés, K. Gajda-Schranz, P. Mazellier, A. Dombi, Phototransformation of ibuprofen and ketoprofen in aqueous solutions, *Chemosphere* 84 (2011) 1658–166.

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- Guzsvány, V., Rajić, Lj., Jović, B., Orčić, D., Csanádi, J., Lazić, S., Abramović, B., Spectroscopic monitoring of photocatalytic degradation of the insecticide acetamiprid and its degradation product 6-chloronicotinic acid on TiO₂ catalyst, *Journal of Environmental Science And Health. Part B: Pesticides, Food Contaminants, and Agricultural Waste, (J. Environ. Sci. Hel. B)* (in press).
- Despotović, V. N., Abramović, B. F., Šojić, D. V., Kler, S. J., Dalmacija, M.B. Bjelica, L. J. Orčić D. Z. , Photocatalytic Degradation of Herbicide Quinmerac in Various Types of Natural Water, *Water, Air and Soil Pollution, (in press)*.
- Abramović, B., Despotović, V., Šojić, D., Rajić, Lj., Orčić, D., Četojević-Simin, D., Comparative assessment of the photocatalytic efficiency of TiO₂ Wackherr in the removal of clopyralid from various types of water, chapter , in: Hasaneen, M. N. (Eds.), "*Herbicides/Book 3*", ISBN 979-953-307-729-0. INTECH, Rijeka, ISBN 979-953-307-729-0 (in press).

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- Zs. Pap, E. Karácsonyi, Zs. Cegléd, A. Dombi, V. Danciu, I.C. Popescu, L. Baia, A. Oszkó, K. Mogyorósi: Dynamic changes on the surface during the calcination of rapid heat treated TiO₂ photocatalysts, *Applied Catalysis B: Environmental (in press)*.
- G. Veréb, Z. Ambrus, Zs. Pap, Á. Kmetykó, A. Dombi, V. Danciu, A. Cheesman, K. Mogyorósi, Comparative study on UV and visible light sensitive bare and doped titanium dioxide photocatalysts for the decomposition of environmental pollutants in water, *Applied Catalysis A: General (in press)*.

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PRESENTATION

1. S. Kler, D. Šojić, V. Despotović, K. Gajda-Schranz, B. Abramović, "Photodegradation of metoprolol using UV, O₃ and O₃/UV in different natural waters", EUROanalysis 16, European Conference on Analytical Chemistry, Belgrade, Serbia, September, 11-15, 2011, S11, str. 70.
2. T. Alapi, J. Farkas, K. Schranz, K. Mogyorósi, L. Manczinger, E. Sajben, A. Palágyi, Cs. Vágvölgyi, B. Abramović, A. Dombi, „UV-induced photolysis and its combination with ozonation in the transformation of diuron and monuron. Effect of matrix and toxicological aspects“, Photocatalytic and Advanced Oxidations Technologies for Treatment of Water, Air, Soil and Surfaces (PAOT), Gdansk, Poland, July 4-8, 2011, P17, str. 84-85.

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3. L. Manczinger, T. Alapi, J. Farkas, K. Schranz, K. Mogyorósi, Enikő Sajben, A. Palágyi, Cs. Vágvölgyi, B. Abramović, A. Dombi, "Genotoxicological aspects of UV-induced photolysis and its combination with ozonation in the transformation of phenylurea herbicides, analysed by Ames test", 16th International Congress of the Hungarian Society for Microbiology, Eötvös Loránd University Convention Centre, Budapest, Hungary, July 20-22, 2011, str. 183
4. Enikő Sajben, T. Alapi, J. Farkas, K. Schranz, K. Mogyorósi, L. Manczinger, Andrea Palágyi, Cs. Vágvölgyi, B. Abramović, A. Dombi, DNA-damaging effect of UV-induced photolytic degradation products of phenylurea herbicides, analyzed by comet-assay, 16th International Congress of the Hungarian Society for Microbiology, Eötvös Loránd University Convention Centre, Budapest, Hungary, July 20-22, 2011, str. 208

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5. Valéria Guzsvány, Ljiljana Rajić, Zsigmond Papp, János Csanádi, ¹H NMR study of stability and photocatalytic degradation of acetamiprid, thiamethoxam, imidacloprid and thiacloprid neonicotinoid insecticides, 11th ISIRR, Szeged, Hungary, 2010, p. 131
6. Sanja Kler, Biljana Abramović, Daniela Šojić, Mila Laušević, Tanja Radović, Davide Vione, Identification of intermediate products of metoprolol photocatalytic degradation in aqueous suspension of TiO₂ Degussa P25 by 18th Young Investigators' Seminar on Analytical Chemistry, Novi Sad, Serbia, June 28th-July 1st, 2011, p. 22
7. Jelena Petrović, Valéria Guzsvány, Zsigmond Papp, Bojan Prolić, Maria Putek, Biljana Abramović, Andrzej Bobrowski, Silver amalgam film electrode for monitoring of photodegradation of imidacloprid insecticide, 18th Young Investigators' Seminar on Analytical Chemistry, Novi Sad, Serbia, June 28th-July 1st, 2011, p. 74

