



In-situ Mass Distribution Quotient (iMDQ) – A New Factor to Compare Bioavailability of Pesticides in Soils?

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Aim of this work was the development of a new non-biological factor to determine microbial in-situ bioavailability of chemicals in soils. Pesticide residues were extracted from ten highly different agricultural soils that had been incubated with the ¹⁴C-herbicide isoproturon (IPU) under comparable soil conditions (water tension – 15 kPa; soil density 1.3 g cm⁻³). Two different pesticide extraction approaches were compared: (i) ¹⁴C-Pesticide residues were measured in the pore water (PW) which was extracted from soil by centrifugation; (ii) ¹⁴C-Pesticide residues were extracted from soil samples with an excess of water (EEW). We introduce the pesticide's in-situ mass distribution quotient (iMDQ) as a measure for pesticide bioavailability, which is calculated as a quotient of adsorbed and dissolved chemical amounts for both approaches (iMDQPW, iMDQEEW). Pesticide mineralization in soils served as a reference for real microbial availability. A highly significant correlation between iMDQPW and mineralization showed that pore water extraction is adequate to assess IPU bioavailability. In contrast, no correlation exists between IPU mineralization and its extractability from soil with an excess of water. Therefore, it can be concluded that soil equilibration at comparable conditions and subsequent pore water extraction is vital for a isoproturon bioavailability ranking of soils.