Food, nutrition, and environmental ‘omics

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FOODENTWIN COORDINATOR

Horizon2020 FoodEnTwin project

creation of a pan-European research network through ‘twinning research activities’ of:

University of Belgrade – Faculty of Chemistry, Serbia (UBFC)

Karolinska Institutet, Department of Medicine Solna, Sweden (KI)

Katholieke Universiteit Leuven, Department of Chemistry, Belgium (KU Leuven)

Universiteit Gent, Faculty of Bioscience Engineering, Belgium (UGent)

and Medizinische Universitaet Wien, Austria (MUW)

that will enable frontier research and infusion of cutting-edge -omics technologies (proteomics, transcriptomics, allergomics, digestomics, metallomics and lipidomics) and experimental animal models into the fields of food, nutrition and environmental sciences.

Consortium: UBFC (coordinator)

Faculty of Chemistry

Laboratory for HRMS

University of Belgrade – Faculty of Chemistry is a promising institution in an EU Associated country of the region of Western Balkan and a key contributor to the research excellence of Belgrade University in the field of analytical and food chemistry.

The UBFC has an excellent analytical platform for proteomics, metalomics and lipidomics, and strong expertise in methods development for food and environmental applications.

Therefore, UBFC has **strong analytical expertise** and **major infrastructure to enable cutting-edge –omics technologies in the fields of food, nutrition, agriculture and environmental sciences**. Twinning of the research activities and training of the staff will enable full potential development of the UBFC and better exploitation of the human and material resources which are already in place.

Group of Prof. Cirkovic Velickovic – Proteomics group

Consortium: KI (partner)

Karolinska Instutet, Department of Medicine, is an important partner for many **food allergy-related** European initiatives. The collection of the sera from numerous food allergic patients, and expertise in both environmental and food proteomics and allergomics will contribute to the FoodEnTwin project.

Food allergy group of Prof. van Hage.

Consortium: KULeuven (partner)

KU Leuven is top-ranked scientific and educational institution in Europe

Widely recognized expertise in synthesis of **artificial proteases**.

Top **innovative** university in Europe.

Specific contribution to Foodentwin will be development of **chemical tools in proteomics**.

Group of Prof. Parac-Vogt – Bioinorganic chemistry

Consortium: MUW (partner)

Medizinische Universitaet Wien is the partner responsible for animal models development and focusing on of the impact of the environment on the health in the animal models of human diseases. There are two labs within this partner with expertise in

1) **food protein chemistry –** Group of Prof. Hoffman-Sommergruber

2) **animal models** of allergic disease. – Group of Dr. Ebstein

Consortium: UGhent (partner)

Ghent University Faculty of Bioscience and Engineering (FBE), Department of **Food Safety and Food Quality** is the focal point for Flemish and European Food Industry and hub of the Food2Know cluster, the largest network of research and industrial partners of the agro-food sector in Europe.

FBE conducts more fundamental studies of the mechanism of **health-promoting of health-detrimental effects of nutrients and contaminants using state-of-the art in-vitro models**.

Expertise in **nutritional transcriptomics, proteomics and lipidomics**, especially with relation to food safety.

Group of Prof. Rajkovic, prof. Tack and prof. de Meulenaer.

Key target actions

The project will focus on the key target actions of twinning of research activities through:

networking,
training and lecturing program

resulting in a roadmap for a future collaboration

organization of four public Summers Schools

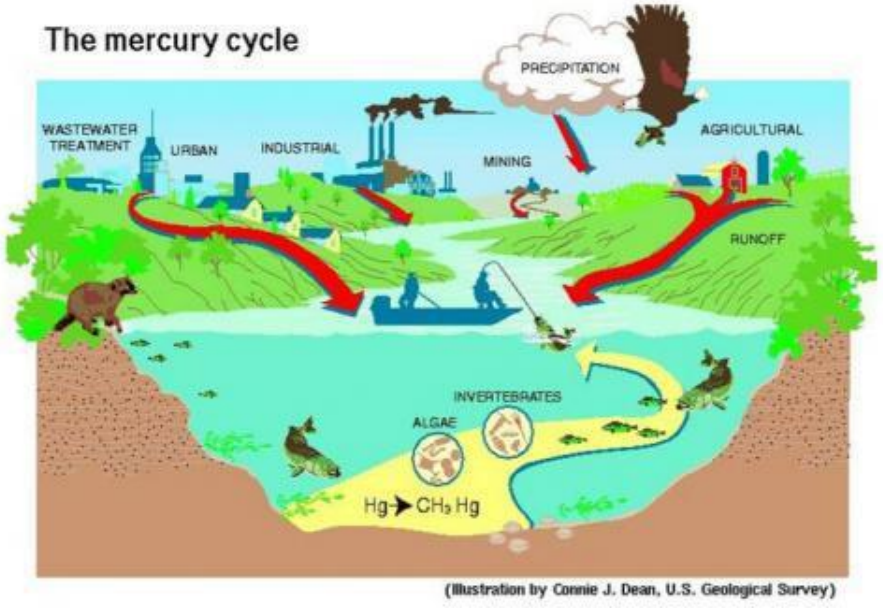
internal and external expert-driven Academia-Industry meetings

