



Effect of envelope material on biosecurity during emergency bovine mortality composting



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HIGHLIGHTS

- ▶ Attainment of pathogen killing time/temp criteria was field tested.
- ▶ Temperatures in silage/straw-manure/cornstalk envelopes were 53/47/34 °C respectively.
- ▶ USEPA criteria were achieved in 89%, 67%, and 22% of silage/straw-manure/cornstalk tests.
- ▶ In cold seasons AE & NDV viruses survived <14 days in silage, >49 days in other materials.
- ▶ % Moisture, gas permeability, biodegradability are key performance indicators.

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ABSTRACT

The biosecurity of composting as an emergency disposal method for cattle mortalities caused by disease was evaluated by conducting full-scale field trials begun during three different seasons and using three different envelope materials. Process biosecurity was significantly affected by the envelope material used to construct the composting matrix. Internal temperatures met USEPA Class A time/temperature criteria for pathogen reduction in 89%, 67%, and 22%, respectively of seasonal test units constructed with corn silage, straw/manure, or ground cornstalks. In trials begun in the winter, survival times of vaccine strains of avian encephalomyelitis and Newcastle disease virus were noticeably shorter in silage test units than in the other two materials, but during summer/spring trials survival times in ground cornstalk and straw/manure test units were similar to those in test units constructed with silage.

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1. Introduction

As poultry and livestock production operations around the world have become larger and concentrated in regions with favorable feed supplies and climate, the potential for catastrophic animal losses – and the need for rapid, bio-secure, and environmentally sound emergency disposal methods – have increased. Examples in North America during the past decade include: avian influenza outbreaks (Virginia, 2002; Maryland and

Delaware, 2004; Alberta, 2004); hurricane-related losses in 2005 (Katrina and Rita); cattle losses caused by rangeland wildfires in North Texas (2006); widespread dairy cattle deaths caused by prolonged heat stress in California (2006); feeder cattle losses caused by blizzards in Kansas and Eastern Colorado (2007); and swine losses caused by severe flooding in Iowa (2008).

Inadequate surge capacity at rendering plants and local landfills – as well as high transportation costs and biosecurity concerns associated with moving large quantities of livestock mortalities long distances – has led to increased use of on-farm emergency disposal alternatives that have potential to cause significant environmental harm. During the 2001 Foot-and-Mouth disease (FMD) outbreak in Great Britain, for example, open-pyre carcass incineration created such serious air pollution that the government quickly halted its use (Scudamore et al., 2002). Burial is also coming under increased scrutiny by environmental agencies. Agency review of geographic information system data bases in Iowa – a state ranked #1, #7, and #1 in swine, cattle, and egg production respectively in the U.S. – showed that 30–40% of the state is characterized by

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