**Occurrence and fate of organic trace pollutants in vegetated ditches managing agricultural drain water discharged into lagoons with aquaculture – a field study in Mexico**

Monika Möder1, Otoniel Carranza-Diaz1 , Gabriela López-Angulo2, Yesmi P. Ahumada-Santos2, Rito Vega-Aviña3, Francisco Armando Chávez-Duran4, Seifeddine Jomaa5, Thorsten Reemtsma1, Francisco Delgado-Vargas2

1Department of Analytical Chemistry, UFZ-Helmholtz Centre for Environmental Research, Leipzig, Germany, monika.moeder@ufz.de

2Facultad de Ciencias Químico Biológicas, Universidad Autónoma de Sinaloa, Ciudad Universitaria s/n, CP 80010 Culiacán, Sinaloa, México, fdelgado@uas.edu.mx

3Facultad de Agronomía de la Universidad Autónoma de Sinaloa, Culiacán, Sinaloa, México

4Comisión Nacional del Agua (CONAGUA), Organismo de Cuenca Pacífico Norte (OCPN), Dirección de Infraestructura Hidroagrícola, Ingeniería de Riego y Drenaje Distrito de Riego 010 Culiacán-Humaya, México

5Department of Aquatic Ecosystem Analysis and Management, UFZ-Helmholtz Centre for Environmental Research, Leipzig, Germany, seifeddine.jomaa@ufz.de

In Mexico, drainage water from fields is often reused in agriculture and aquaculture. Thus, polluted water can contaminate food products representing a risk to human health. The naturally vegetated drainage system studied was in a region of Sinaloa (“La Michoacana”, Northwest of Mexico). The drainages receive discharged water mainly from intensive agriculture and urban inputs from adjacent villages, and finally drains convey the flows to the coast but part of the water is used in artificial lagoons for aquaculture of seafood, mainly shrimp.

Over one year, the concentrations of 40 organic pollutants in the drain water were determined monthly on 5 sampling locations along the drain ditch. The selected pollutants belong to quite different types of substances with a broad range of properties (-1.5 <pKow<6) and biological effects. The target substances are linked with different polluting activities such as from urban and agricultural influences. Thus, their measured concentrations in the water indicate hotspots of relevant inputs and provide information for the design and implementation of better waste management strategies.

The partition of the organic pollutants within the drainage systems was investigated every 4 months in sediment and plants from 5 sampling locations. Data on the importance of soil and plants for accumulation and/or removal of organic pollutants will be presented.

The water quality found in the vegetated ditches varies dependent on the season and the agricultural activities. 25 of the targeted substances were determined at ng-µg/L level over the entire period in water, the more lipophilic pollutants were also detected in sediment and plant materials at low ng/g level.

The special climate in this region (10 °C<T<43 °C, high UV-irradiation) supports the transformation and biodegradation of the pollutants along the drainage systems. The toxicologically relevant insecticide endosulfan was not detected but its transformation products endosulfan-lactone and –sulfate suggested its use. Endosulfan is banned in many countries.

In addition, the influence on the shrimp production receiving partially water from the drain ditches were investigated analysing several shrimp samples as well as sediment and water of the ponds used for aquaculture. The target pollutants were hardly found in the shrimps emphasizing that the use of drain water causes low risk to the shrimp production.

The problems related to the input of coliform germs into the drain water has been presented and discussed previously (Ahumada-Santos et al., 2014).

*Reference*

Ahumada-Santos et al. (2014) Ciencias Marinas 40(4), 277-289