
EXAMINING THE CORRELATION BETWEEN COLIFORM BACTERIA AND HUMAN WASTEWATER IN HOME WELL WATER

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Nearly 15% of the U.S. population relies on home wells for drinking water, and approximately 34% of U.S. wells test positive for coliform bacteria. However, the presence of coliform bacteria alone does not confirm the presence of fecal matter, leaving the well users

uncertain of their health risk and which mitigation measures to take. Therefore, understanding the correlation between human waste and the presence of coliform bacteria is vital to public health. A significant correlation would inform well owners and public health practitioners that mitigation must include addressing home septic system(s) (the well owner's system as well as neighbors' upgradient systems). The goal of this project is to analyze rural residential well water on the Crow Reservation to determine the degree of correlation between coliform presence, E coli presence and markers of human wastewater. The three primary analytes we are looking for are caffeine, cotinine and urobilin. All three chemicals are biomarkers of human waste. The methodology we are using to identify and quantify analytes within our water samples is solid phase extraction to concentrate the unknowns for further analysis using Gas Chromatography Mass Spectrometry. Subsequent analysis with colleagues will determine whether there are any significant correlations between the biomarkers of human waste and (1) the presence of coliform bacteria, (2) the presence of E. coli bacteria and/or (3) the absence of either coliform or E. coli. I will present my results to team members at a monthly meeting of the Crow Environmental Health Steering Committee, whereupon my colleagues on the Crow Reservation will use the data collected to inform and work with home well owners to properly mitigate home well contamination. After the completion of this project my colleagues and I plan on presenting this project at an additional conference and publishing in a peer review journal.