Phosphorus Mineralization and Transport in the Vicinity of an Anion Sink
Experiment and Modeling

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An incubation study with the soil and digestates SEW and SL without anion exchange resin was carried out using the same conditions described in the Materials and Methods section. The emitted CO$_2$ was collected by a KOH solution inside the incubation beaker. The amount of CO$_2$-C determined from the KOH and a one-pool model following a pseudo-first order reaction are presented in Figure S1. The model equation is:

$$C_{em}(t) = C_{org}^0 \left(1 - e^{-kt}\right)$$

Eq. [S1]

$C_{em}$ is the concentration of emitted CO$_2$-C [mg kg$^{-1}$], $C_{org}^0$ is the initial concentration of organic carbon [mg kg$^{-1}$], $t$ is the incubation time [d] and $k$ [d$^{-1}$] the decay parameter. All concentrations are related to bulk soil dry mass. The means of the decay parameter $k$ were used as $k_{\infty}$ for the combined P diffusion and production model (Eq. [3]). Parameters $C_{org}^0$ and $k$ estimated by the one-pool model are shown in Table S1.

![Fig. S1: Cumulative CO$_2$-C emitted by soil-digestate-mixtures during incubation ($C_{em}$): Measured data (three replicates a, b and c) and fitted one-pool model.](image-url)
Table S1. Parameters estimated by the one-pool model for the three replicates a, b and c of the soil-digestate-mixtures

<table>
<thead>
<tr>
<th></th>
<th>$C^0_{org}$</th>
<th></th>
<th></th>
<th>$k$</th>
<th></th>
<th></th>
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<tbody>
<tr>
<td></td>
<td>a</td>
<td>b</td>
<td>c</td>
<td>a</td>
<td>b</td>
<td>c</td>
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<tr>
<td>SEW</td>
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<td>157.4</td>
<td>148.2</td>
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<td>SL</td>
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<td>266.6</td>
<td>367.0</td>
<td>0.0692</td>
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