Dongqing Zhang, J Anal Bioanal Tech 2014, 5:4
http://dx.doi.org/10.4172/2155-9872.S1.017

OMICS Group Conferences
Accelerating Scientific Discovery

5th International Conference and Exhibition on
Analytical & Bioanalytical Techniques
August 18-20, 2014 DoubleTree by Hilton Beijing, China

The fate and transformation of pharmaceuticals in wetland mesocosms planted with *Scirpus validus*

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A systematic approach to assess the fate of selected pharmaceuticals (carbamazepine, naproxen, diclofenac, clofibric acid and caffeine) in wetland mesocosms was described. The overall objective of this study was to determine the kinetics of removal and depletion of selected pharmaceuticals in mesocosms planted with *S. validus* growing hydroponically. The five pharmaceuticals tested including carbamazepine, naproxen, diclofenac, clofibric acid and caffeine were selected on the basis of their high occurrence in surface waters and their wide range of physicochemical properties (e.g., log K_{ow}). The fate, removal mechanisms (i.e., photodegradation, biodegradation and plant uptake) and potential for translocation of these pharmaceuticals from the roots to the shoots was assessed using high performance liquid chromatography (HPLC). Additionally, suitable dark controls were analyzed to determine the quantitative role that photodegradation plays on pharmaceutical elimination. After 21 days of incubation, nearly all of the caffeine, naproxen and diclofenac were eliminated from solution, whereas carbamazepine and clofibric acid were recalcitrant to both photodegradation and biodegradation. Naproxen was sensitive to both photodegradation (30-42%) and biodegradation (>50%), while diclofenac was particularly sensitive (>70%) to photodegradation alone.

Biography

Dongqing Zhang obtained her Master Degree at Magdeburg University (Germany) in 2005. Thereafter she completed PhD at the Dortmund University of Technology, Germany. She joined Nanyang Technological University in 2008 and is currently serving as Senior Research Fellow at Nanyang Environment and Water Research Institute, School of Civil Environmental Engineering. She has published more than 20 papers in reputed peer-reviewed journals, and Project Manager in numerous projects collaborated with local environmental agencies (Public Utility Board and National Park, Singapore).

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