**Supplemental Table 1**. The significance of CO2 emissions between treatments on each measuring day

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | Days after sowing | | | | | | | | | | | | | | | | | | | |
|  | 2018 | | | | | | | | | | | 2019 | | | | | | | | |
|  | 2 | 14 | 28 | 42 | | 56 | | 70 | 84 | 98 | 112 | 2 | 14 | 28 | 42 | 56 | 70 | 84 | 98 | 112 | |
| Control | ns | **b** | **b** | ns | ns | | ns | | ns | ns | ns | ns | **ab** | **ab** | ns | **ab** | ns | **ab** | ns | ns |
| Mineral N f. | ns | **ab** | **a** | ns | ns | | | ns | ns | ns | ns | ns | **ab** | **c** | ns | **a** | ns | **ab** | ns | ns |
| Pig m. d. | ns | **a** | **b** | ns | ns | | | ns | ns | ns | ns | ns | **a** | **ab** | ns | **ab** | ns | **a** | ns | ns |
| Chicken m. d. | ns | **ab** | **a** | ns | ns | | | ns | ns | ns | ns | ns | **b** | **a** | ns | **ab** | ns | **b** | ns | ns |
| Cow m. d | ns | **ab** | **a** | ns | ns | | | ns | ns | ns | ns | ns | **ab** | **bc** | ns | **b** | ns | **ab** | ns | ns |

ns – not significant. Letters indicate statistically significant differences (p<0.05) between the treatments within daily fluxes. m. d. – manure digestate

**Supplemental Table 2**. The significance of CH4 emissions between treatments on each measuring day

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | Days after sowing | | | | | | | | | | | | | | | | | |
|  | 2018 | | | | | | | | | 2019 | | | | | | | | |
|  | 2 | 14 | 28 | 42 | 56 | 70 | 84 | 98 | 112 | 2 | 14 | 28 | 42 | 56 | 70 | 84 | 98 | 112 |
| Control | ns | ns | ns | **b** | **a** | ns | ns | ns | ns | ns | ns | ns | ns | ns | ns | **ab** | ns | ns |
| Mineral N f. | ns | ns | ns | **b** | **a** | ns | ns | ns | ns | ns | ns | ns | ns | ns | ns | **a** | ns | ns |
| Pig m. d. | ns | ns | ns | **a** | **a** | ns | ns | ns | ns | ns | ns | ns | ns | ns | ns | **b** | ns | ns |
| Chicken m. d. | ns | ns | ns | **a** | **a** | ns | ns | ns | ns | ns | ns | ns | ns | ns | ns | **ab** | ns | ns |
| Cow m. d | ns | ns | ns | **b** | **b** | ns | ns | ns | ns | ns | ns | ns | ns | ns | ns | **ab** | ns | ns |

ns – not significant. Letters indicate statistically significant differences (p<0.05) between the treatments within daily fluxes. m. d. – manure digestate

**Supplemental Table 3**. The significance of N2O emissions between treatments on each measuring day

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | Days after sowing | | | | | | | | | | | | | | | | | |
|  | 2018 | | | | | | | | | 2019 | | | | | | | | |
|  | 2 | 14 | 28 | 42 | 56 | 70 | 84 | 98 | 112 | 2 | 14 | 28 | 42 | 56 | 70 | 84 | 98 | 112 |
| Control | ns | ns | **a** | ns | ns | ns | ns | ns | ns | ns | ns | ns | ns | ns | **b** | b | **c** | ns |
| Mineral N f. | ns | ns | **b** | ns | ns | ns | ns | ns | ns | ns | ns | ns | ns | ns | **a** | a | **a** | ns |
| Pig m. d. | ns | ns | **b** | ns | ns | ns | ns | ns | ns | ns | ns | ns | ns | ns | **ab** | b | **c** | ns |
| Chicken m. d. | ns | ns | **b** | ns | ns | ns | ns | ns | ns | ns | ns | ns | ns | ns | **ab** | b | **bc** | ns |
| Cow m. d | ns | ns | **b** | ns | ns | ns | ns | ns | ns | ns | ns | ns | ns | ns | **ab** | b | **ab** | ns |

ns – not significant. Letters indicate statistically significant differences (p<0.05) between the treatments within daily fluxes. m. d. – manure digestate

**Supplemental Table 4**. The cumulative fluxes and the total global warming potential of using mineral nitrogen fertilisers and digestate for spring wheat fertilisation.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Treatment | Total cumulative gases Total of GWP | | | | | |
| µg CO2 ha-1 | | mg N2O ha-1 | | µg CH4 ha-1 kg CO2eq. ha -1 y -1 | |
| 2018 | 2019 | 2018 | 2019 | 2018 | 2019 2018 2019 |
| Control | 8.68 | 7.21 | 7.30 | 7.11 | 0.01250 | 0.0123 1143 1114 |
| Mineral nitrogen fertilizers | 9.08 | 7.21 | 7.39 | 7.18 | 0.01251 | 0.0124 1159 1125 |
| Pig manure digestate | 9.33 | 7.35 | 7.40 | 7.14 | 0.01252 | 0.0122 1159 1113 |
| Chicken manure digestate | 9.13 | 7.23 | 7.34 | 7.15 | 0.01255 | 0.0122 1150 1121 |
| Cow manure digestate | 9.13 | 7.33 | 7.47 | 7.14 | 0.01252 | 0.0123 1170 1119 |