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# Accelerated degradation of 14C-atrazine in an atrazine adapted field soil from Belgium

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Atrazine [2-chloro-4-(ethylamino)-6-(isopropylamino)-s-triazine] is one of the most widely used herbicides in the world. Atrazine is considered to be mobile in soil and has often been characterized as a rather recalcitrant compound in the environment.

In the present study the accelerated atrazine degradation in an agriculturally used soil was examined. Soil samples were collected from a Belgian field which was used for corn-plantations and was regularly treated with atrazine during the last 30 years. The experiment was conducted under controlled laboratory conditions (GLP) using $^{14}$C-labelled and unlabelled atrazine in accordance to the reported field application dose of 1 mg kg$^{-1}$.

Triplicates of treated subsamples were incubated at 50% WHC$_{max}$ and under slurry conditions (1:4 soil:solution ratio, using distilled water) in the dark at 20˚C.

Control samples were collected at an adjacent pear orchard where no atrazine or other triazine pesticides application was reported.

After 92 days of incubation, the mineralized amount of atrazine reached 83% of the initially applied $^{14}$C-activity in the atrazine treated soil for the slurry setup. A maximum of atrazine mineralization was observed in the treated field soil between 6 and 7 days of incubation for both, 50% WHC$_{max}$ and slurry setups. The total $^{14}$C-atrazine mineralization was equally high for 50% WHC$_{max}$ in the atrazine treated soil. After an extended lag-phase in comparison to the treated soil the overall mineralization of $^{14}$C-atrazine of 81% was observed in the atrazine untreated soil under slurry conditions. This observation might be due to a possible cross adaption of the microflora. These results could be attributed to an atrazine drift during application since the control samples were taken in an adjacent pear orchard with no atrazine application history. These results demonstrate an adaption of the microflora to mineralize atrazine rapidly. The formation of desorbable metabolites as well as the formation of unextractable, bound atrazine residues during the incubation process was monitored by accelerated solvent extraction, LC-MSMS and LSC analysis, subsequent to sample oxidation.

Analysis of the *atzABC* and *trzN* genes that code for enzymes able to rapidly catabolize atrazine are under investigation. This outcome will give evidence of the global presence of an atrazine adapted soil microflora in atrazine treated field soils.