

## **Induction of Shiga Toxins in *Escherichia coli* O157: H7 Isolated from Groundwater in the North West Province, South Africa Intended for Human Consumption Using Ampicillin and Tetracycline**

Daphney P. Shandukani<sup>1</sup>, Namathamsaqua P. Sithebe<sup>1</sup> and Collins N. Ateba<sup>1,2\*</sup>

<sup>1</sup>*Department of Biological Sciences, North West University, Mafikeng Campus, Private Bag X 2046, Mmabatho 2735, South Africa*

<sup>2</sup>*Food Security and Safety Niche Area, Faculty of Agriculture, Science and Technology, North-West University, Mmabatho, Mafikeng 2735, South Africa*

**KEYWORDS** *E. coli* O157:H7. Shiga-Toxin. Multiple Antibiotic Resistant (MAR). Ampicillin. Tetracycline. ELISA

**ABSTRACT** A total of 67 isolates from groundwater were used to determine their susceptibilities against 7 antibiotics and the Multiple Antibiotic Resistance (MAR) patterns were compiled. Most isolates were resistant to amocycillin, ampicillin, chloramphenicol and penicillin G. MAR phenotype A-AP-K-NE-OT-C-PG was dominant among isolates from Rustenburg. However, in Carletonville and Delareyville the phenotypes A-AP-C-PG and A-AP-OT-PG were obtained at 87.5 percent and eighty percent, respectively. The isolates were screened for the presence of shiga toxin genes by PCR analysis and none were positive. Moreover, when the *E. coli* O157:H7 isolates were subjected to antibiotic treatment for the induction of shiga toxins using both ampicillin and tetracycline in broth cultures, no shiga toxins were detected with an ELISA assay after 24 hours of incubation. However, after 72 hours of treatment with these antibiotics shiga toxins were detected in a large proportion (89.6%) of *E. coli* O157:H7 isolates with ampicillin when compared to tetracycline in which only one of the isolates produced shiga toxins. Tetracycline and ampicillin are readily available over the counter and are most often used in animal medicine. The consumption of these antibiotics when suffering from *E. coli* O157:H7 infections may worsen the complications.