

## Competitive Survival of *Escherichia coli*, *Vibrio cholerae*, *Salmonella typhimurium* and *Shigella dysenteriae* in Riverbed Sediments

Abia AL  
Ubomba-Jaswa, Eunice  
Momba MN

### ABSTRACT:

Studies on the survival of bacterial enteric pathogens in riverbed sediments have mostly focused on individual organisms. Reports on the competitive survival of these pathogens in riverbed sediments under the same experimental setup are limited. We investigated the survival of *Escherichia coli*, *Salmonella enterica* ser. Typhimurium, *Vibrio cholerae* and *Shigella dysenteriae* in riverbed sediments of the Apies River. Experiments were performed in flow chambers containing three sediment types and connected to aquarium pumps immersed in river water to maintain continuous water circulation. Each chamber was inoculated with  $\sim 10^7$  CFU/mL (final concentration) of each microorganism and kept at 4, 20 and 30 °C. Chambers were sampled on days 0, 1, 2, 7, 14 and 28. At 4 °C, only *E. coli* and *S. typhimurium* survived throughout the 28 experimental days. *V. cholerae* had the shortest survival time at this temperature and was not detected in any of the sediment chambers 24 h after inoculation. *S. dysenteriae* only survived until day 7. At an increased temperature of 20 °C, only *S. dysenteriae* was not detected on day 28 of the experiment. At 30 °C, *V. cholerae* and *Salmonella* survived longer (28 days) than *E. coli* (14 days) and *S. dysenteriae* (4 days). *Vibrio cholerae* was shown to have the highest T<sub>90</sub> values (32 days) in all sediment types at 20 and 30 °C. We conclude that the sediments of the Apies River present a favourable environment for the survival of indicator and pathogenic bacteria depending on the prevailing temperature.