PO12

DIRECT MEASUREMENTS OF CH4 AND N2O EMISSIONS FROM A FEEDLOT

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Beef cattle feedlots are contributors to agricultural greenhouse gas (GHG) emissions, with enteric methane (CH4) emitted directly from the cattle and CH4 and nitrous oxide (N2O) emitted during manure decomposition. A short-term campaign at a 17,000 head cattle feedlot in Victoria, Australia, was undertaken to quantify CH4 and N2O emissions from cattle pens, manure stockpiles and run-off ponds in March and May 2015. The emissions were estimated using open-path Fourier Transform Infrared (OP-FTIR) spectroscopy in conjunction with an inverse-dispersion technique. Daily average emissions of CH4 and N2O were 137 and 0.1 g animal-1 d-1 from the pens, and 22 and 2 g animal-1 d-1 from the manure stockpiles. Emission of CH4 from the runoff pond was minor. There was little change in CH4 emissions between the March to May period, although N2O emissions increased in May as the wet season began. Extrapolating our results to the feedlot population of cattle across Australia would mean that feedlots contribute approximately 0.3% of the national GHG emissions.

PO13

METHANE AND CARBON DIOXIDE EMISSIONS VARIABILITY AND REPEATABILITY FROM CROSS BREED CATTLE FED MAIZE SILAGE DIETS IN BRAZIL

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Understanding patterns of methane (CH4) and carbon dioxide (CO2) emissions from cattle in production environments is essential to determine the possibilities to mitigate emissions. The objective of this study was to determine the repeatability and variability of enteric CH4 emissions from cross breed cattle in a feedlot setting in Brazil. To measure CH4 emissions, the GreenFeed system (C-Lock Inc, Rapid City, SD) was used. The animals were given a Total Mixed Ratio diet at a rate of 11.8±1.3 kg/d and rabbit type pellets were dispensed from GF. 28 cattle were introduced to the system, 7 visited GreenFeed 3.1±1.03 times per day over a 15 day period and received pellets at a rate of 0.28±0.12 kg/d per animal. The GF spot measures were aggregated and averaged over 3-block day periods, with a minimum of 5 visits for one animal needed in each 3-day period to be output. The 3-day averaged values were analyzed for variance and repeatability. In addition, the herd data were averaged by time of day to determine the averaged diurnal variability in CH4 emissions. The herd-averaged CH4 and CO2 emissions were found to be 252±39 g/d (between animal), CO2 emissions were 8.586±0.599 g/d. The herd daily averaged CH4 and CO2 emissions varied by SD= +/- 20 g/d and 357 g/d respectively. The herd-averaged diurnal CH4 pattern varied from 7.9 g/hr at 0730 to 11.4 g/hr at 1340 and 320 to 378 g/hr for CO2. Overall, the repeatability in CH4 and CO2 emissions was found to be 0.59 and 0.48. The CH4/CO2 ratio was 0.029 g/g, and a significant correlation between CH4 and CO2 emissions for individual animals existed ($R2 = 0.92$, $p = 0.003$). Overall, the diurnal pattern CH4 emission was found to be somewhat invariable, but the repeatability of CH4 emissions was found to be marginally high.

PO14

MEASURING AND MANAGING METHANE EMISSIONS FROM LIVESTOCK: FROM LABORATORY TO LANDSCAPE

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The Australian beef sector is unusual among developed agricultural economies insofar that it is heavily dependent upon extensive and rangeland grazing systems. The majority of these extensive and rangeland systems are heterogeneous in their vegetation cover, dominated by C4 grasses of low nutritive value, prone to environmental degradation but are biodiversity rich. Grazing of these ecosystems makes a significant contribution to global protein supply reflecting Australia position as the world's third largest exporter of beef producing an off-farm meat value of $12.75 billion in 2013 (Meat & Livestock Australia, 2014). It is the very nature and characteristics of these systems that lead to the conclusion that they yield comparatively high total methane emissions per livestock