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Biotransformation of trace organic chemicals in the presence of highly refractory dissolved organic carbon

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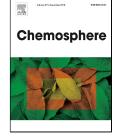
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ACCEPTED MANUSCRIPT

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10 Abstract

11 Previous studies demonstrated that the transformation of trace organic chemicals (TOrCs) in 12 managed aquifer recharge (MAR) systems is favored under carbon-limited and oxic redox conditions especially, if the dissolved organic carbon (DOC) serving as primary substrate has 13 14 a refractory character. Since co-metabolism is suggested to be the dominant removal mechanism, it is hypothesized that TOrCs transformation is controlled by the concentration of 15 16 the refractory carbon under oxic redox conditions. A laboratory-scale soil column experiment 17 mimicking MAR was established to investigate the influence of two different concentrations 18 of highly refractory carbon sources on TOrCs transformation, namely drinking water (DW) 19 and drinking water augmented with humic acid (DW+HA). Oxic redox conditions and carbonlimitation were present in both systems ($\Delta DOC_{DW+HA} \approx 0.6 - 0.7 \text{ mg/L}; \Delta DOC_{DW} \approx 0.1 \text{ mg/L}$). 20 21 Of the 12 TOrCs investigated seven exhibited moderate to efficient transformation in both 22 systems with only one compound (diclofenac) showing significantly enhanced (co-metabolic) 23 biotransformation by adding humic acids as primary growth substrate. It is postulated that 24 transformation of some TOrCs is characterized by metabolic degradation under starving Download English Version:

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