

# ASA, CSSA, and SSSA 2010 International Annual Meetings

Oct. 31-Nov. 3 | Long Beach, CA



## Green Revolution 2.0: Food+Energy and Environmental Security

[Start](#)   [Browse by Day](#)   [Browse by Division](#)   [Author Index](#)   [Help](#)   [Search](#)

252-20 Novel Methods to Assess the Influence of Diet and Incubation Time On the Emissions of Odors From Beef and Swine Manures.

See more from this Division: [S11 Soils & Environmental Quality](#)

See more from this Session: [General Soils and Environmental Quality: III](#)

*Tuesday, November 2, 2010*

*Long Beach Convention Center, Exhibit Hall BC, Lower Level*

*William Rice, USDA-ARS, Bushland, TX and Daniel Miller, East Campus, USDA-ARS, Lincoln, NE*

The influence of diet type and time of incubation (fresh vs. overnight) on the emissions of odors from the feces of beef cattle and swine was evaluated by gas chromatography-mass spectral (GC-MS) analysis. Swine (n=12) and beef cattle (n=24) were fed with two and four separate diets, respectively (n=6). Chemical composition derived from GC-MS analysis consisted of up to 35 distinct organic molecules that belong to the following: esters, sulfurs, ketones, aromatics, alcohols, branch-chain volatile fatty acids (VFA) and straight-chain VFA groups. GC-MS data were statistically analyzed using: hierarchical cluster analysis, principle components analysis, and group separation analysis with user defined groups of animal, diet, and manure age. For swine, age of manure was the most dominant factor influencing organic composition followed closely by dietary treatment. This result is supported by cluster analysis, high overall rate of correct classification (ORCC) of 100%, ( $X^2=12$ ,  $p=0.001$ ) and well resolved ordination plots. Whereas for diet an ORCC was 75% ( $X^2=4.0$ ,  $p=0.046$ ). For beef cattle manures, a similar but more complex result was observed. Again age of manure appeared to have the strongest influence on the composition of volatile odors associated with manures although this effect was not as strong as that observed with swine manures (70.8%,  $X^2=4.44$ ,  $p=0.035$ ). Influence of diet was not as strong as in swine manures with an ORCC of 66.7% ( $X^2=28.04$ ,  $p<0.001$ ). Swine odor analysis with user group comprised of diet by age, revealed a 100% ORCC ( $X^2=36.0$ ,  $p<0.001$ ) whereas for beef cattle a lower ORCC of 66.7% ( $X^2=98.9$ ,  $p<0.001$ ) was observed. As manures age, they tended to lose their unique chemical signature.

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[<< Previous Abstract](#) | [Next Abstract >>](#)

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[Start](#)   [Browse by Day](#)   [Browse by Division of Interest](#)   [Author Index](#)   [Help](#)   [Search](#)

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