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Bioaccessibilty of naturally aged 14C-atrazine residues in different soil size fractions

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In this study the bioaccessibility of naturally aged atrazine-residues in an agricultural soil was examined. Radiolabeled atrazine was applied to the soil in accordance to agricultural practice. Samples for this trial were taken 23 years after the application. For biodegradation studies of ^{14}C-atrazine residues *Pseudomonas* sp. strain ADP was used. Extensive investigations have proven that *Pseudomonas* sp. strain ADP is able to use atrazine as nitrogen and carbon source. The setup for bioaccessibility was performed under water saturated conditions with the native lysimeter soil and its soil size fractions maintained as follows: sand-sized fraction (particles sizes: 2000 - 20μm), silt-sized fraction (20 - 2μm) clay-sized fraction ($<$2μm). With decreasing soil particle sizes an increase of residual ^{14}C-radioactivity was detected. For each essay setup 10 ml of cell suspension (1 x 10^8 cells per ml) were added to 10 g soil sample containing naturally aged ^{14}C-atrazine residues. For each degradation essay, BC-media containing a) no additional carbon source, b) Na-citrate and c) glucose were tested. The incubation times ranged from 1 to 31 days. The results show that mineralization in the native lysimeter soil occurred of up to 4.5 % of the total ^{14}C-radioactivity in the biodegradation setup after 16 days, inoculated with *Pseudomonas* sp. strain ADP and BC-media. The control samples showed a mineralization maximum of almost 1 % after 31 days of incubation. An increase of mineralization was observed in the clay-sized fraction of up to 6.8 % of the total setup ^{14}C-radioactivity. While using BC-media for incubation only minor mineralization differences of the aged ^{14}C-atrazine residues in the soil and soil size fractions was observed. Using additional Na-citrate for incubation of the native soil, the mineralization rate augmented whereas additional glucose showed no significant differences to those without any additional carbon source. These results show that long term aged ^{14}C-atrazine residues are still partly accessible for

the atrazine degrading microorganism *Pseudomonas* sp. strain ADP under modified conditions.