

Sterilization and Disposal of Agricultural Quarantine Waste

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Abstract

Approximately 150 million people and almost \$40 billion worth of agricultural commodities go through U.S. international ports annually. Ports seize animal and plant products potentially contaminated with high risk diseases that then must be decontaminated before entering the waste stream. Currently, there are only 3 methods of decontamination accepted by the Animal Plant and Health Inspection Service at U.S. ports and borders including incineration, high temperature cooking, and discharge of ground waste as sewage. In this study we assess the efficacy of a relatively new decontamination technology, alkaline digestion, to mitigate infectious agents. Transmissible Spongiform Encephalopathies (TSEs), a member of the protein misfolding diseases (ex: Alzheimer's and Parkinson's Diseases), were chosen as the infectious agent for this study because they rank as the hardest to kill microbe/pathogen, affect both human and animal species worldwide and are shed by infected hosts into the environment establishing highly infectious biota. Chronic wasting disease (CWD), an emerging TSE of cervid species (deer, elk, moose) in North America, has recently been spotlighted as a potential concern for European countries, and recapitulates human and animal TSE pathogenesis and shedding. For these reasons CWD is ideal for mitigation studies. We processed CWD positive and negative materials by alkaline digestion under standard temperature and pressure at time intervals of 2, 4, and 6 h. Samples were retrieved after digestion, were neutralized and inoculated intracerebrally into transgenic mice expressing the cervid protein to determine remaining prion infectivity. In addition, the samples (pre and post alkaline digestion) were tested for amplification competent prions by Protein Misfolding Cyclic Amplification (PMCA). Preliminary results suggest a lack of amplification competent prions in samples processed by alkaline digestion at 2, 4, and 6 h cycles as compared to nondigested samples.

Keywords:

other protein