



Czech University of Life Sciences Prague

Faculty of Environmental Sciences

THE USE OF CONSTRUCTED AND NATURAL WETLANDS FOR TREATMENT OF WASTEWATER AND DRAINAGE WATERS

Team introduction:

Constructed wetlands represent a viable alternative to conventional treatment systems for wastewater treatment. The efficiency of this low O&M systems is known for organics, suspended solids, nitrogen and phosphorus and therefore, the research is aimed at emerging pollutants such as PPCP, i.e., pharmaceuticals and personal care products. Besides constructed wetlands, also natural wetlands are used to remove nutrients and pesticides from tile drainage waters.

Team members:

The team consists of [Prof. Jan Vymazal](#), who has been involved in constructed wetland research for more than 20 years, Tereza Březinová, Ph.D., Chen Yi, Ph.D. and Chen Zhongbing, Ph.D.

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5 most significant recent publications by team members:

Vymazal, J., 2011. Constructed wetlands for wastewater treatment: Five decades of Experience. *Environmental Science and Technology* 45: 61-69.

Vymazal, J., 2013. The use of hybrid constructed wetlands for wastewater treatment with special attention to nitrogen removal: A review of a recent development. *Water Research* 47: 4795-4811.

Vymazal, J. a Březinová, T., 2015. The use of constructed wetlands for removal of pesticides from agricultural runoff and drainage: A review. *Environment International* 75: 11-20.

Vymazal, J., Březinová, T., Koželuh, M., 2015. Occurrence and removal of estrogens, progesterone and testosterone in three constructed wetlands treating municipal sewage in the Czech Republic. *Science of the Total Environment* 536: 625-631.

Chen, Y., Wen, Y., Zhou, J., Zhou, Q., Vymazal, J., Kusch, P., 2015. Transformation of chloroform in model treatment wetlands: from mass balance to microbial analysis. *Environmental Science and Technology* 49: 6198-6205.

Applied outcomes of the research and further potential applications of the research:

Elimination of pharmaceuticals in constructed wetlands is very promising process which offers cheap alternative to conventional treatment systems.

Suitably modified natural wetlands, namely in floodplains of small streams, may retain large amounts of nutrients and pesticides and protect larger streams and reservoirs.

In the Czech Republic, there are more than 2,500 small settlements (less than 500 PE) with no wastewater treatment. Constructed wetlands offer a suitable solution for these settlements.



Keywords: wastewater, nitrogen, phosphorus, pesticides, pharmaceuticals, drainage waters, natural wetlands, constructed wetlands, wastewater treatment