**Towards to standardization in the experimental set up for the uptake of emerging organic pollutants by crops under controlled conditions**

Carles Hurtado1, Camen Domínguez1, Núria Cañameras2, Jordi Comas2 and Josep M Bayona1

1IDAEA-CSIC, Jordi Girona, 18, E-08034 Barcelona, SPAIN. Carles.hurtado@idaea.csic.es

2DEAB-UPC, Esteve Terrades 8, Building 4, E-08860, SPAIN, Castelldefels, Spain

The uptake of persistent organic pollutants and heavy metals by vegetation is well established and has been used in environmental monitoring as passive sampling or soil phytoremediation. Nevertheless, during the last decade, the potential incorporation of emerging organic contaminants occurring in the irrigation water, biosolids or manure soil amendment by crops has raised a great deal of attention as a route of introduction of contaminants to the food chain1-4. However, one of the main limitations for the application of the experimental data to model calibration for risk assessment is the large span of concentrations found in vegetables for a same contaminant and crop, which prevents the use of this experimental data. Among the different factors that can influence the concentration levels in vegetables are the irrigation technique, soil or soilless, type of soil, irrigation regime, crop, vegetable concentration normalization (dry or wet weight) and irrigation water quality. In addition, no standardized calculation methods of root bioconcentration and translocation factors exist.

In this presentation, a simplified experimental set up based on a sand:perlite mixture and drip irrigation with spiked rainwater is presented for the evaluation of the uptake of eight emerging contaminants (i.e. bisphenol A, caffeine, carbamazepine, ibuprofen, propanolol, sulfamethazine, tonalide & triclosan) of broad physico-chemical properties (log *K*OW = -0.7 to 5.7) by lettuce at 5 different concentrations (0 - 40 gL-1). Watering was supplied below the field capacity to avoid leachate formation. Under these experimental conditions, contaminant-soil interaction is negligible, no colloidal fraction formation occurs and mostly bioaccesible to crops. However, under these experimental conditions an extensive degradation of some of the investigated emerging organic contaminants in the rhizosphere was observed. Finally, root bioconcentration and translocation factors were modeled and allowed to predict concentrations in leaves in a high degree of certainity. Accordingly, this simplified experimental set up is proposed as a first step towards the standardization of the uptake assessment of organic contaminats by crops grown under controlled conditions.

**Acknowledgments**

Authors thank to the Spanish Ministry of Economy and Competitiveness (MINECO) for funding (CGL2011-24844). C.H. acknowledges a predoctoral fellowship (BES-2012-055067) from MINECO.

**REFERENCES**

1. Ch. Wu, A.L. Spongberg, J.D. Witter, M. Fang, K.P. Czajkwski. *Environ. Sci. Technol*. 44 (2010) 6157-6161.
2. D. Calderón-Preciado, C. Jiménez-Cartagena V. Matamoros, J.M. Bayona. *Water Res.* 45 (2011) 221-231.
3. D. Calderón-Preciado, Q. Renault, V. Matamoros, N. Cañameras, J.M. Bayona. *J. Agric. Food. Chem*. 60 (2012) 2000-2007.
4. M. Goldstein, M. Shenker, B. Chefetz. *Environ. Sci. Technol*. 48 (2014) 5593-5560.