

Investigation of the Chemical and Microbial Constituents of Ground and Surface Water Proximal to Large-Scale Swine Operations

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Continued expansion and intensification of large-scale swine operations in the United States have brought about some important environmental, agricultural, and public-health issues. Waste-management practices for these operations commonly utilize open earthen lagoons, ponds, or slurry tanks for the temporary storage of manure in a liquefied form, which is subsequently applied as fertilizer on agricultural fields. This practice, under certain conditions, may contaminate the ground and surface water in the surrounding area. Research on the direct and indirect human-health effects of this contamination is very limited. We conducted a pilot investigation on the chemical and microbial constituents of ground and surface water proximal to large-scale swine operations in the State of Iowa. We measured potential chemical (pesticides, antibiotics, heavy metals, minerals, and nutrients) and microbial (*Escherichia coli*, *Salmonella sp.*, *Enterococcus sp.*, *Yersinia sp.*, *Campylobacter sp.*, *Cryptosporidium parvum*) contaminants that may be hazardous to human health. The study accomplished its primary goal of obtaining a broad profile of the chemical and microbial constituents of both ground and surface water proximal to large-scale swine operations. We identified chemical pollutants and zoonotic pathogens in the environment on and proximal to these operations. However, the sample-collection sites were not in locations that could pose a direct threat to human health. More research is needed to accurately determine the level of risk, pathways of exposure, and critical control points to avoid any potential exposure; follow-up investigations are being considered in the near future.

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