Swine Hepatitis E Virus Contamination in Hog Operation Waste Streams-- An Emerging Infection?

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Swine Hepatitis E Virus (sHEV) is a recently discovered virus endemic to Midwest hog herds. The proposed zoonotic nature of Asian strains of human HEV (hHEV) and the recent discovery of a clade of human HEV in the United States, with approximately 98% DNA and protein sequence homologies to sHEV, suggest the hypothesis that swine herds are a potential animal reservoir for hHEV. In order to determine whether sHEV is a potential environmental contaminant, we tested water samples collected downstream from hog-farm operations for sHEV by nested reverse transcription polymerase chain reaction amplification (RT-PCR). Thirty-three samples including pit slurries, lagoon influents, lagoons, tile inlets, drainage ditches, tile outlets, a draining creek, and a monitoring well were tested by RT-PCR. Three samples (9%) were positive, including two from waste lagoons and one from a tile outlet draining a field to which manure had been applied. Each sample was collected on a separate farm, two in Iowa and one in Missouri. We next identified three sHEV RT-PCR positive hog-stool samples out of 20 tested from a single Iowa farm. All three positive stools came from 3-month-old hogs. sHEV was confirmed by partial sequencing of RT-PCR amplicon. In order to model the duration of sHEV in the environment, 1% and 10% suspensions of sHEV positive stool were stored in water and phosphate buffered saline, respectively, at -85°C, 4°C, and room temperature. sHEV was detectable by RT-PCR under all conditions at 2 weeks of storage, the longest period tested to date. Therefore, sHEV is present in downstream water waste from hog-farming operations. sHEV may persist in the environment for at least 2 weeks and possibly longer.

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