UNC
GILLINGS SCHOOL OF
GLOBAL PUBLIC HEALTH

Gillings Innovation Labs

Removing Nitrogen, Recovering Energy from Hog Waste

Managing swine waste is crucial for protecting air and water in NC

Environmental and Health Concerns Loom Large in Hog Farming

North Carolina is the country's second-largest hog-producing state. Reducing the environmental and health related risks stemming from hog waste management and disposal is one of the state's most pressing public health problems. Effectively managing and disposing of hog waste could translate into hundreds of millions of dollars in health benefits for our state alone. Therefore, exploring the conversion of hog waste to energy while also reducing air and water pollution is urgent and crucial for North Carolina.

Converting a Lose-Lose to a Win-Win

- ***Current Methods Present Many Risks***

  Typically, managing hog waste in North Carolina involves storing the waste in uncovered lagoons, then periodically spraying lagoon liquid onto crop fields. This process releases ammonia into the atmosphere and overloads the soil and surface waters with nitrogen. Ammonia in the air not only has an unpleasant odor, but this gas contributes to the formation of fine particles in the atmosphere, causing respiratory illnesses such as asthma. Current practices for managing hog waste also lead to greenhouse gas emissions.

- ***From Health Concern to Energy Source***

  This Innovation Lab, operating on-site at a swine farm in Harnett County, NC, is investigating the technical and economic feasibility of coupling existing technologies for methane production with a new approach to nitrogen removal from swine waste. The new approach will increase the organic matter available for conversion to methane, while significantly reducing air and land pollutants. This innovative, integrated system for managing hog waste will greatly reduce both the release of ammonia to the atmosphere and nitrogen to land and surface waters.

Leadership

Michael Aitken, PhD, professor and Chair, UNC's department of environmental sciences and engineering, leads this collaborative effort, which includes experts in environmental policy and engineering design. InVentures Technologies, Inc., is loaning equipment for investigating a high-efficiency device to transfer oxygen to the waste for the ammonia conversion process.

IMPACT!
Clean Air, Improved Health

Reducing the nitrogen pollution and ammonia from hog waste in eastern North Carolina can critically improve the health and quality of life for residents who live near the farms as well as lead to a regional reduction in illnesses associated with air and water pollution.

GOAL

To improve the public health and environment of eastern NC by developing methods for reducing air and water pollution from hog waste, while harnessing methane from the wastes as an energy source.

PARTNERS

UNC Department of Environmental Sciences and Engineering, Environmental Credit Corp, Environmental Defense Fund, inVentures Technologies Inc., North Carolina Cooperative Extension Service at NC State University, and Butler Farm, Lillington, NC