EGU22-7526
https://doi.org/10.5194/egusphere-egu22-7526
EGU General Assembly 2022

Decomposition of a bio-based plastic in soil: CO 2 source partitioning approach

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Expanding the use of environmentally friendly materials to protect the environment is one of the key factors in maintaining a sustainable ecological balance. Polybutylene succinate (PBS) and polybutylene succinate-co-adipate (PBSA) are considered the most promising biobased and biodegradable plastics for the future with a high number of applications. We used stable isotope techniques to partition plastic- and soil-originated C in the CO2 released in the course of PBSA plastic decomposition in the soil as dependent on nitrogen availability. Our 90 days laboratory experiment was conducted using a Haplic Chernozem soil from the conventional farming plot of the Global Change Experimental Facility (GCEF), Bad Lauchstädt, Central Germany. The experiment was designed as 4 treatments: two controls (non-amended soil and soil amended with $(NH_4)_2SO_4$) and two plastic amendments (with (PSN) and without (PS) N). Nitrogen facilitated plastic decomposition by 6 weeks, increased the amount of decomposed plastic by 10% and reduced the priming effect by 26% during the experiment.