two workshops

and finally bringing the European Food Chemistry conference (EuroFoodChem) in 2021 to the UBFC in Serbia.

Rational behind FoodEnTwin

Multiomics technologies in combination with biological readouts afforded by work with animal models can significantly contribute to our understanding of the effects environmental pollution and stress have on the food we eat and how they can impact our health and well-being.



Main S&T objective of the FoodEnTwin is

to enable multiomics approaches for profiling of raw agricultural materials and processed foods, and *in vivo* and *in vitro* models mimicking response of humans to the profiled foods, by developing novel tools and approaches to tackle the impact of pollution and environmental oxidative stress at the molecular level.

Various environmental, food and in-vitro and in-vivo related samples will be subject to:

lipidomics,

transcriptomics,

metalomics,

proteomics and

allergomics,

resulting in qualitative and quantitative description of modifications in response to external stimuli and in relation to the level of inorganic and organic pollutants.

The project has as an underlying idea that humans are through food (as well as environment) exposed to mixtures of contaminants and (modified) food compounds resulting in different in vivo responses.

Overall methodology of FoodEnTwin

Short term staff exchanges; (WP1)

Training workshops, and summer schools; (WP2)

Dissemination and outreach. (WP3).

Project management (WP4).

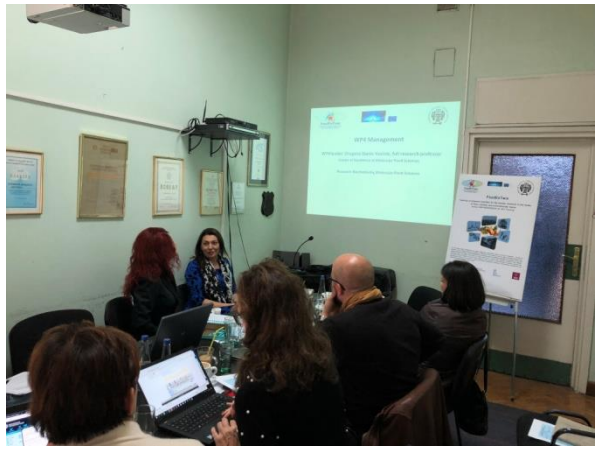
First deliverables of the FoodEnTwin

Web site of the project:

http://horizon2020foodentwin.rs/

Kick off meeting, September 26, 2018

Project runs for 3 years (August 31, 2021).



Main past activities

First periodic report was submitted and accepted

Financial report also accepted

Review by external reviewer (audit) past very well – excellent reviews obtained with few remarks on the improvements

- More followers on Twitter
- More detailed description of qualitative impacts of exchanges and summer schools.

- COVID19 slowed down a lot of FoodEnTwin activities…

WP1: Mutual exchanges aiming at training and collaboration

Task 1.1 Mutual Exchanges aiming at training in –omics technologies (month 2 – month 12)

Task. 1.2. Mutual exchanges in support of already planned collaborative research projects between coordinator and partner institutions. (month 2 – month 24) – ongoing activity

Task 1.3. Short-term staff exchanges in support of novel collaborative projects (month 2 – month 34) – ongoing activities

The call is open for collaborative STSE:

WP2: Raising skills and spreading knowledge

► Activities of the WP2 aimed to spread knowledge, raising skills and enabling blending of novel technologies with the fields of food, nutrition and environmental sciences

► Four advanced training summer schools for PhD students were planned within WP2

Overview of the tasks planned within the WP2:

Task 2.1. Metallomics summer school organization (KULeuven) – Food, feed and environmental applications (month 9th) – **organized in June 2019**

Task 2.2. Proteomics summer school (UBFC): From sample preparation to practical aspects (month 18th) – **organized in February 2020**

