Supplement 1 (S1)

Soil Moisture and Temperature Effects on Nitrogen Mineralization in a High Tunnel Farming System

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**Fig S1.** Net mineralized N during the incubation under all different conditions of soil moisture and temperature with amended with alfalfa (left) or unamended soil (right). Data shown are the means of three replicates.

Table S1. Values of k obtained from the fit of first order kinetic model (Eq 2)

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Treatment | Soil moisture (%) | 2℃ | | | 10℃ | | | 20℃ | | | 30℃ | | |
| k | RMSE | MF | k | RMSE | MF | k | RMSE | MF | k | RMSE | MF |
| residue-amended soil | 15 | 0.0014 | 1.0 | 0.97 | 0.0023 | 8.3 | 0.53 | 0.0043 | 5.9 | 0.90 | 0.0091 | 5.9 | 0.67 |
| 20 | 0.0017 | 2.5 | 0.93 | 0.0030 | 10.0 | 0.56 | 0.0050 | 6.1 | 0.92 | 0.0112 | 6.1 | 0.44 |
| 25 | 0.0028 | 5.5 | 0.80 | 0.0039 | 12.3 | 0.57 | 0.0064 | 7.6 | 0.86 | 0.0105 | 7.6 | 0.44 |
| 30 | 0.0026 | 3.8 | 0.96 | 0.0035 | 9.8 | 0.65 | 0.0065 | 4.0 | 0.85 | 0.0117 | 4.0 | 0.32 |
| 35 | 0.0031 | 3.0 | 0.95 | 0.0037 | 9.0 | 0.73 | 0.0070 | 12.3 | 0.82 | 0.0118 | 12.3 | 0.39 |
| un-amended soil | 15 | 0.0012 | 2.6 | 0.93 | 0.0015 | 0.9 | 0.88 | 0.0026 | 2.8 | 0.83 | 0.0044 | 6.3 | 0.54 |
| 20 | 0.0017 | 3.5 | 0.49 | 0.0020 | 5.2 | 0.42 | 0.0032 | 2.1 | 0.82 | 0.0068 | 5.8 | 0.47 |
| 25 | 0.0021 | 4.0 | 0.66 | 0.0022 | 1.0 | 0.83 | 0.0046 | 7.3 | 0.50 | 0.0089 | 5.1 | 0.51 |
| 30 | 0.0030 | 3.5 | 0.74 | 0.0032 | 1.1 | 0.32 | 0.0058 | 11.1 | 0.52 | 0.0108 | 10.7 | 0.32 |
| 35 | 0.0029 | 4.3 | 0.69 | 0.0031 | 1.1 | 0.73 | 0.0059 | 9.1 | 0.38 | 0.0105 | 10.2 | 0.32 |

k: estimated mineralization rate from eq 2; RMSE: root mean squared error; MF: modeling efficiency.

Table S2. Q10 values obtained from fitting of Q10 Arrhenius model (Eqs 3 and 4)

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Soil moisture (%) | Residue-amended soil | | | Un-amended soil | | |
| Q10 | RMSE | MF | Q10 | RMSE | MF |
| 15 | 2.03 | 0.0001 | 0.99 | 1.66 | 0.0002 | 0.99 |
| 20 | 2.04 | 0.0004 | 0.99 | 1.83 | 0.0005 | 0.99 |
| 25 | 1.62 | 0.0001 | 0.99 | 1.85 | 0.0005 | 0.99 |
| 30 | 1.78 | 0.0002 | 0.99 | 1.73 | 0.0006 | 0.99 |
| 35 | 1.69 | 0.0004 | 0.99 | 1.70 | 0.0005 | 0.99 |

RMSE: root mean squared error; MF: modeling efficiency.