

## CHARACTERIZATION OF BIOGENIC NON-METHANE VOLATILE ORGANIC COMPOUNDS FROM CONFINED ANIMAL FEEDING OPERATIONS

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Samples were collected and analyzed in a field study to characterize C2-C12 volatile organic compounds (VOCs) emitted at six swine facilities (i.e. Confined Animal Feeding Operations) in Eastern North Carolina between April 2002 and March 2003. Two sites employed conventional lagoon and field spray technologies, while four sites utilized various alternative waste treatment technologies in an effort to substantially reduce gaseous compound emissions, odor, and pathogens from these swine facilities. More than 100 compounds, including various alcohols, aldehydes, ketones, phenols, and sulfides, were positively identified and quantified by Gas Chromatographic/Flame Ionization Detection (GC/FID) analysis and confirmed by Gas Chromatographic/Mass Spectrometry (GC/MS). GC/MS analysis of one particularly complex sample collected assisted in providing identification and retention times for 17 sulfur type VOCs including dimethyl sulfide, dimethyl disulfide, and dimethyl trisulfide as well as many other VOCs. Carbonyl sulfide and carbon disulfide were positively identified by GC/MS analysis. Highest VOC concentration levels measured at each of the facilities were near the hog barn ventilation fans. Total measured VOCs at the hog barns were typically dominated by oxygenated hydrocarbons, i.e., ethanol, methanol, acetaldehyde, and acetone. These compounds, in addition to other oxygenated VOCs, represented ~37-73% of net total measured VOCs emitted from the hog barns at the various sites. Dimethyl sulfide and dimethyl disulfide, recognized as malodorous compounds, were determined to have higher concentration levels at the barns than the background at most farms sampled.