

Centennial Honors College
Thomas E. Helm Undergraduate Research Day 2024

ABSTRACT

Major: Biology

Poster

Faculty Mentor(s): Scott Holt

Toxic Bacterial Clostridioides in America's Greatest River

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Clostridioides difficile is a Gram-positive, spore-forming anaerobic bacterium responsible for various gastrointestinal diseases in humans and animals. It is the most common cause of healthcare-associated infectious diarrhea and it is responsible for substantial morbidity and healthcare costs in the United States each year. However, its non-clinical geographical distribution varies, with reports of *C. difficile* found in environmental samples such as soil, sand, and mud in some regions. Unfortunately, limited information exists about its prevalence in the environment, so by identifying the possible reservoirs we can add to the pool of research in avoiding its contamination and transmission.

We hypothesize that the Mississippi River is a reservoir for toxic strains of *Clostridioides*. Twenty Mississippi River water samples will be filtered through a bacteria-trapping membrane and incubated in Banana Broth for 24-48 hours. A positive sample of *C. difficile* is indicated by yellow color formation. Positive samples will be plated on a special CCFA agar plate and placed in anaerobic conditions for 24-48 hours. The CCFA will then be observed for *C. difficile* colonies. If present, an isolation streak on CCFA agar will be prepared and incubated to confirm purity. The isolated CCFA culture will be examined for diagnostic features typical of *C. difficile*: Gram's reaction stain, endospore stain, strong odor, colony fluorescence with UV light, and a positive enzyme proline aminopeptidase test. If *C. difficile* is detected after the procedures outlined, that is a clear indication that America's greatest River contains pathogenic *Clostridioides difficile*.