

# *Reduction of Odor Gases from Cattle Manure with Chemical Additives*

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In order to reduce odor emitted from livestock manure, the microbial populations responsible for producing the odorous fermentation end products must be controlled. Odorous compounds are produced from an incomplete fermentation of the organic substrates in manure. Even under optimum conditions, complete fermentation of manure produces the greenhouse gases--methane and carbon dioxide. The environmental conditions that livestock manures are exposed to are unpredictable, and manure-handling systems vary greatly. Thus, microbial manure fermentation is difficult to predict and usually results in a variety of odorous and greenhouse-gas emissions. Therefore, the fermentation should be inhibited before the odorous gases are produced. The objectives of our studies were to evaluate a variety of naturally produced chemicals, which inhibit the microbial fermentation of stored manure. Duplicate one-liter stoppered flasks with a 500-milliliter working volume were used in a series of experiments with beef cattle manure (urine and feces) to evaluate chemicals that reduced total gas and volatile fatty-acid production. Over 20 antimicrobial chemicals were evaluated separately and in combination. A combination of a cationic agent, halogenic carboxylic acid, and a plant essential oil reduced the volatile fatty acids and gas volume after 27 days, 50% and 80%, respectively, when compared with controls. Further studies are needed to determine which volatile organic compounds are reduced. We conclude that various naturally produced additives can be added to manure, which will reduce odorous and greenhouse gases, conserve nutrients in manure that are valuable as plant fertilizer, and potentially reduce pathogenic microorganisms.

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