



COST TD1203

NOVI SAD, August 6th– 7th, 2014

WORKSHOP ON VALORISATION OF VEGETABLE WASTE

Scientific report

The Workshop on Valorization of Vegetable Waste was held in Novi Sad, Serbia, 6-7 August 2014. The Workshop Programme is enclosed to this report.

The main issues covered by the oral presentations given during the Workshop were:

- extraction of valuable ingredients from vegetable waste and the various technical approaches,
- production of alternative fuels from vegetable waste,
- possibility to reuse the modified vegetable waste as materials for immobilization, adsorptions, etc

Wednesday 6th August 2014

After the registration, day 1 began with opening words of Prof.Dr.Biljana Škrbić, the event coordinator from the local organizer Center of Excellence in Food Safety and Emerging Risks, Faculty of Technology, University of Novi Sad.Prof. Škrbić welcomed the guests and invited them to take this event as an opportunity to better understand and discuss mutual research activities and possibilities for future collaboration in the domain of biowaste, wishing the Workshop would be fruitful one and a joyful stay in Novi Sad, the capitol of the Vojvodina Province, the main agro-region in Serbia.

Then, the first Workshop session on Valorization of Vegetable Waste chaired by Prof. Dr. Biljana Škrbić started with the the presentation of Thierry Talou, who presented an innovative approach of valorization of vegetable wastes (seeds, kernels) rich in both lipids and aromatic compounds. The second presentation was given by Jasna Mastilović, who presented the results of integrated approach to tomato waste utilization in food production. Then,Ivo Safarik presented modified biosorbents with possibility of magnetic separation for use in difficult-to-handle systems. Afterwards, the morning break for refreshments was organized, followed by the first part of the session on Valorization Technologies That Could Be Applied to Vegetable Wastes, which started with presentation of Blaz Likozar on modelling, optimization and intensification of waste oil conversion to biodiesel. It was followed with the results on waste cooking oil valorization towards alternative fuels production,given by Nataša Đurišić-Mladenović. Then, Julio Fierro gave an overview of the pilot-plant experiences on valorisation of food waste from local market through conventional and solid-phase anaerobic digestion and production of biogas.

Before the lunch, in the frame of the networking activities, each of the participants presented briefly (in about 3 minutes) their own work and/or interest in the domain of biowaste, which was good start for further mutual conversion during the workshop exploring the mutual interests for collaboration.



The session on Valorization of Vegetable Waste was continued after the lunch and it was chaired by Dr. Nataša Đurišić-Mladenović. Johannes Hell started this session presenting arabinoxylan labeling in combination with confocal laser scanning microscopy application to wheat bran. Afterwards, two approaches for waste valorization were given by Ana Morais and Rafal Bogel-Lukasik: firstly, the valorization of wastes utilizing H_2O and CO_2 - H_2O as supercritical/high pressure fluids was presented by Ana, then Rafal gave the lecture on ionic liquids.

Uroš Miljić, presented the last two presentations. Both presentations covered the issue of the kitchen waste utilization for ethanol production, with the one dealing with thermo-acid hydrolysis and the other with thermo-enzymatic pretreatment.

After the discussion raised by the questions of the participants to the lecturers and the afternoon coffee break, the roundtable was organized and chaired by Prof. Dr. Biljana Škrbić, highlighting main challenges and opportunities mentioned during the Workshop, emphasizing the great interest of European Commission in biowaste valorization, which can be followed through forthcoming calls within HORIZON 2020 program.

Thursday 7th August 2014.

The visit to „ZDRAVO-ORGANIC“ the private company of the vegetable and fruit based organic products was organized on the second day of the Workshop. The company is located in the Vojvodina's village Selenča. The Director of the company, Mr. Jožef Gašparovski was the host during this visit, and he described feed stocks used and products obtained in the plant; Mr. Stevan Prokopec, the Managing Director and the chief engineer showed the plant facilities to the participants. Also, Mr. Gašparovski explained the company's potential plan for the utilization of the waste generated after apple and beetroot base products. After fruitful discussion of the Workshop participants with Mr. Gašparovski, the group returned to Novi Sad. Afterwards, the participants who expressed the interest to visit the laboratories of the Centre of Excellence in Food Safety and Emerging Risks took this opportunity to visit the Faculty of Technology and discuss further with Prof. Dr. Biljana Škrbić about the possibilities for collaboration.







