# Greenhouse gas emissions from dairy manure management

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# Abstract

# Introduction

# Methods

## Study design

## Study sites

## Manure and soil sampling

## Greenhouse gas flux measurements

# Results

## Manure and soil composition

Substrate composition were different between the manure management practices.

Table 1 = C and N, VS, pH

Table 2 = inorg N and mineralization rates

## Climate and substrate environmental conditions

## Greenhouse gas fluxes

## Comparison with other data

# Discussion

# Conclusion

# Table 1. Fresh manure, corral soil, manure pile, and field soil characteristics (mean ± standard error of all measurements).

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | **C %** | **N %** | **C/N** | **VS**  **(% DM)\*** | **pH** |
| Fresh manure | 37.85 ± 0.95 | 2.17 ± 0.10 | 17.61 ± 0.82 | 80.57 ± 1.68 | 6.70 ± 0.16 |
| Corral | 18.58 ± 1.98 | 1.51 ± 0.12 | 11.96 ± 0.36 | 36.62 ± 3.55 | 7.92 ± 0.16 |
| Pile (0-10 cm) | 12.52 ± 0.45 | 1.22 ± 0.04 | 10.15 ± 0.16 | 26.27 ± 1.86 | 7.53 ± 0.08 |
| Pile (10-30 cm) | 11.93 ± 0.77 | 1.19 ± 0.07 | 9.91 ± 0.17 | 23.01 ± 1.30 | 7.77± 0.10 |
| Pile (30-50 cm) | 13.44 ± 0.70 | 1.26 ± 0.06 | 10.58 ± 0.15 | 23.04 ± 1.43 | 8.12 ± 0.14 |
| Pile (50-100 cm) | 12.10 ± 0.69 | 1.11 ± 0.05 | 10.77 ± 0.23 | 28.41 ± 1.95 | 8.32 ± 0.14 |
| Field soil (0-5 cm) | 6.29 ± 0.19 | 0.57 ± 0.02 | 10.96 ± 0.10 | NM | 6.08 ± 0.07 |
| Field soil (5-10 cm) | 4.88 ± 0.12 | 0.45 ± 0.01 | 10.86 ± 0.07 | NM | 5.76 ± 0.08 |
| Field soil (10-20 cm) | 2.76 ± 0.05 | 0.25 ± 0.01 | 11.06 ± 0.04 | NM | 5.89 ± 0.12 |
| Field soil (20-30 cm) | 2.15 ± 0.05 | 0.19 ± 0.01 | 11.28 ± 0.06 | NM | 5.97 ± 0.07 |
| Field soil (30-50 cm) | 1.60 ± 0.09 | 0.14 ± 0.01 | 11.27 ± 0.13 | NM | 5.95 ± 0.09 |

\* VS = volatile solid, DM = dry matter, NM = not measured

# Table 2. Inorganic N, potential net nitrification, and potential net mineralization in fresh manure, corral soil, and field soil.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | **NH4+**  **(ug N g soil-1)** | **NO3-**  **(ug N g soil-1)** | **Potential net nitrification**  **(ug N g soil-1 day-1)** | **Potential net mineralization**  **(ug N g soil-1 day-1)** |
| Fresh manure | 506 ± 107 | 38.2 ± 13.6 | -4.15 ± 2.22 | -54.2 ± 15.5 |
| Corral | 112 ± 32.1 | 93.0 ± 32.6 | -4.98 ± 4.71 | -12.2 ± 7.54 |
| Field soil (0-5 cm) | 5.20 ± 1.00 | 30.0 ± 6.33 | 3.83 ± 3.29 | 3.85 ± 3.30 |
| Field soil (5-10 cm) | 3.46 ± 0.99 | 41.1 ± 5.5 | 0.38 ± 0.25 | 0.47 ± 0.22 |
| Field soil (10-20 cm) | 1.35 ± 0.34 | 22.2 ± 1.9 | 0.55 ± 0.25 | 0.66 ± 0.19 |