Task 2.3. Lipidomics summer school (UGent) (month 24th) - **ongoing activity, call open for applications**

Task 2.4. Transcriptomic-functionomic host-hazard interactions summer school (UGent) (month 30th) –

WP3: Dissemination and communication

● WP3 aimed at dissemination of the results of the project by organization of three workshops, co-organization of congress and support for conferences attendance by FoodEnTwin researchers

Task 3.1. Dissemination of the results to the scientific community ***Task 3.1.1.*** Organization of a workshop: Food and Environmental -Omics (UBFC) – **organized in June 2019**
Task 3.1.2. Organization of a workshop: Experimental animal models for food and environment (MUW) – **organized in February 2020**

Task 3.1.3. Co-organization of the European Food Chemistry congress with a satellite symposium on novel instrumental approaches in food science – European Congress of Food Chemistry - EuroFoodChem XXI, 2021 (UBFC) – **Congress postponed until 2023, Symposium to be organized in June 2021**

Task 3.1.4. Dissemination of results to the scientific community (UBFC) – **ongoing activity**
Task 3.2. Dissemination targeting policy-makers and industry (UBFC) – **ongoing activity**

Task 3.3. Communication of project results (UBFC) – **ongoing activity**

Task 3.3.1. FoodEnTwin web platform (UBFC) – **www.horizon2020Foodentwin.rs**

Task 3.3.2. Press conference (UBFC) - scheduled for June 14, 2021

Dissemination activities

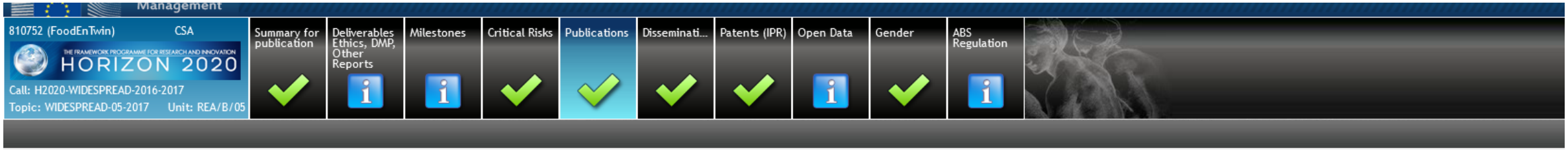
1) Dissemination to scientific community

► Organization of three international workshops and co-organization of congress

- 1st FoodEnTwin Workshop Food and Environmental -Omics – June 2019
- 2nd FoodEnTwin Workshop “Experimental animal models for food and environment – February 2020
- 3rd FoodEnTwin Workshop “Business meets Academia” – call open for June 16, 2021

- The scientific results were presented at more than 50 national and international conferences and workshops attended by all project partners

- 13 publications with acknowledgement to the FoodEnTwin project have been published so far



Publications

☐ This project does not currently have any scientific publication

Suggested publications from OpenAIRE (8 publications)

No.	Type	Title	Authors	Title of the Journal/Proc./Book	Date of Acceptance	DOI
4	Publication in C	Klasifikacija školjki na osnovu sadržaja esencijalnih elemenata i hemometrije	Mutić, Jelena; Jovanović, Vesna; Ristivojević, I	Kratki izvodi radova / 56. savetovanje Srpskog hemijskog društ	01/01/2019	
5	Publication in C	Određivanje toksičnih elemenata (žive, kadmijuma, olova i arsena) u uzorcima	Đurđić, Slađana Z.; Jovanović, Vesna; Tomić, S	Kratki izvodi radova / 56. savetovanje Srpskog hemijskog društ	01/01/2019	
6	Publication in C	Unrestricted and quantitative method of post translational modifications pro	Smiljanić, Katarina; Prodić, Ivana; Apostolović,	XIV Italian Proteomics Association Annual Meeting with HPS, 2	01/01/2019	
7	Publication in C	Study of element contents in bivalve molluscs: health benefit and risk	Tomić, Sofija; Jovanović, Vesna B.; Ristivojević	Book of Abstracts of the XX EuroFoodChem Congress EDITORS	01/01/2019	
8	Thesis/Disserta	Proteomika posttranslacionih i hemijskih modifikacija proteina i interakcije p	Mihailović, Jelena	Универзитет у Београду	09/12/2019	

Project publications (13 publications)

