



REPORT ON THE REINFORCEMENT OF THE CEFSEK MATERIAL RESOURCES

The main objectives of WP2 “Reinforcement of material resources” were the purchase and installation of ultra high performance liquid chromatograph coupled to triple quadrupole mass spectrometer-UHPLC/MS/MS, ultra high performance liquid chromatograph with high resolution mass spectrometer-UHPLC/HRMS-with Orbitrap technology and of sample preparation equipment. The negotiation with the representatives of the local distributors of the leading world companies for the advanced separation instruments and mass spectrometry begun in February 2009 and lasted almost entire 2009. Each of the offers was read in detail and discussed within the CEFSEK team. During this period, the basics and applications of the mass spectrometry were studied and the advantages as well as disadvantages of the offered instruments were theoretically evaluated. The supporting partners were asked to give comments on the offers with respect to the price-to-quality ratio. In December, the official procurement procedure was performed. The opening of tender was on December 01, when the conditions of payment and instruments delivery were agreed. The contract was signed by the representatives of ANALYSIS and of the Faculty of Technology on December 28, 2009. Two outstanding analytical instruments:

- UHPLC Accela - TSQ Vantage MS/MS, Thermo Fisher Scientific, and
- UHPLC Accela – Exactive with Orbitrap technology, Thermo Fisher Scientific,

arrived at the Faculty of Technology during February and March 2010, followed by the installation and introductory trainings.



*FP7 CEFSER Lab for Mass Spectrometry:
Thermo Fisher Scientific UHPLC Accela –Exactive MS (on the left) and
Thermo Fisher Scientific UHPLC Accela - TSQ Vantage™ MS/MS (on the right)*

These systems are now operational at the CEFSER Lab for Mass Spectrometry, as their installation finished in the 14 project month, and since then they have been used actively in training purposes.

It should be emphasized that these two UHPLC/MS systems are unique for the whole Western Balkan Countries (WBCs) region and even wider for now, particularly due to their mass spectrometers with features that separated them from the similar instruments available in the region. Details on the negotiation and procurement of these two advanced instrumental systems are given in the Report on the Instruments Installation. After extensive discussions with the project Advisory Committee (by tele-conferences, e-mails, phone) it has been concluded that instead of the procurement of different items of sample preparation equipment foreseen to be bought in accordance to the Annex I, it would be more reasonable to buy an extra analytical instrument for the same price, particularly keeping in mind that some of the sample prep items have been purchased through other projects in which the CEFSER team has been involved in order to avoid duplication and to optimize the resources. Namely, purification system for ultra pure water, microwave oven for digestion, centrifuge, and sample concentrator were purchased through the project BIOXEN (HU-SRB-0901-214-150/25) funded under

Hungary-Serbia IPA Cross-border Co-operation programme implemented within the 2007 – 2013 European Union financial framework under the Instrument for Pre-accession Assistance (IPA), in which Faculty of Technology with the CEFSER team is involved as a project partner, while pressurized liquid extractor are going to be purchased through the national project no. 172050 “Development and application of the advanced chromatographic and separation methods in the analysis of xenobiotics and their degradation pathways in biotic and abiotic matrices” coordinated by the CEFSER coordinator and funded by the Serbian Ministry of Science and Technological Development in financial agreement with European Investment Bank (EIB) and Council of Europe Development Bank (CEB). Key personnel from the supporting institutions emphasized that the CEFSER lab should be equipped for the analysis of persistent organic pollutant classes like organochlorine pesticides and polychlorinated byphenils, and it should be reinforced by gas chromatograph with electron capture detector (GC/ECD), the instrument which price is the same as some preparatory equipment. After this decision, the negotiation with the Serbian distributors for the GC/ECD system started in July 2010, and tender was opened on November 11, 2011. The contract was signed with DSP Chromatography d.o.o., a Serbian representative of the Agilent instruments. The goal was to purchase the latest version of the system, which upgrading (e.g. with mass spectrometry detector) is possible in order to be able to further widen the research topics in the CEFSER Lab. Additionally, the EU origin of the instrument was also requested. Delivery and installation of the Agilent GC/ECD system was expected to be in the 23 project month (December 2010); however, distributor informed the project coordinator at the end of December that they would not be able to deliver the instrument in contractual timeframe due to final testing equipment complications in Waldbornn factory, Germany, announcing new delivery date on mid January 2011. Described delay have not had any impacts on other project tasks as well as on available resources and planning.

After the installation, CEFSER team members had initial training sessions for the introduction to the instrument maintenance, troubleshooting, software application and data evaluation.



Agilent 7890 GC/ECD system installed at the laboratory of the Faculty of Technology

Finally, through reinforcement of material resources of the Laboratory for Chemical Contaminants upgraded into the CEFSER Lab, Faculty of Technology is equipped with advanced analytical systems (UHPLC/MS/MS, UHPLC/HRMS with Orbitrap technology, and GC/ECD) that together with the instruments already possessed (GC/FID, HPLC/UV-DAD and atomic absorption spectrometer with graphite furnace) enable analysis of wide range of organic and inorganic contaminants in food and the environment. With these new analytical systems the research agenda of the CEFSER lab has been broaden, and the team started to tackle with new analytical challenges in food safety area, such as screening of multicomponent mixture of mycotoxins and pesticides by high resolution MS, development of the advanced method (UHPLC-APPI-MS/MS) for analysis of PAHs in sub-ppb levels; etc. The first results obtained by working on the new analytical systems have been already accepted for publishing in international journal *Food Control* 2011 ("Fusarium mycotoxins in wheat samples harvested in Serbia: A preliminary survey", Article in Press, doi:10.1016/j.foodcont.2011.01.027). All these issues are new and have never been investigated in Serbia or even wider in the WBC region. Hence, direct impact of the CEFSER project could be seen in upgrading of the national and regional research capacities and capabilities.