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NEWS RELEASE

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Straw Cover Trims Emissions of Specific Gases from Slurry

The mechanisms of emission reduction from straw cover are investigated in a recent study in the July-August issue of Journal of Environmental Quality.

MADISON, WI, AUGUST 24, 2009 -- Odor complaints related to animal production have increased during the past decade. Swine slurry stored in open storages is a source of airborne contaminants, including ammonia and odorous compounds. A customary practice for ammonia and odor control consists of covering the surface of the slurry with floating materials, such as straw. In general terms, straw covers reduce odorant emissions from slurry storages. However, little is known about which specific gases and odorant emissions are reduced by the straw covers. Besides, it has not been determined whether the emission reduction is mainly the result of physical, chemical, or biological processes.

The microbial population growing in the straw cover may convert the gases emitted from the slurry (including odorous compounds) into biomass, nonodorous compounds, carbon dioxide, and water. Unlike the physical barrier effect, the biofiltration effect is not immediate, as the development of a microbial population takes time, and so its impact is expected to be associated with the age of the cover.

A scientist at the University of Southern Denmark investigated how age, moisture content, and microbiological development of the straw cover affect the concentration of odor in the air above stored slurry and the emission of 19 specific odorous gases from slurry. The study, funded by the Danish Ministry of Food, Agriculture and Fisheries, was carried out at Research Center Bygholm (Denmark). The results of the study were published in the July-August issue of the *Journal of Environmental Quality*.

The experimental setup consisted of 15 dynamic flux chambers in which the slurry was stored during a nine-week period. A fixed amount of chopped straw (with different moisture contents) covered twelve of the slurry samples, while the other chambers contained uncovered slurry. Measurements of concentrations of odor and volatile organic compounds and slurry characterizations were performed at the beginning and at the end of the experiment. Concentrations of NH₃ and H₂S in the headspace air were measured six times in the course of the experiment.

The results of this study support the concept that the main mechanism for odor and odorant emission reduction in straw covered slurry is associated with the cover acting as a physical barrier. However, the reduction in emission of four specific gases (NH₃, dimethylsulfide, *p*-cresol, and benzylalcohol) appears to be also caused by the straw cover acting as a biofilter, as the microbial mechanism was responsible for about 50, 100, 50, and 75% of the reduction on the emissions of these gases, respectively, from straw-covered slurry. The moisture content of the straw cover neither affected emissions of odor nor odorants.

Victoria Blanes-Vidal, who conducted the study, stated: "Discovering that the mechanism for odor reduction is gas-dependent is a very interesting finding. Knowing whether the emission of a gas is reduced by the cover acting as a physical barrier or by the cover acting as a biofilter can contribute to develop cost-effective strategies for controlling the emission of specific target gases from slurry storages."

The full article is available for no charge for 30 days following the date of this summary. View the abstract at <http://jeq.scijournals.org/cgi/content/abstract/38/4/1518>.

The *Journal of Environmental Quality*, <http://jeq.scijournals.org> is a peer-reviewed, international journal of environmental quality in natural and agricultural ecosystems published six times a year by the American Society of Agronomy (ASA), Crop Science Society of America (CSSA), and the Soil Science Society of America (SSSA). The *Journal of Environmental Quality* covers various aspects of anthropogenic impacts on the environment, including terrestrial, atmospheric, and aquatic systems.

The *Soil Science Society of America (SSSA)* is a progressive, international scientific society that fosters the transfer of knowledge and practices to sustain global soils. Based in Madison, WI, and founded in 1936, SSSA is the professional home for 6,000+ members dedicated to advancing the field of soil science. It provides information about soils in relation to crop production, environmental quality, ecosystem sustainability, bioremediation, waste management, recycling, and wise land use.

SSSA supports its members by providing quality research-based publications, educational programs, certifications, and science policy initiatives via a Washington, DC, office. For more information, visit www.soils.org.

SSSA is the founding sponsor of an approximately 5,000-square foot exhibition, *Dig It! The Secrets of Soil*, which opened July 19, 2008 at the Smithsonian's National Museum of Natural History in Washington, DC.