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No.	Type	Title	Authors	Title of the Journal/Proc./Book	Number, date or freq. of the Journal/Proc./Book	Is Peer-reviewed?	Is Open Access?	DOI
1	Article in Jou	In-depth quantitative profiling of post-translational modifications of T	Katarina Smiljanic, Ivana Prodic, Danijela	Environment International	126	Yes	Gold	10.1016/j.envint.2
2	Article in Jou	Accumulation of U, Th, Pb, V, Rb, and Ag in wild mushrooms Macrole	Vesna Vukojević, Slađana Đurđić, Jelena M	Environmental Science and Pollution Research	26/13	Yes	Green	10.1007/s11356-0
3	Article in Jou	Opposite clozapine and ziprasidone effects on the reactivity of plasn	Tamara N. Uzelac, Aleksandra L. Nikolić-K	Chemico-Biological Interactions	311	Yes	Green	10.1016/j.cbi.20
4	Article in Jou	Thermal Processing of Peanut Grains Impairs Their Mimicked Gastroin	Ivana Prodić, Katarina Smiljanić, Ana Simo	Foods	8/10	Yes	Gold	10.3390/foods
5	Article in Jou	Stabilization of apo α-lactalbumin by binding of epigallocatechin-3-ga	Milica Radibratovic, Ayah Al-Hanish, Simec	Food Chemistry	278	Yes	Green	10.1016/j.foodchen
6	Publication in	FoodEnTwin: Impactof environment onfoodqualityandsafety studied b	Ćirković-Veličković, Tanja	Book of Abstracts of XIV Italian Proteomics Association	1	No	Gold	
7	Article in Jou	Allergenomics of the tick Ixodes ricinus reveals important α-Gal-carry	Danijela Apostolovic, Jelena Mihailovic, S	Allergy	75/1	Yes	Green	10.1111/all.
8	Article in Jou	Hydrolysis of transferrin promoted by a cerium(IV)-Keggin polyoxome	Jens Moons, Laura S. Van Rompuy, Alvaro	Polyhedron	170	Yes	Green	10.1016/j.poly.2(
9	Publication in	Highly improved method for in-depth post-translational modification	Smiljanić, Katarina; Prodić, Ivana; Apostol	1st FoodEnTwin Workshop "Food and Environmental - Or	2	No	Gold	
10	Article in Jou	The interactions of the ruthenium(II)-cymene complexes with lysozyr	Dragana Stanic-Vucinic, Stefan Nikolic, Ka	JBIC Journal of Biological Inorganic Chemistry	04 February 2020	Yes	Green	10.1007/s00775-0

2) Dissemination to industry

- Within task 3.2. Dissemination targeting policy-makers and industry (UBFC) organization of a workshop Business meets Academia is planned

► 3rd FoodEnTwin workshop **“Business meets Academia”** was announced during February, 2020 on FoodEnTwin website, to be held May 27, 2020 in Belgrade, providing the main topics:

- *Analytical methods development*
- *Food allergy*
- *Sustainability of food production*

Workshop is postponed for June 2021 and it will be in a hybrid format.

- All session will be followed by round-table discussion with focus on specific industry-related questions and needs and the outcome documented in a report open for the public.

FoodEnTwin
-omics technologies bridging food and environmental sciences

3rd FoodEnTwin Workshop: Business meets Academia

In cooperation with Serbian Chamber of Commerce

Hybrid event

Belgrade, June 15, 2021

Innovative research in food and environment

Preliminary programme:

Topic 1: Analytical methods development:

Developments in microplastics research: methods for identification and characterization of micorplastics

Innovation in mass spectrometry of proteins

Methods development for protein modifications profiling

Round table discussion

Topic 2: Allergy and allergens

Novelties in allergy diagnosis and therapy

Food allergens detection

Round table discussion

Topic 3: Sustainability of food production

Novel sources of food and feed

Impact of environment on food and food on environment

Food authenticity

Topic 4: Impact of Covid-19 on research and innovation

Topic 5: Success stories of Foodentwin

Round table discussion

The event is open for public. Registration is free, but necessary. In order to register, send an e-mail to: foodentwinwp3@chem.bg.ac.rs before May 30, 2021.

FoodEnTwin
-omics technologies bridging food and environmental sciences

Final FoodEnTwin Symposium: Novel instrumental approaches in food science

Hybrid event

Belgrade, June 16-18, 2021

Topics to be covered:

Thermapheresis; Microcalorimetry; Advances in mass spectrometry; Capilary electrophoresis; Multidimensional analysis. The symposium will focus on food and agricultural applications of modern instrumental analytical methods.