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WORKSHOP ON VALORISATION OF VEGETABLE WASTE

Hotel Centar

Location: Uspenska 1

Programme

Wednesday 6th August 2014

9.00-9.30 Registration

9.30-9.40 Welcome and Opening, Biljana Škrbić, *Faculty of Technology, University of Novi Sad*

Valorisation of Vegetable Waste

Chairperson: Prof. Dr. Biljana Škrbić

9.40-10.00 Could wastes from vegetables be potential sources for aromatic vegetal oils?
Thierry Talou, *Université de Toulouse, INP-ENSIACET, Toulouse, France*

10.00-10.20 Integrated approach to vegetable waste utilization in food production: tomato example,
Jasna Mastilović, Žarko Kevrešan, Aleksandra Torbica, Nebojša Ilić, Miona Belović, Jelena
Tomić, Andrea Vuković, *Institute for Food Technology, Novi Sad, Serbia*

10.20-10.40 Magnetically responsive biological waste materials for xenobiotics removal, Ivo Safarik,
Eva Baldikova, Kristyna Pospiskova, Zdenka Maderova, Mirka Safarikova, *Department of
Nanobiotechnology, Institute of Nanobiology and Structural Biology of GCRC, Czech Republic*

10.40-11.00 Coffee break

Valorisation Technologies That Could Be Applied to Vegetable Wastes – part I

11.00-11.20 Modelling, optimization and intensification of waste oil conversion,
Blaz Likozar, *Laboratory of Catalysis and Chemical Reaction Engineering
National Institute of Chemistry, Ljubljana, Slovenia*

11.20-11.40 Possibilities for sustainable valorization of waste vegetable oils towards alternative fuels
production, Nataša Đurišić-Mladenović¹, Biljana Škrbić¹, Zlatica Predojević¹, Anastasia



Zabaniotou², ¹*Faculty of Technology, University of Novi Sad, Novi Sad, Serbia*, ²*Department of Chemical Engineering, Aristotle University of Thessaloniki, Thessaloniki, Greece*

- 11.40-12.00 Pilot-plant experiences of food waste valorisation: Conventional and solid-phase digestion, Julio Fierro, *University of Leon, Spain*
- 12.00-13.00 Networking activity
- 13.00-14.30 Lunch break and poster competition

Valorisation Technologies That Could Be Applied to Vegetable Wastes – part II

Chairperson: Dr. Nataša Đurišić-Mladenović

- 14.30-14.50 Integrated treatment of olive mill solid wastes for the production of biotechnological products, Hassan Azaizah, *Institute of Applied Research, the Galilee Society, Tel Hai College, Israel*
- 14.50 -15.10 Immunolocalization of arabinoxylan in wheat bran to monitor the effect of different treatments, Johannes Hell, *University of Natural Resources and Life Sciences Christian Doppler Laboratory for Innovative Bran Biorefinery, Department of Chemistry and Department of Food Sciences, UFT Research Center Tulln, Tulln, Austria*
- 15.10-15.30 High pressure technologies in the valorisation of wastes, A. R. C. Morais, *Laboratório Nacional de Energia e Geologia (LNEG), Portugal*
- 15.30-15.50 Ionic liquids as new solvents for residues, Rafal Bogel-Lukasik, *Laboratório Nacional de Energia e Geologia (LNEG), Portugal*
- 15.50-16.10 Ethanol production from starch based kitchen waste after thermo-enzymatic pretreatment, Vesna Vučurović, Radojka Razmovski, Uroš Miljić, Marijana Ačanski, Vladimir Puškaš, *Faculty of Technology, University of Novi Sad, Novi Sad, Serbia*
- 16.10-16.30 Investigation of thermo-chemical hydrolysis of kitchen waste for ethanol production, Uroš Miljić, Vesna Vučurović, Radojka Razmovski, Vladimir Puškaš, Marijana Ačanski, *Faculty of Technology, University of Novi Sad, Novi Sad, Serbia*
- 16.30-17.00 Coffee break
- 17.00-18.00 Roundtable to highlight main challenges and main opportunities

Thursday 7th August 2014

- 9.30 Departure to the factory
- 10.30-12.30 Visit- "ZDRAVO ORGANIC" Selenča
- 14.00 Arrival to Novi Sad



POSTER SECTION

Maria Saarela, The CYCLE project, *VTT Technical Research Centre of Finland.*

Cecilia Fenech, Bio-Thermal RED: Food waste in the circular economy, *Institute for Energy and Resource Technology, Cranfield University, England.*

Estrella Nunez Delicado, Revalorization of wine and olive oil by-products by using cyclodextrins. Total phenolic content and antioxidant capacity, *Universidad Catolica de Murcia, Spain.*

Nayil Dinkci, An alternative method for cheese whey valorisation: Biogas, *Department of Dairy Technology, Ege University, Turkey.*

Bojana Bajić, Siniša Dodić, Damjan Vučurović, Jovana Grahovac, Jelena Dodić, Potential of bioethanol production from sugar beet wastes in Serbia, *Faculty of Technology, University of Novi Sad*