

# Water Microbiology & Novel Technologies

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## Determining the antimicrobial resistance profiles of diarrheagenic *Escherichia coli* strains from rainwater harvesting tanks in Eastern Cape, South Africa

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Although, rainwater harvesting is practiced routinely in South Africa there is currently little research on monitoring that assesses the microbial and chemical quality of harvested rainwater, especially in rural and peri-urban areas. Furthermore, guidelines designed specifically to address the quality of harvested rainwater do not currently exist. A study was conducted in the Eastern Cape, South Africa, where harvested rainwater is commonly used for drinking and other household use to determine the possible microbial exposure of users to diarrheagenic and antimicrobial resistant *E. coli* strains. The need of this study is also in light of increasing evidence that shows the proliferation of multiple antibiotic resistance organisms and their associated negative health impacts. Rainwater samples were collected once a week from 11 tanks located in various areas in the Eastern Cape during the three (July -September) month winter period of 2016. Physiochemical parameters were analysed and the Colilert®18/Quanti-Tray® 2000 method was used to isolate and enumerate *E. coli*. Antimicrobial resistance profiles of 100 *E. coli* strains to 12 commonly used antibiotics were determined using the disc diffusion method. Standard values provided by the Clinical and Laboratory Standards Institute were used to classify (sensitivity or resistance) the zones of inhibition measured. DNA extraction from purified *E. coli* isolates followed by RT-PCR was used to identify diarrheagenic *E. coli* virulence genes. Results revealed the presence of *E. coli* strains carrying one or more DEC virulence genes (*eaeA*, *stx1*, *stx2*, *ipaH*, *eagg*, *st1a* and *st1b*) as well as the presence of *E. coli* strains exhibiting multiple resistances to tested antibiotics. The implications of these preliminary results are of great concern, as standard antibiotic treatments in response to a waterborne disease outbreak due to diarrheagenic *E. coli* is likely to be ineffective and as a result *E. coli* infections will persist and waterborne disease will spread.

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