

ENVIRONMENT

Title: Manipulation of Swine Diets to Reduce Odors and Harmful Gaseous Emissions from Manure –
NPB #97-1791

Investigator: G.L. Cromwell^a,

Institution: University of Kentucky

Co-Investigators: L.W. Turner^b, J.L. Taraba^b, R.S. Gates^b, M.D. Lindemann^a, S.L. Traylor^a, W.A. Dozier^a,
and H.J. Monegue^a

Date Submitted: October 1, 1998

1. Abstract

Four experiments were conducted to assess the effects of feeding low protein diets with supplemental amino acids (lysine, threonine, and tryptophan) and the addition of various dietary additives on the emission of volatile gasses from swine manure in simulated anaerobic manure pits. Gasses monitored were ammonia (NH₃), hydrogen sulfide (H₂S), methane (CH₄) and carbon dioxide (CO₂). Reducing the dietary protein level from 16 to 10% resulted in a linear reduction ($P < .01$) in NH₃ emissions from the manure. Also, manure pH was linearly ($P < .01$) reduced as dietary protein was reduced. There was a strong relationship between NH₃ emission and pH of the manure, with the lower pH resulting in less NH₃ emissions. The H₂S level tended to be lower with reduced dietary protein level, but CH₄ and CO₂ emissions did not follow any consistent pattern. The addition of zeolite (clinoptilolite), yucca extract, a modified carbohydrate (inulin), or a microbial product to an 18% protein diet reduced NH₃ emissions by 9, 15, 29, and 38%, respectively, and reduced H₂S emissions by 7, 11, 6, and 11%, respectively. The reduction in NH₃ from the microbial product was significant ($P < .10$). In comparison, a 4 percentage point reduction in dietary protein reduced NH₃ and H₂S emissions by 29 and 2%, respectively. Volatile fatty acid concentrations in the manure were not consistently affected by the additives. The results indicate that NH₃ and possibly H₂S emissions from swine manure can be reduced by lowering the dietary protein and supplementing with amino acids or by the addition of certain additives to the diet.

These research results were submitted in fulfillment of checkoff funded research projects. This report is published directly as submitted by the project's principal investigator. This report has not been peer reviewed

For more information contact:

National Pork Board, P.O. Box 9114, Des Moines, Iowa USA

800-456-7675, **Fax:** 515-223-2646, **E-Mail:** porkboard@porkboard.org, **Web:** <http://www.porkboard.org/>