**Polar pollutants and carbamazepine metabolites monitored in common vegetables irrigated with treated wastewater under field conditions**

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Water scarcity is one of the main challenges in arid and semiarid regions, such as the Middle East. Therefore, the reuse of treated municipal wastewater (TWW) for crop irrigation is a necessity. Under these circumstances polar pollutants such as pharmaceuticals, pesticides or industrial chemicals, which are only incompletely removed from municipal wastewater in conventional wastewater treatment, are introduced into the agro-ecosystem. Several study in recent years has shown that pharmaceuticals may be transferred from irrigation water into edible plants and may finally enter the food chain (Goldstein et al. 2014, macherius et al. 2012, shenker et al. 2011). However, until now little work has been done to investigate the occurrence of a larger number of polar pollutants in plants grown under field conditions and to study metabolism of polar contaminants after uptake into plants.

Carbamazepine is an antiepileptic drug which is commonly detected in TWW, surface water and even groundwater (ternes et al. 2007). The uptake of CBZ in plants and moreover the occurrence of two metabolites (10,11-dihydro-10,11-dihydroxy carbamazepine and carbamazepine 10,11-epoxide) in irrigated plants has already been reported (Goldstein et al. 2014, malchi et al. 2014).

We analyzed cucumber plants grown in hydroponic cultures and searched for metabolites of carbamazepine (CBZ) using liquid chromatography-high resolution mass spectrometry (UPLC-Xevo Q-TOF mass spectrometer). At least seven metabolites could be detected from the one contaminant CBZ in the different plant organs and structure proposals were elaborated based on the mass spectrometric data and reference compounds. This example illustrates that, due to plant metabolism, the number of contaminants found in plants can be significantly higher than the number of contaminants in the irrigation water.

Knowledge of the contaminant metabolites in plants from the hydroponic culture was then transferred to targeted analytical methods (LC-MS/MS) that offer higher sensitivity. With such a method we searched for these metabolites also in field grown vegetable, together with 23 polar pollutants (Pharmaceuticals, pesticides, industrial chemicals). A total of ten different vegetables (among them cabbage, tomato, carrot, parsley), which were irrigated with surface water with a high portion of treated municipal wastewater, have been analyzed.

Both the occurrence and concentration of CBZ metabolites and polar pollutants differed considerably between the vegetables and their respective plant organs. These data help us to elucidate which vegetable is most susceptible for contaminant transfer into its edible parts and which contaminants are transferred most effectively.

Generally disregarding metabolites of contaminants formed within the plants after uptake of the parent compound may result in an underestimation of the extent of contamination.

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