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8. B. Abramović, T. Alapi, E. Arany, S. Beszédes, A. Dombi, J. Farkas, E. Illés, Sz. Kertész, Á. Kmetykó, L. Kredics, Zs. László, L. Manczinger, P. Mazellier, K. Mogyorósi, Zs. Pap, E. Szabó, R. Szabó, K. Gajda-Schranz, Cs. Vágvölgyi, K. Vajda, G. Veréb, „Removal of persistent organic pollutants (pharmaceuticals and pesticides) from waters using Advanced Oxidation Processes“ The 17th International Conference on Advanced Oxidation Technologies for Treatment of Water, Air and Soil November 7-10, 2011, San Diego, California, USA.
9. Zs. Pap, É. Karácsonyi, Zs. Cegléd, A. Dombi, I.C. Popescu, L. Baia, T. A. Oszkó, K. Mogyorósi, “Dynamic Changes on the Surface During the Calcination of Rapid Heat Treated TiO₂ Photocatalysis”, Photocatalytic and Advanced Oxidations Technologies for Treatment of Water, Air, Soil and Surfaces (PAOT), Gdansk, Poland, July 4-8, 2011, P17, str. 157-158.

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10. E. Arany, T. Alapi, K. Gajda-Schranz, A. Dombi, „Vacuum-Ultraviolet Photolysis of Diclofenac“, Photocatalytic and Advanced Oxidations Technologies for Treatment of Water, Air, Soil and Surfaces (PAOT), Gdansk, Poland, July 4-8, 2011, P17, str. 185.
11. E Czabo, A. Dombi, K. Gajda-Schranz, K. Mogyorósi, G. Simon, “Removal of Phenol from Pre-Treated and Raw Thermal Water via Different AOP Methods”, Photocatalytic and Advanced Oxidations Technologies for Treatment of Water, Air, Soil and Surfaces (PAOT), Gdansk, Poland, July 4-8, 2011, P17, str. 187.

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- Size of the area on which results of this project may influence water purification (synthesized catalysts and developed techniques of degradation of pharmaceuticals and pesticides) is about 40,768.00 km².
- Work visit of UNSPMF team to Szeged and Work visit of SZTE team to Novi Sad. The outcome of this were the results included in joint the contributions presented in August and September.

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- **Promoting equal opportunities** - Results achieved in the frame of the work visit of UNSPMF team to Szeged and of SZTE team to Novi Sad. Preparation of articles is in progress.
- **Promoting sustainable development** - The newly synthesized catalysts and developed mutagenic methods, whose application allows purification of both surface and ground waters.

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The success of the project realization can also
be viewed through purchase of new
equipment.



UFLC



Microbalance



Peristaltic pump	Portable pH-/mV/°C-meter
Ultrasonic bath	Multiposition hot plate stirrer
Flowmeter	Chemicals
Mobile phase filtration apparatus	Computer
Solid ptfе vacuum pump	Refrigerator
Portable conductivity meter	Magnetic stirrer
Air conditioner	
Circulating thermostat	about 101,000 EUR



Luminometer	Laptop
Millipore water cleaning equipment	Ice maker
Adsorbable Organic Halogen Analyzer (AOX)	Microscope
Analytical balance	Chemicals
Incubator	
Centrifuge	
Cooled laboratory Eppendorf-centrifuge	about 142,000 EUR



Any problems encountered with partners during the reporting period?

- In the reporting period, no such problems were encountered. Quite contrary – the communication was excellent. The project leaders have been constantly in contact either by phone, email, or they have met in person to exchange information.



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Finally, I would like to point out the especially correct and successful collaboration with Mr. Péter Rácz (Programme Manager, Joint Technical Secretariat), who was always ready to give quickly his competent answers to all my questions.



- Now, I open discussion.
- Would somebody like to take the floor?



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Verzija sa visokim kontrastom EN HU SRB

Dobrodošli O Programu Pozivi za prikupljanje predloga projekata Novosti, Događaji Preuzimanje Kontakt/Linkovi

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Thank you for your
attention

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