Preliminary programme:

Topic 1. Analytical methods development:

Topic 2. Instrumental methods in microplastics research

Topic 3. Microcalorimetry and thermapheresis

Topic 4. Spectroscopy in food and environmental sciences

Topic 5. Multidimensional analysis

Topic 6. NMR of proteins in food and environmental science

Topic 7. Foodentwin STSM

Junior researchers' day

Sightseeing – MicroProt Lab

Contributions are welcome: Send an abstract to foodentwinwp3@chem.bg.ac.rs

The event is open for public. Registration is free, but necessary. In order to register, send an e-mail to: foodentwinwp3@chem.bg.ac.rs before May 30, 2021.

3) Dissemination to wider audiance

► The **FoodEnTwin webpage** (http://horizon2020foodentwin.rs/)

► FoodEnTwin accounts **on social media**:
- Twitter (https://twitter.com/FoodEnTwin)
- ResearchGate (https://www.researchgate.net/project/Twinning-of-research-activities-for-the-frontier-research-in-the-fields-of-food-nutrition-and-environmental-omics-FoodEnTwin)
- Facebook (https://www.facebook.com/search/top/?q=foodentwin&epa=SERP_TAB)
- Instagram (https://www.instagram.com/p/ByNr4HDoCDb/?utm_source=ig_web_copy_link)

► **Popular articles and media presentation**:
- popular articles in magazines and websites
- media presentations
- Popular lectures at Kolarac in April 2021

IMPACT

In the period considered, the FoodEnTwin project has made good progress towards the realization of the expected impacts, and primarily the main impact:

- creation of a **networking collaboration** between the UBFC and its CoE MFS, and four highly renowned institutions from EU, as well as increasing the scientific excellence, visibility and technology innovation of UBFC and its partners.

The broader thematic approach of FoodEnTwin project, rather than narrow focus on technical or data-related topics, enabled significant impact of the project through many complementary activities.

The consortium has successfully applied for the Horizon2020 RIA call on the health effects of microplastics.

New H2020 project Imptox will start on April 1st, 2021.

Impact related to industrial needs at regional level

Innovation Vouchers programme of Republic of Serbia Innovation Fund: Improvement of Serbian food products database, duration: 6 months, Project coordinator Jelena Radosavljevic (http://www.inovacionifond.rs/cms/files//iv-odobreni-vauceri/Lista_odobrenih_inovacionih_vaucera_cetvrti_javni_poziv.pdf)

Innovation voucher programme of Republic of Serbia Innovation Fund: Development of analytical procedures for quality control of different medicinal plant based preparations, Client: ParPak doo; realization period: November 2018 - February 2019, Project coordinator Dušanka Milojković-Opsenica;

Innovation voucher programme of Republic of Serbia Innovation Fund: Innovative approach to quality control of watch bases and beeswax in order to obtain quality and safe bee products,, duration: 6 months, Client: Veterinarska stanica Leđanac Vet doo Susek; Project manager Dušanka Milojković-Opsenica; (http://www.inovacionifond.rs/cms/files//iv-odobreni-vauceri/Lista_odobrenih_inovacionih_vaucera_cetvrti_javni_poziv.pdf)

Innovation voucher programme of Republic of Serbia Innovation Fund: An innovative approach to the detection of honey counterfeit, duration: 6 months Client: Plant for the collection and placement of honey from beekeepers SPOS "Our honey" d.o.o; Project coordinator Dušanka Milojković-Opsenica; (http://www.inovacionifond.rs/cms/files//iv-odobreni-vauceri/Lista_odobrenih_inovacionih_vaucera_cetvrti_javni_poziv.pdf)

Innovation voucher programme of Republic of Serbia Innovation Fund: Development of analytical procedures for characterization and quality control of different soy-based preparations; duration: 6 months Client: ParPak doo; Project coordinator Dušanka Milojković-Opsenica; (http://www.inovacionifond.rs/cms/files//iv-odobreni-vauceri/Lista_odobrenih_inovacionih_vaucera_cetvrti_javni_poziv.pdf)

Impact of Covid-19

Amendment requested to cover extension of project duration and modification of project activities

Extension of project duration for 4 months

STSE planned for the period 2020-summer 2021 have been modified to allow exchange of material and ideas rather than exchanges of staff

Essential STSE are planned for the period May-November 2021

Summer school No.4 will be fully digital

Two extraordinary SC meetings took place due to Covid-19 situation

Thank you for the attention